Comments and Suggestions concerning the draft IWV GSP Figures prepared by Stetson Engineers and available on 11/4/2019

From Don Decker 11/8/19

Figures for Section 1 no comment

Figures for Section 2
2-1 Why aren't the other sub basins shown? El Paso?
2-2 Adjacent and Neighboring?? Strange wording
2-3 "China Lake Basin" seems to be moving around?
2-4 Showing the Little Dixie Wash as a blue dashed line and then identifying it as a stream or creek is totally misleading. This needs to be corrected.
2-5 The actual municipal wells are mislocated/mislabeled. Have you included mutual wells in municipal?
2-6 This map shows the IWV WD owning property on N Brown Rd. This property was transferred in a trade with Mojave Pistachios a few years ago.
2-7 no comment
2-8 no comment
2-9 colors are hard to distinguish on map in small areas
2-10 no comment
2-11 no comment
2-12 Urban area that is half way between Inyokern and Ridgecrest (China Lake Acres) is shown extending 1 ½ miles too far south.
2-13 no comment
2-14 there is no disposal site west of Hwy 14.
2-15 no comment
2-16 no comment

Figures for Section 3
3-01 no comment
3-02 no comment
3-03 Sierra frontal fault is show as dipping too steeply- it is more like 45deg.
3-04a Sierra frontal fault not shown
3-04b no comment
3-05a does not show the laucustrine clays extending westward much beyond the playa
3-05b no comment
3-06 no comment
3-07 no comment
3-08 map shows stream gages at NAF and Trona?? Does not show the EKCRCD CIMIS station at the China Lake golf course
3-09 no comment
3-10 what do we learn from this spotty record?
3-11 This map is obviously schematic. The Sierra Canyon fans extend out further than shown.

3-12 This is a very useful map with the well water level overlays
3-13 Another very useful map. The largest consistent changes are increase in TDS and are in the N Brown Rd area as expected.
3-14 no comment
3-15 no comment
3-16 No one has mapped the Sierra Canyons?
3-17 Does not show the Sierra frontal fault – all of the maps that show the major Basin faults should include the SFF
3-18 values consistent with other work
3-19 nice plot
3-20 no comment
3-21 very important but hard to understand without some work
3-22 very important modeling results

Figures for Section 4

4-1 change or remove Figure 2 from map
4-2 need to add BoR 10
4-3 need to add BoR 10
4-4 no comment
4-5a no comment
4-5b no comment
4-5c no comment
4-5d no comment
4-5e no comment
4-5f no comment
4-5g no comment
4-5h no comment
4-5i no comment
4-5j no comment
4-6a to 4-6f no comment

Figures for Section 5

5-1 ok as a conceptual route but other possibly better routes exist
5-2 why not use the existing IWC tap? Much shorter pipeline.
5-3 map shows a very expensive purple line project. My suggestion of vigorously pursuing a MOA project with SVM would offer many advantages over this plan
5-4 a ridiculously expensive addition to the project in 5-3
5-4 an even more expensive and unjustifiable project to inject such a small amount of water. Injection well is poorly located technically.

Figures for Section 6
6-1 very little detail at this level

<u>Comments and Suggestions concerning the draft IWV GSP Sections prepared by Stetson Engineers and available on 11/4/2019</u>

From Don Decker 11/8/19

<u>Preliminary comments and suggestions</u>:

1) The Plan as presented is technically functional but not very realistic. The time line available is very short and the projects are complex. There is little specific recognition of this major issue in the draft Plan. For example, the delivery of additional treated waste water for irrigation use is scheduled for 2025. Simply impossible. On close examination there are many more very concerning timeline conflicts that unless resolved will actually effectively destroy the good intentions of the Plan. Extracting significant additional groundwater (GW) and reducing the storage accordingly is simply continuing the already ominous overdraft even if it part of the Plan.

2) The budget estimates are very preliminary and do not have enough detail to make accurate choices. A large amount of time has gone into the Plan creation and some sections are very well researched and written. However, there is a long way yet to go in building out the Implementation Plan and its specific details. The Pumping Plan as described is essentially the Domestic Well Owners Association market force plan offered January 2019, 9 months ago. At the time, the Well Owners Plan was declared to have serious legal issues. So now it has been largely adopted. What has happened? One thing that is obvious- a lot of time has been effectively wasted.

3) Many areas of the draft Plan are detail weak to the point that serious questions still remain as to the actual Plan. For example, an agricultural water rights buy-out is being called a "fallowing" plan which would imply that at some point the farm activity would resume. The "fallowing" would be implemented based on "market price" of the land which would imply a property buy-out. Which is it?

4) There still remains as an unknown a major area of pumping fees, who pays and how much and how these fees are justified in a real budget.

5) The market price buy-out details are completely absent so it is not possible for an affected property owner to reach an understanding to guide his decision. According to the draft Plan, the property owner's decision to enter into a buy- out will be made not later than August 2020, further compounding the confusing issues here.

6) Stetson Engineers has come a long way in understanding the historic and continuing issues underlying the serious Basin overdraft. However, they are caught up indirectly in the same GA Board conflict of interest disaster that results from the self-same agencies that stood back or even abetted the ongoing GW shortfall who are now being charged by SGMA to execute its repair.

7) The GSP as written takes no account of the political and technical struggles that have occurred over decades between the City and the Navy over the waste water plant. The suggestions to move concentrated pumping out of the SW echoes battles fought with the WD over this very same issue 20 years ago.

8) The inputs from the TAC are to be seen in many aspects of the Plan as a result of the tight coupling between the TAC and Stetson Engineers. However, much of the PAC inputs have been effectively ignored including their Engagement Plan. The critical step of getting the public behind this GSA effort has largely failed.

9) The draft GSP is complete enough that it will likely be accepted by the State. However, the Plan as it is written is much lighter in detail than most of the public expected. Filling out the functional details in a realistic Implementation Plan to the satisfaction of many pumpers will be nearly impossible. The threat of litigation from the major pumpers remains unchanged.

<u>Section 1, Introduction</u>

1) Although this is Section 1 according to the Title page, the pages starting at 3 and beyond misidentify it as Section 2. This error must be fixed.
2) As a matter of customary usage, the word “basin” which appears throughout the entire document dozens of places starting at the bottom of p 3 should be capitalized when it is referring to the IWV Basin. This rule has been followed in other situations, e.g., “City” where a capital C is used as a shorter reference to City of Ridgecrest.
3) The first sentence of the third paragraph of 1.1 on p 3 uses the word “forced”. This is an incorrect assertion- no producers have been forced to pump groundwater. The pumpers have simply elected to continue pumping and in so doing ignoring the declining water levels and its effects on themselves and their neighbors.
4) The last sentence of the first paragraph on p 4 implies by omission that public health and safety is a paramount consideration by failing to describe de minimis rights, the Navy FRWR and other early water pumper’s rights. This omission has occurred partly from trying to give a short and simple consideration. However, this omission leaves a very inaccurate impression to the reader at this early point.
5) The sustainability goal as stated in the last paragraph on p 4 is concise, accurate and well written.
6) The last paragraph on p 5 uses the metric unit “hectare”. There is no need to offer metric units in a US engineering document. I don’t think this usage is present anywhere else in the draft.
7) This same paragraph uses NAWS as the descriptor for the Navy facilities at China Lake and goes on to describe the support for the Navy’s research, development, acquisition and more on the next page. The Navy command at China Lake that conducts these programs with over 9,600 positions is NAWCWD not NAWS.
8) At the end of the second paragraph on p 6, the word “federal” should be capitalized and elsewhere in the document where the use of the word has a similar context.
9) In the last line of the text on p 8 it is stated the “the WRM *presents* all technical information and reports to the IWVGA. This is not correct. The TAC and PAC largely through chairmen present technical advice at every GA Board meeting. The WRM does provide a level of prior evaluation of this information.
10) The bulletized summary chart on p 9 has two entries which are overly broad and actually incorrect. The first bullet claims that the powers of the GA include the collection and monitoring of all data related to development, adoption and so on. In fact, virtually all of the data in the IWV hydrology data base has been collected and analyzed by professional scientists and engineers working for other agencies going back in time before SGMA was conceived.
11) In bullet item 5, the words “state” and “federal” should be capitalized.
12) In bullet item 6 an overly broad and simplistic claim is made as to GA powers. The claim as written does not recognize the legal powers of the associate Board members, Inyo and SB Counties and the Navy. It also does not recognize the California water rights of the Basin pumpers. The claims are based in SGMA language which is clearly in conflict with existing California and Federal water right law.

13) In the first sentence of the second paragraph on p 10, Tim Carroll's name is spelled out as the Inyokern CSD representative. No other PAC representative is mentioned. This inconsistency should be repaired by dropping his name.

14) The description of the TAC on p 11, no mention is made of voting and non-voting members as are described in the bylaws. This can be described as a minor discrepancy except that the TAC has and continues to vote on various issues as a way to understand the often disparate views of its members.

15) In the first sentence of the last paragraph on p 14, the words "Board or" should be added to the sentence "… to address the respective *Board or* Committee…." And the word "committee" should be capitalized.

<u>Section 2, Plan Area</u>

1) In the chart at the bottom of p 6, remove the "," and add a paren ")".

2) On page 7 reduce the font size in the chart so that all of the digits or letters are on the same line.

3) The last sentence on page 26 contains a statement that "due to a lack of communication among interested parties" is incorrect and very misleading. The Cooperative group was formed as a follow-on to the Technical Committee that guided the Bureau of Reclamation Project. Before that there was a Technical Committee that met regularly for decades that was the interface with the USGS. The Navy and the IWVWD were fully engaged in all of this activity and regular oral and written reports were offered to the public at fully announced IWVWD meetings. All of the USGS activity, the Bureau of Reclamation Study and the subsequent AB 303 study did not come out of a vacuum or exist in a vacuum. There was always an adversarial contingent that claimed that we did not need any additional studies "that we already knew all we needed to know about the IWV groundwater and where it came from". The ignorance and denial of this group existed as a result of their non participation not because the information was not being made available.

4) In the last sentence on p 27, there is a confused statement about the March and October KCWA water level measurements. March and October were selected to be before and after the peak pumping demands.

5) The last sentence on p 28 and first complete sentence at the top of p 29 are false and totally misleading. It is as a result of the lack of *real management* that the Basin finds itself now with 60 or more years of continuous overdraft. Invention of a positive spin on this leadership failure cannot reverse or improve our critical condition as embarrassing as it may be to the parties involved now. *Remove these sentences.*

6) In the bulletized chart on p 29, the first bullet uses the word "Identifies". The present SNMP contains a serious error in its identification of SN sources. There is no evidence except at a few locations that surface waters in the Basin can percolate to the existing groundwater due to the prevalence of very impermeable soils and alluvium. I suggest you modify "Identifies" with "Tentatively identifies". Presumably this error will be corrected in future submissions of the SNMP.

7) The summary of IWVWD Ordinance 103 on p 30 and 31 is correct. However, as a terrible example for the public to observe, the City is exempt from the provisions of this ordinance and fails to follow its own version as summarized on p 31. The continual waste of water by the City irrigation practices is an unacceptable breach of responsibility to the community. It will be hard to place a sentence in the GSP trying to justify this breach but this citizen is placing it here for the record.

8) In the first full paragraph on p 37 it is stated that the Tui chub is located in a GDE that is recognized in the "Natural Communities Commonly Associated with Groundwater dataset". The issue here is that the Tui chub present in Lark Seep are not natural or native to the seep but rather were transported and introduced into the seep by an individual who had no authorization or permits to carry out this action. These fish, through no fault of their own are trespassers. This condition has produced substantial confusion and expenditure of large amounts of money and precious water ever since.
9) On p 39 and following, unit 5.3.3, the description "shallow well" is used with no definition. The term is obviously subjective and is sometimes used in a derisive manner. Many of the existing shallower wells in the Basin are in fact over 400 ft in drilled depth. Compared to Basin wells in other areas, this depth would not be considered shallow. Wells that have been redrilled or deepened here are often over 500 ft. The cost of drilling and completing a well to these depths is the reason there is as much financial and other concern as there is. These "shallow" wells constitute 95% of the total wells in the Basin.
10) On p 40, 2'nd paragraph, we see that a well repair will only be considered for wells drilled after Feb 1, 2020. This means that the existing shallower well abuse that was brought on by the major pumpers including the IWVWD, SVM and the Navy and others over the decades of serious overdraft pumping is not being recognized and will only be addressed in legal action undertaken by the affected parties.
11) On p 40, A general comment: for the new wells that will come under this repair provision, the existing technical evaluation prepared by Stetson Engineers should be adequate. If the additional proposed extraction beyond the Basin sustainable yield actually happens, this well repair compensation element will be important to those recent well owners who can apply. *For the existing 800 + well owners who are already suffering some degree of damage it is a very disappointing change from an earlier version of the shallow well mitigation plan.*
12) On p 43 in the fifth bullet and the paragraph following, an error is made in not recognizing the special de minimis status that was recognized in SGMA. De minimis pumpers are not exempt from registration but are not required to meter, report or pay pumping fees. The fifth bullet and the sentence stating fee requirements must be repaired.
13) On p 46 and elsewhere, the word "well" should be reserved for use to mean "water well". In the title of unit 1.1.1.3 drop the word "well" and substitute "Efficiently".

Section 3, Basin Setting

1) Again, on p 5 and following, the word "basin" should be capitalized when referring to the IWV Basin.
2) In the first paragraph on p 6, no the Owens River did not simply flow through the IWV. At multiple times in the Pleistocene the OR filled the IWV to spillway depth and then the continued flow of the River resulted in an outflow to Searles Valley. SV in turn filled and spilled multiple times into Panamint Valley. A similar filling and then spilling into Death Valley was the final destination in Lake Manix. China Lake was fresh only during the times when the Owens River flow was great enough to fill CL to the point of spill over. The conifer forest aspect was very likely not as important to early man as the broad leaf forests that were near to China Lake on the Valley floor. All of the known early man sites are at the China Lake shore.
3) In page 6 and in the first 3 paragraphs on p 7, too much emphasis is made on early (pre 1900) minor water use by a small number of transient travelers. The first significant water use was associated with the moderate scale agriculture that was started by the development of the Inyo and Kern Land and

Farming Company headquartered in what would later be called Inyokern. Water for this farming was taken from the first drilled wells north of present Inyokern. The proper reference here is the paper by Lee published in 1913. *Lee identified the limited potable groundwater in the IWV Basin in this paper for the first time*. It is this paper that should be given the most space and summarized in 3.2 and a lot less on the historical exploration efforts as interesting as they may be. If the SPRR details are left intact the words "Jaw Bone" should be in capitals.

4) On p 9, the last sentence in footnote 7 should be modified to say "…model update for this GSP *as appropriate*"

5) On p 10, first paragraph first partial sentence, "Blue Max Peak" is not the highest elevation mountain in the IWV Basin watershed. It is Owens Peak by thousands of feet. In this same paragraph, the word "valley" should be capitalized when referring to the IWV.

6) On p 10 and beyond, the summary of IWV geology and hydrology as described in the literature is very well written and summarized.

7) In the first complete paragraph on p 10, the subflow from Rose Valley is mentioned for the first time. Even in recent times, Little lake Creek often reaches significantly down into the IWV. The subsurface flows from Rose Valley are a major component of the Basin recharge. As this author has pointed out repeatedly, Rose Valley should be included as part of the IWV Basin, not a separate entity, politics aside. This Basin should be able to manage all of the important areas involved in the Basin water balance.

8) Starting on p 10, unit 3.3.1 is very well constructed and written. In this unit on p11 it is again mentioned the unique aspect of subflow from Rose Valley that results in an apparent flow gradient in the mapped groundwater levels in the NW area of the Basin. This gradient is unique in this Basin.

9) At the end of the existing wording of the second bullet at the top of p 12, this author suggests the following addition: In the northwest area an unusually thick and extensive deposit of organic clay and silt of Pleistocene age occurs as a continuous unit (BR vol II Technical Report)

10) On p 12 in the first complete paragraph, *all* of the multi-level wells in the Basin today are BoR wells. Most of these wells are being used to support CASGEM reporting. CASGEM has not funded or participated in any well drilling or characterization.

11) On p 13, it is mentioned that the NRCS soil results are not available for the main non Navy areas of the IWV. This author has pointed out previously that in fact, extensive Valley soil sampling took place in the mid 1970's in the Valley. This author actually saw survey maps from this effort at a later time, but has no idea as to where this survey information might be located.

12) On p 13, first paragraph, first sentence, delete the words "not occupied by vegetation or development",

13) There is no mention in unit 3.3.2 of the pervasive presence of cemented soils (caliche) over the Basin that are impermeable to the point of greatly limiting surface water from reaching groundwater. This is occurring even in moderately disturbed alluvium of the canyon fans. This is a hallmark of an arid climate soil.

14) On page 22, first sentence of unit 3.3.4.2, the farming and well data that Lee reports from 1910 (not 1920) is the start of significant Basin GW extraction. Lee reports declines in water levels of 1 ft/yr in the area being pumped in his Report.

15) On p 27 bullet four, I suggest the word "specific" be added to the existing wording for clarity "… *a specific* saturated aquifer is a … ".

16) On p 27 add the word "*effect*ive" to the sentence "… that will increase the *effective* recharge to the …". When talking about recharge that has been augmented by supplemental water it would be clearer in all instances to use the term "effective recharge" or something similar.

16) In the water balance chart on p 28, a growth element is seen to result in a net loss of storage of 4080 ac-ft for 2070. I realize that Stetson Engineers has been given instructions by the GA Board to incorporate a growth element in the sustainability planning. I will point out that SGMA says to consider growth; this is totally different than incorporating growth. Until there is a demonstrated actual sustainable Basin condition there should be no additional growth except that which may be dictated by the Navy. A loss of 4,000 AFY is not a small effect as might be permissible under SGMA. This is not a conservative plan, 4,000 AFY is about 1/6 of the current out of control loss.

17) On p 31, in the first sentence of unit 3.4.4.1, this writer suggests replacement of "particles" by "components".

18) Also in 3.4.4.1, add the words "under some conditions" to the sentence "…These increased concentrations can then *under some conditions* be mobilized …" Thanks to Stetson Engineers for recognizing and adding the next two sentences in the draft text- they are very important.

19) On p 32, first sentence add the words "earlier times" to the expression in parentheses (caused by high evaporation rates *at earlier times*).

20) In the first whole paragraph on p 32, first sentence, delete "and degraded" – it is incorrect.

21) On p 34, last sentence change "lodge" to "restaurant"

22) On p 36, in the second complete paragraph after " City of Ridgecrest" add and "in the southwest".

23) On p 38, in the first complete paragraph, change the first sentence to read "The Water Resources Manager, staff *and TAC* reviewed existing …" .

24) On page 45, project no 2, recycled water, an assumption is made that recycled water would be available for use by 2025. This assumption is unrealistic. The present recycled water use is invisible in the model so this water will not make any difference in model prediction if it is actually not physically present. The artificial recharge quantity assumed is relatively small so again little change will exist if it is not present.

25) On page 46, a summary of the inputs into pumping scenario 6.2 are presented. This author has two comments: i) a yearly loss of storage of 4,000 ac-ft is not a minor loss and will definitely have a significant effect, ii) it is unrealistic to assume that agricultural pumping will continue unchanged through 2070 even as the price of the pumped water will increase dramatically. So this author's concern expressed in i) is cleared up. However, the pumping scenario does not provide an accurate basis for a GA cost analysis.

26) The assumptions made in unit 3.5.6 on p 47 are reasonable and likely the best that can be done.

27) On page 47, unit 3.6, first sentence change Cooperative Group to KCWA. If the second sentence is to be kept, remove "concerned citizens".

28) The description for Cooperative Group coordination in unit 3.6 is *greatly overblown*. The actual work was done by the agencies with real legal authority. The CG had no contracting power or supervisory function at all. The stream gages and weather stations were installed by the USGS and the BLM. The well water depth measurements were organized, planned and executed in modern times by KCWA and earlier by the USGS. The EKCRCD was directly responsible for many projects that the CG has been given credit for. I suggest that this write up describing the CG in unit 3.6 be cut back considerably.

29) On the top of p 48 is a list of instruments and facilities monitoring meteorological and other physical measurements critical to the monitoring of the Basin. The DWR CIMIS station installed at the golf course under EKCRCD sponsorship should be added.
30) Unit 3.1.1.1 describes a number of data gap areas that are being pursued including the El Paso sub Basin. Another area of even greater interest is not being given the attention it should be. The sub flow from Rose Valley in the extreme NW is the largest recharge component in the DRI flow model. The only well in the area is BoR 10 which appears to have been removed from the monitoring well network. *If this is correct it is a major mistake.*
31) Unit 3.1.1.2 in paragraph 2 sentence 3 indicates that a new stream gage is to be installed in Indian Wells Canyon. Why is the scarce Prop 1 money being wasted in this endeavor? IWC is a much dryer canyon than Sand or Grapevine and even in wet years the gage will see only very little water. *The money could be far better spent on a shallow seismic exploration near the mouth of the canyons and out onto the fans as I have recommended over and over. Another valuable asset would come from shallow reference wells drilled in the same areas.*
32) Unit 3.1.1.4 states that the evaporation at the playa is the largest Basin discharge. Is this correct? This author thinks the largest discharge today is actually at the phreatophyte zone west and north of NAF.

<u>Section 4, Sustainable Management Criteria</u>
1) On page 9, the second bullet describes the expanded recycled water project will be online in 2025- *this is unbelievably optimistic*. On the same page in bullet 4, change sentence to read "..water supply *to be available* no later than…)
2) On p10, bullet 1, the sentence uses the word "fallow" incorrectly. I think what is meant is really "discontinued". On the same page at bullet 4 remove the word "Additional"- the word is unnecessary and redundant.
3) On p 11 in the 2'nd bullet, "implemented by 2025" –overly optimistic. Same page in bullet 4, use of the word "fallow" is incorrect.
4) On p 12, 3'rd paragraph, remove the word "for" in the 5'th line.
5) On p 13, item 4.3.1.1 change sentence 3 to read "*Groundwater elevation data and associated* modeling results…"
6) On page 15, bullet 6, the word fallowing is again used incorrectly. Substitute "abandonment"
7) On p 16, bullet 6 again the incorrect use of the word fallowing. Suggest substitute "abandoning". Same page last paragraph suggest a sentence change to read "…due to poor water quality *as a result of natural effects*."
8) On p 17, again incorrect use of the word fallowing and remove "s" from "results" in the same sentence.
9) On p 18, unit 4.3.5, the content of the sentence "Critical information on the relationship …the GSP monitoring program" is incorrect. There is a direct relationship between groundwater levels and the health of GDE's. The only data gap here is lack of detailed monitoring of GDE health.
10) On p 20, unit 4.4.1.1 the word "stimulated" is incorrect. Replace with "simulated". In unit 4.4.1.2, suggest adding "directly" before the word "related in the first sentence.
11) On p21, unit 4.4.1.4, remove the word "and" between the words "impact "*and* "limits".

12) A comment related to unit 4.4.1.5, unfortunately the statement made in the unit is correct relative to the content in GP's. The authorities responsible for these documents have been unwilling to bring forth the resource or infrastructure limitations on growth that have been so obvious for so long.
Big changes are going to have to be made in the truthfulness of these documents as relates to water supplies and other essential resources.
13) On p 22, unit 4.4.1.7, there is an "equation" that needs to be properly formatted to get the entire expression onto one line.
14) On p 23, first sentence is garbled and needs to be reconstructed. It is important to emphasize the central role that *measured* groundwater levels plays in setting Minimum Thresholds.
15) On p 25, the chart of representative monitoring wells has not included BoR 10. This well provides critical water level data in the subflow region at the Little Lake gap. This recharge flow is estimated to be the largest single component in the Basin recharge. *This well was located where it is for a very important reason.*
16) On p 27, in unit 4.4.3.3, no mention is made of the subflow from Rose Valley. *This is a serious omission.*
17) On p29, Table 42 does not have a monitoring well in the Intermediate Well field area. Add BoR 4 to meet this requirement. Except for completeness, BoR 1 will add very little to purpose of this list of wells.
18) On p32, unit 4.5.1 add the words "not more than" between the words "is" and "213,474" in the last sentence of the first paragraph.
19) On p35, in unit 4.6.2, the Table omits BoR 10. For the same reason as was given in comment 15) above BoR 10 should without doubt be added to this Table.

<u>Section 5, Projects and Management Actions</u>

1) On p 9, unit 5.1.1.1, the second sentence implies that the only purpose for setting annual pumping allocations is to set fees! I submit this is a very poor way to describe the allocations. It has the effect of de emphasizing the real purpose of the pumping allocations which is to bring in the Basin into sustainability. On the same page reformat the first sentence of the second paragraph to get the reference superscript in the proper location.
2) On the same page the list of considerations for creating the pumping allocations omits de minimis pumping conditions which are defined in SGMA.
3) On p11, in the first paragraph the word "fallowing" is again used incorrectly. In the last paragraph it is stated that the IWVGA will allow for some *reasonable* overdraft of the IWVGB. There should be some additional clarification and indication that there will be some level of buy- in by the shallow well community. Otherwise, this is a business as usual approach to the Basin overdraft issue.
4) On p 11, line 5 in the last paragraph should actually read: "… 12,000afy plus any agricultural *and industrial* pumping …".
5) On p 13, in the last sentence of the first paragraph the word "fallowing" needs to be removed and replaced by a correct word. In the same sentence with the list of considered parties a number 6) needs to be added: *6) de minimis*
6) A comment for all pages involved. The superscript reference numbers need to be in a larger more readable font.

7) On p 14, the text in the last paragraph correctly identifies the de minimis pumper and the associated pumping conditions- good work
8) On p 15, the second paragraph does not identify the unique de minimis circumstance. The de minimis water rights for a given property were likely established at the time the original Homestead patent was granted. Most of the homestead activity in this Basin occurred in the 1910 to 1930 time frame.
9) On p 15, in the last paragraph the word fallow is again used incorrectly. *The $9M estimated cost for the buyout program seems way too small*. Since this program has not been adequately defined a more accurate estimate is perhaps not possible?
10) On p 16, in unit 5.2.1.4 and 5.2.1.5, a description of a pumping declaration requirement is made with no distinction for de minimis pumpers who by SGMA are not required to meter or report. In the last sentence of 5.2.1.5 a deadline for signing up to the "fallowing" program is given. Without a lot more detail no one is going to be able to form an accurate plan for their property under this program element.
11) On p 20, 2'nd line down, remove the "s" from "transfers" – a typo.
12) On p 25, unit 5.1.1 describes an optimized waste water treatment and distribution system for the IWVGB. This GSP section is seriously remiss in many aspects that appear to not be recognized. There are three substantially intertwined aspects to this problem; 1, the plant itself and 2, the ultimate disposal (use) of the waste water and 3, the political entanglement between the Navy, the City, the IWVWD and now the IWVGA. Under the present circumstances of a Basin wide water supply shortfall, all of the plant water output should be used effectively and not simply disposed.

1. <u>The plant</u> a) The present waste water disposal system has been patched together for decades under a MOA with the Navy since it is on Navy property. b) The City has been unable to renegotiate a new MOA with the Navy for a new larger capacity plant since it is clear to the Navy that the proposed designs more or less on the existing site would increase the already seriously objectionable pond leakage. The new design is not materially different than the original since it was conceived 30 years ago. c) This negotiation has been ongoing at some level for decades through many different City and Navy management cycles. The mistrust is now more or less impenetrable. d) This author will submit that the only way a new plant can be constructed is to build at a different location off of Navy land. e) The original disposal plant is on City property on S County Line Rd. There are multiple serious problems for this site including inadequate available area without condemnation of additional property and a land elevation that requires the majority of the input sewage water to be pumped to the location. *A new location substantially further north needs to be identified and pursued*. It has been discussed privately since the Navy removed and cleared out all of the early housing that a location at or near Satellite Lake would be ideal. The new plant should be designed to produce a high level secondary treated water that would be directly utilized. There would ideally be no evaporation pond loss at all.

2. **<u>The utilization of the plant output water</u>** a) Under the present Basin water supply shortfall condition the new plant represents an opportunity to solve two problems. Searles Valley Minerals (actually its predecessors) have approached the City multiple times in the past with requests for the water presently going to the ponds. Under the present GSP SVM will not have a permanent water allocation. Either the present location or the Satellite Lake locations are close to existing SVM pipeline easements and these easements and perhaps even pipelines could be readily accessed. No complicated expensive purple

pipelines out in the City are required. b) SVM would buy this treated water under an MOA and would be able to take all of the likely future quantity. c) Additional water would be sold to the Navy for the golf course and potentially for the Tui chub. d) The Tc presents yet another opportunity for water savings. As has been stated elsewhere by this author, the Tc is not native to Lark Seep and was introduced there in the 1970's by an individual without any authorization or permits at all – even before the endangered species act was passed. With legal effort, the Navy could negotiate the removal of the existing fish back to their natural habitat. Obviously a very substantial quantity of water could be saved here. A serious incentive to the Navy for moving ahead on the Tc removal action would come from the high expense of buying water for the fish if they were to stay in LS.

3. **The political entanglement between the Navy, the City, the IWVWD and the IWVGA** The City has struggled with the waste water issues for forty years and more. Compounding the problem, the City directed property tax derived waste water fee money into the General Fund until Prop 218 brought that to a halt. It is very clear the City lacks the technical and political strength to carry out this essential facility revitalization. It has been discussed publicly for some time that the waste water system responsibility should be taken over by the IWVWD. The legal steps to be taken may be complicated but could be the step required to actually move ahead on this critical project. The IWVGA has no staff and is incapable of taking on such a project. However, the GA could function as a facilitator in working through the political issues that are so apparent here. The GA would have a nice reward in so doing. SVM would have a stable water supply that would supply about 2/3 of their need with substantially reduced groundwater pumping.

13) The subprojects described on pages 26, 27 and 28 would be unnecessary and the 10's of miles of *very* expensive purple pipeline in the City will be avoided. No money would be wasted on an attempt to recharge what amounts to a very small volume of very expensive water to the aquifer. The permits and regulatory hurdles described in unit 5.3.1.14 will be partially avoided with the elimination of the purple pipe in the City.

14) The project costs summary on p 29 would be substantially changed with the adoption of the plan suggested. The Navy land at Satellite Lake could be deeded to the City or IWVWD in exchange for a quantity of treated waste water that would be supplied for irrigation of the golf course under a MOA that would extend for years with an element for renewal upon expiration. The project as described here is adequate to describe this new approach.

15) On p 43, unit 5.3.4.1, the use of the incorrect word "fallowing" again occurs. *In the second paragraph a description of abandoned field dust control fails to even mention what has repeatedly been shown to be the cheapest and best approach which is to revegitate the fields with native plant cover*. A small amount of water will be required initially to get the seeds germinated reliably and the plants to a size where they are strong enough to stand the wind. The existing irrigation systems should be left intact for this purpose. It took 20+ years for Neal Ranch to revegitate naturally starting from alfalfa stubble. A huge amount of sand and dust came off of the abandoned fields in the early years that could have been avoided if even a small amount of irrigation water had been applied. The ideas of berms, windbreaks, etc are expensive and involve moving lots of fragile soil around. In many aspects they are

counterproductive in a desert environment. The idea here is to do an effective dust control effort without making a major $19M project out of it.

16) On p 46, unit 5.1.1, Pumping Optimization, a discussion is made to move existing IWVWD pumping from the SW where it is having a significant negative effect from over pumping an area with limited recharge. Great idea. These WD SW wells were strongly opposed by this author and many others 20 years ago for the exact same reason. The WD also considered a purchase of Circle M Farms on N Brown Rd in 1986 but declined to do so. We are somehow in an echo chamber with a very long delay time.

17) On p 45, unit 5.4.1, the brackish groundwater project actually holds out little hope for any real benefit even at the very high costs involved. The only shallow brackish water of any quantity in the Basin is in the vicinity of the CL Playa. This area is off limits for any outside development as controlled by Navy interests. The subsidence threat simply cannot be dismissed. This was pointed out clearly by this author 3 years ago when this project was created.

18) On p 49, The present project version is considering brackish water that might be developed at considerable depth in the Pearsonville area. The encouragement for pursuing this area comes from the deep piezometer discoveries in BoR 10. The deeper sediments in this area are coarse enough to presumably limit subsidence at least initially. However, as the project cone of depression spreads to areas to the south and east, including significant area on the Navy North range a huge area of much finer sediment will be dewatered. The shallower thick clay layers displayed in BoR 10 will also be soon dewatered with disastrous effects. Subsidence cannot be avoided by pumping "deep" water. Even if this brackish water could be successfully pumped it is being removed from the same Basin as the potable nearby water which will be adversely affected by its removal. A lot of time and money has been wasted on this project unfortunately.

<u>Section 6, Implementation Plan</u>

1) On page 1, the title page change the section number from "5" to "6" and change the title to "Implementation Plan"

2) This section is obviously in outline form. The detail yet to come will be anxiously awaited. Will the IWVGB have a functional GSP and avoid litigation?

Comments (Draft) GSP Sec. 1 Earl Wilson

Page 1-4&5

50-year planning horizon will be indicative the ----- sustainability goal has been achieved

Comment: Page split error: add the word “that” before “the”.

Comments on entire document: ALL FIGURES SHOULD HAVE COUNTY LINES PROPERLY IDENTIFIED. I have only found a few that are correct – mostly from other sources and properly noted. I need my time for reading not commenting on figures.

THE SHAPE FILE FOR THE WATERSHEAD BOUNDARY (see Figure 3-1) NEEDS TO BE ADDRESSED IN THE INTRODUCTION OR EARLY ON – EXPLAINING A REASON THAT IT INCLUDES OTHER BASINS THAN IWVGB OR BE REDONE THROUGHOUT THE DOCUMENT. (Figure 3-8 is an example of proper use)

END

Comments (Draft) GSP Sec. 2 Earl Wilson

Sec. 2-2-1, para 1

Figure 2-1: Does not show the county lines as in the narrative. Owens Lake is not part of the Coso Range.

China Lake Playa not shown as in narrative.

Figure 2-2: Does not show the county lines as in the narrative. Cuddyback and Kelso Landers not in narrative.

Figure 2-3: There is an area just NE'ly of Ridgecrest that is actually Navy controlled. 178). Strange greenish section not labeled or defined in narrative (Green over Gray).

Figure 2-4: Washes are ephemeral/or are release areas for the LA Aqueduct. LA Aqueducts are neither streams nor washes & should use different line type and color.

Sec.2-2-4, para 3

for a total of 546 wells located in the Kern County portion of the IWVGB. The IWVGA has incorporated this spatial data into the development of this GSP. As shown on Figure 2-5, there are 932 estimated groundwater production wells located in the IWVGB with an average well density. ***Comment:*** Is that what is actually shown on Fig. 2-5. ? See below.

Figure 2-5: Put actual number of wells of each type on figure or reword paragraph to end conflicting values. Same problem as with Figure 2-3 NE'ly of Ridgecrest on Navy Base lands.

Sec.2-3-4 thru 6

As shown on Figure 2-6, the AVEK service area extends into the largely undeveloped land in the southernmost portion of the IWVGB, but no AVEK water infrastructure or water supply services exist in that portion of the IWVGB.

Comment: The reason it is largely "undeveloped" is Red Rock State Park and Jawbone Recreation Area are there. (Check your shape file. Red Rock has received new lands from BLM recently)

Figure 2-6: ***Comment:*** DWR as well as other reviewers may not be familiar with the area. "Barstow" label is cutoff, "Sempitropic Water Bank" is covered by inserted box, and Bakersfield should be labeled, as well as Hwy's 14, 58 and 99.

Sec.2-5-1, para 2

the IWVGA will coordinate with the relevant land use planning agencies

Comment: You should add BLM to this list. BLM is very much about "land use".

Sec.2-5-2-4, para 2

The City of Ridgecrest's General Plan was last updated in 2009. The City's General Plan discusses the City's goals for a number of elements, including public facilities and public services.

Comment: DWR and the general public probably are not familiar with the Acronyms for the 'Goals'. Land Use (LU) ?. I don't even know what CD and OSC stand for !!

Figures 2-8 thru 11: ***Comment:*** All have the same undefined Gray area NE'ly of Ridgecrest.

Figure 2-12: ***Comment:*** "URBAN AREAS" is the Mystery Gray area I keep seeing. Define it or remove the shape file way back to Figure 3.

Sec.2-7-4-3

Based on the actual cost to produce and distribute water, the Water District has adopted a tiered water rate structure which rewards customers that conserve water through lower water rates. Customers that consistently waste water may be subject to having flow restrictions placed on their meters.

Comment: Do you mean flow "restrictors"?

Comments (Draft) GSP Sec. 3 Earl Wilson

Sec. 3-2, para 5 (page 3-7, para 2)

led to land and farming promotions that fostered to the establishment of the communities of Inyokern and Brown. As development in late 1800s continued,

Comment: fostered what? late 1800's should be 1900's. Out of sequence with narrative. See next paragraph.

Figure 3-1: The "watershed boundary" to the East and North of the IWVGB is not correct and includes Salt Wells Valley GB (a discharge area) and Coso Valley GB (an isolated area from IWVGB. **See Figure 2-2**

Figure 3-4a: Same problem as Figure 3-1.

Table 3-1 *Historical Pumping Distribution by Water Use*

Comment: Do these values include the estimated de-minimums pumping?

Sec. 3-3, (Page 3-9, footnotes)

Comment: Dates should be included for AB-303.

Sec. 3-3, (page 3-10) ***Comment:*** FYI - "amsl" is the proper term, it's a quote so it's OK.

Sec. 3-3-4-1, para 1

The elements contributing to the IWVGB water budget include recharge, groundwater pumping, ET, and interbasin flow.

Comment: Should be changed to "inflow and outflow". There are also losses to Salt Wells Valley.

Sec. 3-3-4-1, Page 3-20, (para 2)

by the Cooperative Group are provided in Appendix 3-A. The location of all groundwater production wells in the IWV is shown in Figure 2-3.

Comment: Fig.2-3 is "Jurisdictions". "Production Wells" is **Fig. 2-5**

Page 3-20 (Footnote 13)

Comment: Does not specify source of that figure and including mutual in the mix.

Page 3-22 (Footnote 14)

Comment: Is not noted in narrative text.

Table 3-2. (Page 3-28)

Mountain Front Recharge[1]

Comment: Footnote not found ~~or is it supposed to be 18~~ ? Footnote needs to be moved up into table.

Sec. 3-6-1-2. (Page 3-50, para 2)

TYPO: Data gaps for stream flow and mountainfront recharge are being addressed initially under Prop 1 Grant

Sec. 3-6-1-3. (Page 3-52, para 1)

sampling event is being completed in Fall 2019 to monitor 30 wells and 10 springs basin-side to develop a

Comment: basin-wide??

References. (Page 3-54, item 2)

Bacon, Steve, et al, GSA Annual meeting, paper no. 310-7, 2014.

Comment: Public confusion?. Needs to be spelled out not abbreviated.

END

Comments (Draft) GSP Sec. 4 Earl Wilson

Sec. 4.1 Introduction (Page 4-6, para 2)

groundwater levels in the IWVGB is relatively small, the SNORT facility at NAWS China Lake, which is a significant asset, has been impact by subsidence due to both reduction of groundwater levels and tectonic

Comment: Obvious wrong word ---- "impacted"

Sec. 4-1-1 Sustainability Indicators

SGMA has identified six sustainability which refer to effects caused by groundwater conditions occurring

Comment: What's the topic?

Sec. 4-1-2

The IWVGA has selected representative monitoring sites to be used to measure monitor groundwater

Comment: measure AND monitor

Sec. 4-2-2 (Page 4-8, para 1)

unreasonable undesirable results throughout the planning horizon will be indicative the sustainability goal

Comment: unreasonable OR undesirable results --- indicative THAT the sustainability

Sec. 4-2-4 (Page 4-10, last bullet)

others have already implemented successful conservation measures. Additional conservation will

Comment: Cosmetic error ---- underlined word

Sec. 4-3, (Page4-12, para 1)

There are four sustainability indicators with documented current and/or historical significant and unreasonable undesirable results: reduction in groundwater in storage, chronic lowering of groundwater

Comment: historically **------** unreasonable OR undesirable results

Figures seem OK

END

Comments (Draft) GSP Sec. 6 Earl Wilson

Sec. 6-1, para 2

unreasonable undesirable results throughout the planning horizon will be indicative the sustainability goal

Comment: "unreasonable **OR** undesirable results --- indicative **THAT** the sustainability

Table 6-1. Estimated GSP Implementation Costs

Comment: I see no "total estimated capital cost" or "total annual costs" cells as place holders.

Highest and lowest values and gives a rough idea of the range of costs.

Figure 6-1: No Comment.

END

November 15, 2019
File No. 18-1-021

Sent via e-mail: SteveJ@stetsonengineers.com

Mr. Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority Water Resources Manager
Stetson Engineers Inc.
861 S. Village Oaks Drive, Suite 100
Covina, CA 91724

Indian Wells Valley Groundwater Authority Technical Advisory Committee Members
c/o Water Resources Manager

SUBJECT: INDIAN WELLS VALLEY GROUNDWATER AUTHORITY TECHNICAL ADVISORY COMMITTEE MEMBER COMMENTS ON DRAFT GROUNDWATER SUSTAINABILITY PLAN

Dear Mr. Johnson:

This letter is being written on behalf of our client, Meadowbrook Dairy ("Meadowbrook"). This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager's (WRM) November 7, 2019 request for input from Technical Advisory Committee (TAC) members on the following items:

1. Draft Groundwater Sustainability Plan Documentation Text
2. Draft Groundwater Sustainability Plan Figures
3. Draft Groundwater Sustainability Plan Appendices

With respect to each of these discussion items, we reserve the opportunity to provide further comments on public draft GSP materials and chapters, and in response to comments offered by WRM, Policy Advisory Committee (PAC) and other TAC members.

Although we are very disappointed with the lack of transparency that occurred during the development of GSP Sections 3, 4, 5 and 6, we do appreciate the opportunity to provide preliminary comments on these items and we look forward to developing a process to reach technical consensus as we move forward through the GSP process.

EXECUTIVE SUMMARY

General Comments:

- Why was a draft of an executive summary (ES) not provided as part of this review process? Please provide for review to this committee prior to issuing draft of the complete GSP packet for public comment. ES should include a table of contents, applicable support figures and include a detailed description for each of the major sections of the GSP.

SECTION 1 – INTRODUCTION

General Comments:

- Please include list of tables and figures in the Table of Contents
- DWR Preparation Checklist should be moved from the appendix and incorporated into this section.
- Section 1.2 (Sustainability Goal), page 1-4, second paragraph. The sustainability goal is to manage, not just preserve the IWVGB groundwater resources as sustainable water supply for all beneficial users. To the greatest extent possible, the goal is to preserve the character of the community, and beneficial users, preserve the quality…………
- Section 1.3 (Agency Information), page 1-5, fourth paragraph. This whole paragraph should be rewritten to convey to the reader where NAWS China Lake is located in relation to the IWVGB. A figure showing all entities, including NAWS China Lake should be included in order to get a spatial sense of where the entities are located within the basin.
- Section 1.3 (Agency Information), page 1-6, first paragraph, last sentence. This paragraph should be rewritten to identify other industries and their contribution to the economy of the basin and region.
- Section 1.3 (Agency Information), page 1-6, second paragraph. Text should provide additional detail on whether the federal agencies are also voluntarily willing to comply with any decisions with the GSA to impose projects and management actions on federal land in order to ensure the basin is sustainable by 2040.
- Section 1.3.1 (Organization and Management Structure of the IWVGA), page 1-6. Include a footnote identifying notable exclusions of some beneficial users (i.e. agricultural and environmental interests, whether as voting or non-voting members) and the reason(s) why all beneficial users were not included.
- Section 1.4 (Notice of Communication). Although the author references the C&E, DWR is also looking for summary documentation of all meetings, and examples of how all public meetings were advertised (including how specific technical content was distributed to non-English speaking members of the public). Please provide a summary table detailing the process (do not just reference a website).

SECTION 2 – PLAN AREA

General Comments:

- Please include list of tables and figures in the Table of Contents
- Please check DWR annotated outline to ensure all required content is included. As an example, per DWR the GSP should include an analysis of the density of wells per square mile. This information is not included in this section of the GSP.
- Section 2.2.4 (Water Supply Source), page 2-5, third paragraph. Provide a paragraph detailing the methodology used to determine the number of wells, well type, uncertainty in the number of wells and reference to how this uncertainty will be reduced through future data gap analysis.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-11, last paragraph. Provide additional details on other beneficial use members, including small and large agriculture, and also include a summary of who the original members were.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-12, last paragraph. Provide reference and additional details as to why the Cooperative Group is no longer a functional entity.
- Section 2.5.2.1 (Kern County), page 2-15, second paragraph. Although the El Paso area is largely uninhabited and current groundwater demand does not require "significant" groundwater extraction, given the increasing trends in groundwater levels to this area over the last decade, future "significant" groundwater extraction could be possible and should be further investigated for potential projects and management actions prior to enforcing perhaps unnecessary or insufficiently supported pumping allocations.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-15, Table 2-5. Please include a footnote to explain to the reader the designation of Limited Agriculture and Exclusive Agriculture.
- Section 2.7.1 (Background), page 2-24, last paragraph. Please provide a reference to historic and recent studies regarding overdraft conditions in the basin. Are the current conditions a result of overdraft or removal of temporary surplus (or both)?
- Section 2.7.3 (Conservation Programs). Please include a detailed section of both water efficiency and demand management measures and practices currently underway by large Agriculture (specifically to Alfalfa operations along north Brown Road).
- Section 2.7.6 (Groundwater Contamination Cleanup), page 2-33. Please provide additional details on all chemicals of concern (including chemicals per- and polyfluoroalkyl substances (PFAS)) and results of the 2017 sampling that turned up PFAS levels of 8 million parts per trillion (which are the highest in California, and one of the highest globally as noted in the report).
- Section 2.7.7.4 (IWVGA Policies), page 2-38. Provide additional details on how the extraction fee was calculated, what outreach efforts occurred to reach out to non de minimis and de minimis extractors and based on best available data how many non de minimis and de minimis pumpers have failed to register their wells. In addition, explain the current management process for enforcement for unregistered groundwater extraction facilities.

SECTION 3 – BASIN SETTING

General Comments:

- Please include list of tables and figures in the Table of Contents
- Please check DWR Annotated Outline to ensure all required content is included. As an example, per DWR, the GSP should include description of neighboring basins. This information is not included in this section of the GSP.
- Section 3.1 (Introduction), page 3-5, first paragraph, second sentence. The descriptive HCM….will be used to describe basin setting "static" conditions. Why is the author using the word static here?
- Section 3.2 (History of Water Use in the Indian Wells Valley), page 3-8, second paragraph. According to the data presented, peak groundwater usage occurred in 1985 (approximately 29,730 AF), not in 2007 (29,430 AF). In addition, significant conservation efforts were made by the Navy (60% reduction), Meadowbrook Dairy (35% reduction), but an increase occurred of 45% IWVWD. Please revise paragraph and tables to reflect peak water usage and conservation measures implemented by all beneficial groundwater users.
- Section 3.3.1 (Geology and Hydrogeology), page 3-10, first paragraph, Figures 3-5a and 3-5b. Given the recent amount of new geologic and hydrogeologic information, and supposed concerns about overdraft in this basin, the author should attempt to include more recent local geologic information (i.e. SkyTEM, supported financially by DWR and recent installation of new production wells). Also please revise cross-section to be in color. Also recommend providing more than just two cross-sections (the minimum required by SGMA). Additional cross-sections should be developed specifically through the North Brown Road Area and include at least one diagonal cross-section (either oriented Northeast-Southwest and/or Northwest-Southeast).
- Section 3.3.1 (Geology and Hydrogeology), page 3-12, first paragraph. Please provide a more detailed description of the two principal aquifers (i.e. thickness) and how the applicable aquifer characteristics (thickness, permeability, etc.) change throughout the basin.
- Section 3.3.1 (Geology and Hydrogeology), page 3-12. Regarding USBR (1993) slug test data. Typically slug tests are not very useful as they only represent a very small area within the vicinity of the test location. A sentence should be included to reflect the value of this data.
- Section 3.3.3.1 (Climate and Precipitation), page 3-14, second paragraph, Figure 3-8. Color flood information would show more numeric values between the two end numbers of 3 inches and 26 inches. Is this data reported as the average for 1980 through 2010 water year or calendar year? It should be reported as water year (per DWR).
- Section 3.3.3.1 (Climate and Precipitation), page 3-14, second paragraph, Figure 3-9. A paragraph should be included to explain whether the information illustrated on Figure 3-9 was used to select the historical water budget period. Also, these plots should be redone to report data in water years and not calendar year per GSP regulations.
- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-16, first paragraph. Mountain front recharge is difficult to quantify and estimate and often has a lot of uncertainty associated with it. Please reference work on mountain front recharge as part of the Antelope Valley

adjudication and provide revised documentation utilizing current methodologies using all recent data (and do not rely exclusively on others' work).

- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-17, first paragraph. Is there data that proves the statement "There are no significant interconnected surface water systems"? To exclude this SMC, GSP needs to have data to support this. The use of the phrase"…….no significant….." implies there are interconnected surface-waters, yet in the opinion of the author they are not significant. They either are or are not interconnected surface waters.
- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-17, first paragraph, fourth sentence "The IWVGB has many natural spring….." if the basin contains springs, then it contains interconnected surface water.
- Section 3.3.4.1 (Water Budget Elements), page 3-18, first complete paragraph. The USGS BCM model has been issued as a draft. Interesting information, but not very useful for this GSP, unless there are plans to incorporate the content prior to adoption.
- Section 3.3.4.1 (Water Budget Elements), page 3-20, first paragraph. If pumping data was not available, how were pumping rates developed?
- Section 3.3.4.1 (Water Budget Elements), page 3-20, second paragraph. With all the various sources of groundwater pumping data described in previous sections, were any comparisons done of pumping estimates made over time periods that were common to each of the investigations? How did previous studies vary and compare to the Cooperative Group's historical data? Please include additional details on this information.
- Section 3.3.4.1 (Water Budget Elements), page 3-20, third paragraph. How was the domestic wells residence average of 1 AFY determined? This should be explained and also how do pumping volumes vary over time. Same comment applies to water use by mutuals and co-ops. Footnote 13 should be expanded upon and included into this paragraph.
- Section 3.3.4.1 (Water Budget Elements), page 3-21, third paragraph. Include a reference to Section 1 table. In addition, the previous paragraph sounds exclusively promotional for the Navy while a similar tone and content is not provided for elsewhere in this paragraph. There is no mention of the reduction in ag pumping from 1985, 2007 or 2015 like there is for urban discussion or the Navy, why not? The last sentence of this paragraph is not supported by any information provided to support it. Unless there is relevant agreed upon information available, please remove the sentence "unless restricted, agricultural use is expected to increase significantly", as this is not necessarily true.
- Section 3.3.4.1 (Water Budget Elements), page 3-21, first paragraph, last sentence. Does the current ET value vary on an annual basis? If so, a range should be presented along with any variations associated with dry versus wet climatic conditions.
- Section 3.3.4.2 (Historical Water Budgets), page 3-22. The historical water budget spans almost 100 years and does not account for any temporary surplus. This is not a representative period of analysis for evaluating a SGMA historical water budget period because the selection of this long of a period includes different cultural conditions that have occurred over that time frame. This selection of such a long-time frame is not consistent with industry practice in the selection of a representative period that represents average annual historical conditions. In addition, the use of rainfall gage stations presented in Figure 3-9 should have used stations that are located in the

areas in the western portion of the basin, which are supplying the majority of recharge to the basin, not the two that were presented.

- Section 3.3.4.2 (Historical Water Budgets), page 3-23, second paragraph. Revise first sentence from………….extractions increased to extractions occurred. In addition, please explain whether the IWVGA has considered the process described in this paragraph to be related to removal of temporary surplus rather than an overdraft condition.

- Section 3.3.4.2 (Historical Water Budgets), page 3-23 and 3-24, Table 3-6 (Historical Water Budget). Since there is still outflow from the basin (ET and Interbasin Subsurface Flow), which is similar to what happened in San Fernando), has the IWVGA considered whether this reduction in storage is not overdraft but removal of temporary surplus?

- Section 3.3.4.3 (Current Water Budget), page 3-24, first paragraph. For GSP purposes, the "current water budget" follows the historical water budget; it is not a subset of the historical water budget. Since the historical water budget was 1922 through 2016, the current water budget should be 2017. In addition, the 2011 through 2015 period corresponds to an extremely dry period in California history and any review of groundwater levels or water budgets is going to show dramatic declines. The selection of this period appears to be a case of "pick a period and pick your answer".

- Section 3.3.4.4 (Overdraft Conditions), page 3-25. If there is still outflow from the basin to Salt Wells Valley and extensive ET still occurs at the playa, then has the IWVGA considered whether this is a removal of temporary surplus, and not overdraft?

- Please provide basin wide figures illustrating groundwater elevations for select periods (dry, wet, historic, current, change in groundwater elevation) utilizing all known data sets. Do not just rely on work by others, the author should utilize their own interpolations and include adequate details (utilizing linear and color contour methodologies).

- Section 3.3.4.4 (Overdraft Conditions), page 3-25, first paragraph, last sentence. Disagree with the author, as you are using a historically dry period, coupled with a period of temporary surplus to conclude overdraft occurs. In addition, the current water budget period should follow historical water budget period, not be part of it (reference GSP Best Management Practices).

- Section 3.3.4.4 (Overdraft Conditions), page 3-26, third paragraph, last sentence. This sentence does not make sense.

- Section 3.3.4.4 (Overdraft Conditions), page 3-26. Provide additional information in addition to a single 25-year-old study (i.e. extrapolate storage from the DRI model, recent WRM evaluations) of the total current amount of groundwater in storage. Recent preliminary investigations by others have estimated that usable amount of available storage could exceed 10-million AF. What additional analysis was conducted by WRM to evaluate the total amount of storage?

- Assuming there is approximately 10 million AF of groundwater in storage, and the cumulative change in storage has been approximately 620,000 AF since 1992 (23-year period); this cumulative change in storage, which includes both representative dry and wet years, reflects a rate of approximately 0.3% per year. It would not be reasonable to expect that the available groundwater in storage would be exhausted over any foreseeable time period.

- Section 3.3.5 (Sustainable Yield), page 3-28, second paragraph, first sentence. What is the estimated sustainable yield if climate change is incorporated (as required by SGMA)?

- Section 3.3.5 (Sustainable Yield), page 3-28, Table 3-8. Regarding Outflows, specific to ET. The ET should be separated out to differentiate between ET from vegetation versus ET from China Lake Playa. ET from China Lake is water that could instead be captured by increasing extraction, thereby removing surplus and increasing aquifer storage space. This is water that is being wasted unless it is meeting a reasonable and beneficial use.
- Section 3.3.5 (Sustainable Yield), page 3-28, Table 3-8. Regarding Outflows, specific to Extractions. Provide information on extraction by water use sector (ag, urban, domestic, and other).
- Section 3.3.5 (Sustainable Yield), page 3-29, Table 3-8. Regarding Change of Groundwater Storage. This increase of -4.080 AFY in aquifer storage depletion indicates that sustainability is not being projected beyond 2040 on an annual basis.
- Section 3.3.5 (Sustainable Yield), page 3-29, first paragraph. The formulation of the water budget should be separated into a ground-surface water budget and a groundwater budget to clarify the water budget dynamics of the basin, or the author cold potentially have more sustainable yield in order to reduce the amount of outflow via ET and subsurface flows to Salt Valley to near zero. Please include the equation that was used to estimate sustainable yield. Currently, the author is only assuming that recharge equals sustainable yield when in reality water lost to ET and outflow to Salt Valley should be included. DWR's Draft BMP also indicates that reducing pumping to an estimated basin-wide average annual recharge does not equate to sustainability.
- Section 3.3.5 (Sustainable Yield), page 3-29, first paragraph, last sentence. Does the author include climatic variability over the 50-year planning horizon? If not, why?
- Section 3.4.4 (Groundwater Quality Conditions). Please include a discussion on the distribution of anthropogenic contaminants (i.e. PFASS), and an evaluation for the potential future potable, industrial or other uses of de-designated groundwater (which would require varying degrees of treatment) on NAWS property.
- Section 3.4.5 (Land Subsidence), page 3-33. Please include additional details on actions the Navy is planning to implement to avoid increasing further land subsidence and also provide a detailed approach on how applicable changes to Navy and other pumping would impact other applicable SMC's.
- Section 3.4.7 (Groundwater-Dependent Ecosystems), page 3-35. Please include additional details on actions the Navy is planning to implement to avoid impacting GDE's which are located primarily if not entirely on Navy property.
- Section 3.5.5 (Numerical Model Scenario 6.2). Concerns with Scenario 6 (as well as Scenarios 3-5) have been extensively documented in the public record, but largely remain unaddressed and unresolved. Scenario 6.2 includes many built-in assumptions, including for example, imposition of groundwater pumping allocations that require Meadowbrook and other large producers to cease production over a given time period, relocating the IWV Water District's pumping locations to very area of the Basin from which Meadowbrook and others would be eradicated, and importing water, all of which are more accurately described as Projects and Management Actions, and many of which are objectionable, not fully vetted and not agreed upon. Scenario 6.2 is, in other words, more accurately described as a Project and Management Action model scenario, and not a valid framework for a GSP. At a minimum, individual PMA's should instead be specifically identified, detailed in their assumptions, vetted for feasibility and consensus, and then compared to a revised baseline scenario, before being considered for inclusion or implementation in a GSP.

As described under the GSP regulations, PMA's should be developed to address sustainability goals, measurable objectives, and undesirable results identified in the Basin. The PMAs developed for the GSP should consider reducing the potential socioeconomic impacts associated with actions required to sustainably manage groundwater in the Basin.

- Section 3.5 (Numerical Groundwater Model). All documentation related to the model should be included as an appendix. In addition, please provide more details to how the groundwater model is related to the current conceptual understanding of the basin, and where there are known issues where the current flow model does not represent the current conceptual understanding of the basin (i.e. along north Brown Road, Layer 1 in current flow model does not accurately represent the actual lithology (the model underestimates the actual thickness, which would then overestimate the amount of drawdown occurring from pumping in that area). As detailed during several TAC meetings, current groundwater levels (i.e. USBR 6) in North Brown Road have not changed since 2010. Current pumping in the North Brown Road area is estimated to be greater than 15,000 AFY, and recent groundwater data (i.e. USBR 6S, on-going monitoring by large Ag) has not decreased, suggesting that the sustainable yield in the North Brown Road area could be greater than 15,000 AFY. In addition, the El Paso area has increased groundwater levels over the last decade, which by some preliminary estimates equates to approximately 1,000 to 4,000 AFY of additional recharge. This additional recharge could be utilized to supplement existing supplies. Please include a discussion of this and add as a project Concept in Section 5. The potential use of such additional recharge should be seriously considered in informing any "allocation" scheme.

- The "current" baseline model developed for the initial modeling scenarios, should not be considered a true baseline scenario. For the "current" baseline period, a request was made by the WRM to selected producers to estimate potential future pumping over a 50-year period (factoring in growth). This information was compiled and utilized by the WRM in the current groundwater flow model. Subsequent model scenarios have been compared to this "current" baseline model run. Recommend that a "revised" baseline model scenario be developed in accordance with the GSP Regulations. The exact development of how pumping rates in the "revised" baseline model scenario should be discussed further.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-44. Why is model Scenario 6.2 included in this section but there is no section for the "baseline" model, which should be included and utilized for comparison purposes.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-45, Management Action No. 1. Please explain in more detail how the allocations over a 20-year period to 2040 were determined, how was the "highest beneficial use determined", and why was the highest continual pumping from 2010 to 2014 used for domestic and municipal pumping (which was also an extremely dry period in California).

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-46, second bullet. Please define projects 3,4 and 5.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-46, Table 3-11. Why would agricultural water use necessarily increase from 42% (in 2020) to 56% (in 2070)?

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-47, Table 3-12, Outflow, Groundwater Extraction. What is the distribution among "Ag" pumpers and how does this relate to pool allocations?

- Section 3.5.6 (Climate Change). GSP regulations require climate change be considered.
- Management Areas – Please provide a detailed explanation of why management areas were not evaluated and were not determined to be appropriate for this basin to help facilitate groundwater management by the different water use sector, geology and aquifer characteristics. Multiple requests and suggestions were made from TAC members and the public to consider management areas.

SECTION 4 – SUSTAINABILITY MANAGEMENT CRITERIA

General Comments:

- Please include list of tables and figures in the Table of Contents
- Revise entire section 4 to follow DWR GSP annotated outline as agreed upon among the TAC and WRM. As an example, why are undesirable results presented prior to measurable objectives and minimum thresholds?
- Include a general summary table for sustainable management criteria. The summary table should include the Sustainability Indicator, Minimum Threshold, Measurable Objective and Undesirable Result.
- Section 4.2.4 (Explanation of How Goal will be Achieved). NAWS operations are documented to be responsible for groundwater contamination, potential impacts to subsidence and depletion of interconnected surface water. Please include a detailed description of how NAWS groundwater production will impact the overall health of the basin to achieve sustainability goals under the proposed projected listed in Section 4.2.4.
- Section 4.4.1.7 (Method of Quantitative Measurement), page 4-22. For comparison purposes, please provide the Theissen weighted average polygon method to historic and current groundwater conditions and include a detailed description and figures in Section 3. This information will then form the baseline comparison and can be utilized to assess the impacts of future project management actions into the future.
- Section 4.4.2.6 (Representative Monitoring Sites), page 4-25, Table 4-1. Please justify why USBR (25S/38E-12L02 and 25S/38E-12L03) are being utilized to monitoring groundwater levels in this area. Both of these wells are screened below (1190 – 1210, and 1640 – 1660 feet below ground surface) any known deep pumping wells in this area and therefore do not represent localized pumping effects.
- Section 4.4.3 (Degraded Water Quality Minimum Thresholds), page 4-27, second paragraph. Please provide further justification on why the author is increasing minimum threshold values to 600 mg/L and 1,000 mg/L in areas with poor water quality. In addition, water quality data for current agricultural wells have not significantly changed since the early 1990's. Significant data already exists to determine minimum thresholds in this area and should also be derived based on beneficial usage. Please explain how postponing the establishment of minimum thresholds impacts proposed management actions and projects—including potentially imposing severe groundwater pumping limitations that would eliminate an entire class of producers—and how such postponement is justified under SGMA, the DWR Regulations and related requirements.

- Section 4.4.3.6 (Representative Monitoring Sites), page 4-29, third paragraph. Given the potential for additional groundwater extraction from the El Paso area, recommend adding additional wells to this monitoring network.
- Section 4.7 (GSP Proposed Monitoring Network), page 4-37, first paragraph. Please provide further justification as to why only 10 or 11 wells are proposed to be utilized to monitor sustainable management criteria. DWR has developed specific regulations and guidance documents (reference Monitoring Networks and Identification of Data Gaps BMP) that recommend that in a basin the size of IWV (600 square miles) and pumps more than 10,000 AFY, the minimum number of monitoring well locations should be between 24 and 60. In addition, why would the author not integrate current agricultural well monitoring into the program?
- Section 4.6.2 (Chronic Lowering of Groundwater Levels). Several monitoring wells listed in the proposed network have groundwater data that indicate groundwater levels have been stable since 2010 (USBR-01, USBR-04), 2012 (USBR-06S), 2014 (USBR-2), and 2016 (NR 2). Why would current pumping in these areas need to be adjusted or reduced since current groundwater levels in these areas indicate that current pumping is sustainable? And if imposed, how does the IWVGA justify the Scenario 6.2 PMA that would eradicate Agriculture and then move the water district and other producers into that very area?

SECTION 5 – PROJECTS AND MANAGEMENT ACTIONS

General Comments:

- Please include list of tables and figures in the Table of Contents
- Provide a summary table the includes the project, measurable objective expected to benefit, expected benefits to stakeholders, current status, timetable (initiation and completion), estimated cost and permitting and regulatory process.
- Section 5.2 (Planned Management Actions), page 5-10, third paragraph. Please provide information supporting the use of 2010 through 2014 period as a base period.
- Section 5.4 (Conceptual projects under consideration). Please include an additional project to this list. The project would focus on investigating the potential to utilize surplus groundwater in the El Paso subarea to supplement existing supplies. Preliminary useable groundwater estimates are greater than 4,000 AFY, or even higher if additional volumes are removed from storage. This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- Section 5.5 (Conceptual project under consideration). Please include a project that would focus on treating and using the current de-designated area groundwater supply below NAWS property (which is preliminarily estimated to exceed 500,000 AF). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility to capture current evaporative loses from the Coso Geothermal field and utilize to enhance water in the IWV (which is preliminarily estimated to exceed 10,000 AFY). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.

- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility for SVM to treat local groundwater in the Salt Wells Valley Basin (which is preliminarily estimated to exceed 500 AFY).
- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility for SVM to capture current evaporative loses from their facilities.

SECTION 6 – PROJECTS AND MANAGEMENT ACTIONS

General Comments:

- Please include list of tables and figures in the Table of Contents.
- Cover page needs to be modified and edited to detail Section 6 content, not Section 5.
- Section 6.1 (Implementation Plan Summary). Please include how stakeholder engagement through the advisory committee activities will be utilized to allow the general public to provide input and develop an exchange amongst a broad range of stakeholders. Develop a schedule (including meeting times, i.e. quarterly) to discuss GSP and GSA activities, provide input and present on items of interest.
- Describe how public outreach will continue and provide opportunities for engagement during GSP implementation. This should include providing opportunities for public participation, especially from all beneficial users, at public meetings, providing access to GSP information online, and continued coordination with entities conducting outreach.
- Section 6.3 (GSP Implementation Costs and Funding), page 6-6, Table 6-1. Estimated GSP Implementation costs are not complete. Also, please provide costs for Conceptual projects under consideration. Also, provide row that summarizes all annual costs.
- Section 6.3 (GSP Implementation Costs), page 6-6, Table 6-1. Please provide a column in the table that summarizes the assumptions for each task.
- Section 6.3.2 (Potential Funding Sources). Please provide more detail on the potential funding amount associated with each potential funding source and how that related to applicable projects and management actions.
- Section 6.3.2 (Potential Funding Sources). Please provide a planning level estimate of annual amount of funds needed to implement GSP projects. Also, prior to implementation of any fee or assessment program needed to fund these projects, please detail the types of assessment studies or other analysis (consistent with regulatory requirements) needed in this section. Notably, the IWVGA's currently imposed GSP development groundwater extraction fee of $30/AF is among the highest in the State, was not supported by a traditional Proposition 26/218 study or analysis, and was imposed over extensive objections raised by many producers and members of the public.
- Section 6.4 (Progress Assessment and Reporting). Revise section to state, as required under GSP regulations, annual reports must include three key sections: 1) General Information, 2) Basin Conditions, and 3) Plan Implementation Progress. Pease provide a detailed paragraph on each of the required sections (i.e. General Information, Basin Conditions, which must include how GDE's are being evaluated) and plan implementation progress.
- Section 6.4 (Periodic Evaluations and Assessment). SGMA requires that the GSP be evaluated regarding their progress towards meeting the approved sustainability goals at least every five

years, and to provide a written assessment to DWR. An evaluation must also be made whenever the GSP is amended.

- Section 6.4 (Periodic Evaluations and Assessment). Please include a summary table for GSP Schedule for Implementation. The table should highlight the high-level activities anticipated for each five-year period. These activities are necessary for ongoing plan monitoring and updates, as well as tentative schedules for projects and management actions.
- Provide an additional section, entitles First Five Year Update (2020 – 2025) and identify several key tasks that were identified during the development of the first GSP that need to be further developed or resolved in the five-year GSP update. These could be special studies that need resolution but could not be resolved during the initial GSP development. These could include establishment of metering program, finalizing allocation framework, developing methodology for establishing minimum thresholds for new wells, refining and improving the current groundwater model, mitigation for possible future domestic wells, creating a data gap plan, etc.

APPENDIX (3-H) – GSP MODEL DOCUMENTATION

General Comments:

- Please provide a Table of Contents for this document.
- The primary authors of this model document should sign, date and stamp this document per California Code of Regulations.
- There are some "Section XX" all inside the appendix text which should be replaced with the correct section number.
- Section 2.4.1, page 2, describe the vertical extension of the General-Head Boundary. Also, provide a figure which illustrates the location of GHB and No-Flow boundary conditions on the perimeter boundaries and a cross section which shows the vertical distribution of the boundary conditions as well.
- Section 2.4.3, page 3, describe if the recharge rates are specified only at the highest active layer of the model or only at the first layer. Also, describe briefly why the author did not use "Recharge" package of MODFLOW to simulate the mountain-front recharge and instead, the "Well" package was utilized.
- Section 2.4.3, page 3 and the associated figure 4 at page 24, the text on page 3 implies that there are some recharge boundary conditions on the perimeter boundaries but the figure shows "black lines" everywhere on the perimeter boundary. Provide more transparent description or revise the figure with color lines representing different boundary conditions (No-Flow/GHB/Recharge) on the study domain.
- Figure 4, page 24, provide units for the flux values.
- Section 2.4.5, page 4, provide a range of depth for the pumping wells.
- Section 2.4.5, page 4, describe the package used for simulating the pumping wells. Is it "Well" package or "MNW" package (Multi-Node Well)?
- Section 2.5.1, page 7, Table 2, provide the units.

- Section 3.2, page 13, provide more detailed information about the temporal-resolution of the transport model. The flow model has annual time discretization for the transient model and monthly discretization for the predictive model. What is the time-step of the transport model?
- Section 3.4, page 14, last line, and the associated figure 36, page 55, simple averaging of simulated TDS value from layers of the multi-screen well is not exactly an appropriate approach, unless the flow rates to the well screens are the same for those layers. The calculation of mean concentration from a multi-screen well is usually based on volumetric flow rates to/from each screen. This flow rate can be captured by using MNW package in modeling the pumping wells (https://pdfs.semanticscholar.org/e8f2/dc3b4aa227532ad74f977b99abf070560321.pdf):

$$C_{average} = \frac{\sum_{i=1}^{n} Q_i C_i}{\sum_{i=1}^{n} Q_i}$$

where Q_i and C_i are flow rates and concentrations for each layer of the multi-screened well, respectively.

- Section 3.5, page 16, provide additional graphs to describe the qualitative validation of the model using box and whisker plot of the TDS concentrations (simulated vs. measured) for different time intervals (for example 1920-50, 1951-70, 1971-90, 1991-2016) for shallow (plot #1), intermediate (plot #2), and deep (plot #3) TDS zones. Collect all available measured concentrations for each depth zone, for each time interval, and then compare them with the model's results at the same location and time (As reference, review https://doi.org/10.1016/j.jconhyd.2019.103521 , section 3.1).
- Section 4, page 17, add to the limitation list, that this transport model is qualified only for the purpose of "scenario analysis" and it is not an "absolute predictive model" because the transport model has not been quantitatively calibrated (which increases the uncertainty of the simulated results).

Thank you for considering our initial comments and recommendations. We look forward to working with you to further produce and implement the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Supervising Hydrogeologist

CC: Adam Bingham (Chair Technical Advisory Committee

LSCE

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 2 – PLAN AREA

DRAFT

November 4, 2019

SECTION 2: PLAN AREA

2.1 INTRODUCTION

This section provides background and discussion of 1) geographic area and jurisdictions; 2) management agencies; 3) land use; 4) existing monitoring and management programs; and 5) the data management system, as required in the GSP Emergency Regulations (§354.8).

2.2 GENERAL DESCRIPTION

2.2.1 Setting

The IWVGB is located in the northwestern part of the Mojave Desert in southern California, as shown on Figure 2-1, and underlies approximately 382,000 acres or approximately 600 square miles of land area in portions of the Counties of Kern, Inyo, and San Bernardino. The IWVGB is bordered on the west by the Sierra Nevada Mountain Range, on the north by the Coso Range, on the east by the Argus Range, and on the south by the El Paso Mountains. Surface water flow from the surrounding mountain ranges drains to China Lake, a large dry lake, or playa, located in the central north-east part of the basin. U.S. Route 395 and State Route 14 are the major vehicular arteries through the Indian Wells Valley. The IWVGB is in the vicinity of other Bulletin-118 groundwater basins including the Fremont Valley, Salt Wells Valley, Searles Valley, Coso Valley, Rose Valley, and Kern River Valley groundwater basins (see Figure 2-2).

The IWVGB is designated Basin Number 6-054 by DWR and is included in DWR Bulletin No. 118 entitled "California's Ground Water", dated September 1975. Bulletin 118 noted that recharge in the IWVGB averaged about 10,000 acre-feet per year (AFY) while extractions (as of 1968) were about 12,500 AFY, implying that overdraft conditions have existed for at least the past 50 years. DWR Bulletin 118 was updated in January 1980 and designated Bulletin 118-80. Table 8 of Bulletin 118-80 noted that there is evidence of groundwater overdraft in the IWVGB. Table 1 of Bulletin 118-16 (dated January 2016) indicates the IWVGB is subject to critical conditions of overdraft.

2.2.2 Jurisdictions

The Indian Wells Valley land overlying the IWVGB encompasses portions of the Counties of Kern, Inyo, and San Bernardino, with the majority (approximately 73%) being in Kern County as shown in Table 2-1. The City of Ridgecrest is the only incorporated community in the Indian Wells Valley and covers an area of approximately 20 square miles with a population of approximately 27,000 people. Unincorporated communities in the Indian Wells Valley include the communities of Inyokern in Kern County and Pearsonville in Inyo County, along with other smaller communities.

Table 2-1. IWVGB: Distribution of Overlying Land, by County

County Name	Overlying Land (acres)	Overlying Land (%)
Kern County	277,204	73%
Inyo County	66,519	17%
San Bernardino County	37,985	10%
Total	**381,708**	**100%**

As shown in Tables 2-2 and 2-3, approximately 302,000 acres of land overlying the IWVGB are federal property managed by either the US Navy's Naval Air Weapons Station China Lake (NAWS China Lake) or the US Department of Interior, Bureau of Land Management (BLM). The non-federal lands overlying the IWVGB consist of the incorporated city of Ridgecrest and unincorporated lands in the counties of Kern, Inyo, and San Bernardino (see Section 2.4). A map showing general jurisdictions and boundaries is provided in Figure 2-3.

Table 2-2. IWVGB: Distribution of Federal and Non-Federal Overlying Lands, by Entity

Entity	Overlying Land (acres)	Overlying Land (%)

U.S. Department of the Interior (Bureau of Land Management)	140,184	37%
U.S. Navy (Naval Air Weapons Station, China Lake)	161,911	42%
Non-Federal Entities	79,613	21%
Total	**381,708**	**100%**

Table 2-3. IWVGB: Distribution of Federal and Non-Federal Overlying Lands, by County

Entity	Overlying Land (acres)				Overlying Land (%)			
	NAWS China Lake	BLM	Non-Federal	Subtotal	NAWS China Lake	BLM	Non-Federal	Subtotal
Kern County	71,971	129,032	76,201	277,204	26%	47%	27%	100%
Inyo County	57,413	6,448	2,658	66,519	86%	10%	4%	100%
San Bernardino County	32,527	4,704	754	37,985	86%	12%	2%	100%
Total	**161,911**	**140,184**	**79,613**	**381,708**	-	-	-	-

2.2.3 Classification

In accordance with SGMA, DWR is required to classify groundwater basins by priority for achieving long-term sustainable groundwater management. DWR has published the "Sustainable Groundwater Management Act, 2018 Basin Prioritization Process and Results" document, dated January 2019, which provides the process, components, and rationale to develop the prioritization of California groundwater basins. In this document, DWR identifies and prioritizes 517 groundwater basins and subbasins as either "High", "Medium", "Low," or "Very Low". DWR considered the following eight components when prioritizing the groundwater basins:

1) The population overlying the basin or subbasin.
2) The rate of current and projected growth of the population overlying the basin or subbasin.
3) The number of public supply wells that draw from the basin or subbasin.
4) The total number of wells that draw from the basin or subbasin.
5) The irrigated acreage overlying the basin or subbasin.
6) The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water.
7) Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation.
8) Any other information determined to be relevant by the department, *including adverse impacts on local habitat and local streamflows*.

In addition to the IWVGB's designation as a basin subject to critical conditions of overdraft, the 2018 Basin Prioritization Report rates the IWVGB as a "High" Priority basin. Consequently, the IWVGA is required to submit this GSP by January 31, 2020 pursuant to SGMA.

2.2.4 Water Supply Source

In general, streams and other surface waters in the IWVGB are ephemeral due to low annual precipitation in the Indian Wells Valley, and basin recharge occurs as mountain block recharge. Consequently, although natural channels for surface water exist in the IWVGB (see Figure 2-4), surface water resources in the

IWVGB are limited. Further discussion on surface water systems in the IWVGB is provided in Section 3.3.3.2.

The IWVGB serves as the sole supply of potable water for the Indian Wells Valley. Residents of the Indian Wells Valley are served groundwater through private domestic wells, small cooperative groups sharing wells, small mutual water companies, the Inyokern Community Services District (Inyokern CSD), and the Indian Wells Valley Water District. The Navy produces and distributes groundwater for the on-station water uses at the NAWS China Lake. However, the majority of Navy-affiliated staff reside off-station, and the water supply needs of the off-station Navy-affiliated staff and their dependents are supplied by either the Indian Wells Valley Water District, Inyokern CSD, or by privately-owned domestic wells ~~However, a number of Navy affiliated staff reside off station, and the water supply needs of the off station Navy-affiliated staff and their dependents are supplied by either the Indian Wells Valley Water District, Inyokern CSD, or by privately-owned domestic wells.~~ Searles Valley Minerals, Inc. produces groundwater from the IWVGB for use in its minerals recovery and processing operations in the Searles Valley (located east of the IWVGB) and for potable use in the small communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley. In addition, a number of farms located in the Indian Wells Valley rely on the IWVGB's water supplies for their agricultural operations, including Meadowbrook Dairy, Mojave Pistachios, Simmons Ranch, Quist Farms, and other smaller farms. The crops grown in the Indian Wells Valley are primarily alfalfa and pistachios.

The Kern County Public Health Services Department has provided the IWVGA with spatial data on wells located in the Kern County portion of the IWVGB. The data included well information such as approximate well location, point of contact, driller, and permit number. As of July 2018, the data provided such information (where available) for a total of 546 wells located in the Kern County portion of the IWVGB. The IWVGA has incorporated this spatial data into the development of this GSP. As shown on Figure 2-5, there are 932 estimated groundwater production wells located in the IWVGB with an average well density of approximately 1.6 wells per square mile. A summary of groundwater production wells by type of use is provided in Table 2-4.

Approximately 90% of all groundwater production wells in the IWVGB support domestic/private uses. It is estimated that the 832 domestic/private wells in the IWVGB produced approximately 800 acre-feet (AF) in 2015, or approximately 3% of total groundwater production in 2015.

Table 2-4. Summary of Groundwater Production Wells in the IWVGB

Well Use	Number of Wells
Domestic/Private	832
Dust Control	1
Industrial	5
Landscape Irrigation	5
Large Agriculture	18
Municipal	51
Small Agriculture	20
Total	**932**

2.3 Local Water Agencies

2.3.1 Background

The local water agencies within the IWVGB are shown on Figure 2-6 and are briefly summarized below. Additional information on the local water agencies and total current groundwater pumping is provided in Section 3.3.4.1.

2.3.2 Indian Wells Valley Water District

The Indian Wells Valley Water District (Water District) was formed in 1955 as the Ridgecrest County Water District by consolidating several smaller water companies serving the Ridgecrest area with domestic water. On January 19, 1970, the Water District's Board of Directors voted to change the name from the Ridgecrest County Water District to the Indian Wells Valley County Water District, reflecting its service area which covers areas beyond the City of Ridgecrest. In 1980, the Water District's Board of Directors formally dropped the word "County" from the name of the Water District. Since that date, the Water District has been known as the "Indian Wells Valley Water District".

The Water District serves approximately 30,000 customers through approximately 12,000 connections and encompasses an area of approximately 37.7 square miles within the eastern portion of the IWVGB. The Water District operates facilities (groundwater production wells, treatment systems, booster stations, storage tanks, and distribution pipelines) to provide potable groundwater from the IWVGB to its customers. Accordingly, the protection, conservation, and replenishment of groundwater supplies is of critical importance to the Water District.

2.3.3 Inyokern Community Services District

The Inyokern CSD, established in 1983, provides water, wastewater, and street lighting services to the community of Inyokern, located approximately 7 miles west of Ridgecrest. The Inyokern CSD operates service facilities including approximately 265 water service connections, 4 groundwater production wells, distribution pipelines, and a wastewater treatment plant. The Inyokern CSD serves a primarily residential population of approximately 1,000 and an estimated 420 residential households (Alpert et al., 2014).

2.3.4 Antelope Valley – East Kern Water Agency

The Antelope Valley – East Kern Water Agency (AVEK) is a wholesale water agency serving nearly 2,400 square miles in northern Los Angeles and eastern Kern Counties, as well as a small portion of Ventura County. AVEK produces groundwater from the Antelope Valley groundwater basin and also obtains imported water from Northern California through a long-term contract with the State Water Project (SWP). As shown on Figure 2-6, the AVEK service area extends into the largely undeveloped land in the southernmost portion of the IWVGB, but no AVEK water infrastructure or water supply services exist in that portion of the IWVGB. The AVEK water transmission lines closest to the IWVGB are located in California City, located approximately 15 miles south of the IWVGB boundaries and 50 miles south of Ridgecrest.

2.3.5 Kern County Water Agency

The Kern County Water Agency (KCWA) is a public agency providing wholesale water services to its 13 member units along with water resources management and monitoring services throughout Kern County. As shown on Figure 2-6, the KCWA service area encompasses all portions of the IWVGB within Kern County, except for that portion of the IWVGB in the AVEK service area. KCWA obtains imported water from Northern California through a long-term contract with the SWP. At this time, no water agencies in the IWVGB serve as member units to KCWA, and no KCWA water infrastructure exists within the IWVGB boundaries.

Additional information on KCWA's water resources monitoring efforts in the IWVGB is provided in Section 2.6.2.

2.3.6 Mojave Water Agency

The Mojave Water Agency (MWA) is a wholesale water agency serving 4,900 square miles of the High Desert in San Bernardino County. MWA produces groundwater from the Mojave Basin Area, a series of Bulletin 118 groundwater basins and subbasins located along the Mojave River. MWA also obtains imported water from Northern California through a long-term contract with the SWP. As shown on Figure 2-6, the MWA service area extends into the easternmost portion of the IWVGB, but no MWA water infrastructure or water supply services exist in that portion of the IWVGB. The MWA water transmission lines closest to the IWVGB are located in Barstow, located approximately 60 miles southeast of the IWVGB boundaries and Ridgecrest.

2.4 REGIONAL WATER MANAGEMENT AGENCIES

2.4.1 Background

The IWVGA is the exclusive Groundwater Sustainability Agency for the IWVGB, Bulletin 118 Basin No. 6-054. There are several other existing regional entities with water supply, management, planning, and/or regulatory authority whose boundaries encompass all or portions of IWVGB. These entities include the Kern County Water Agency (KCWA), the Lahontan Regional Water Quality Control Board (LRWQCB), the

Inyo-Mono Integrated Regional Water Management Program (Inyo-Mono IRWMP), and the East Kern County Resource Conservation District (EKCRCD). The following is a brief overview of these entities and their role in water supply management within the IWVGB.

2.4.2 Kern County Water Agency

The Kern County Water Agency (KCWA) was created in 1961 by a special act of the California State Legislature and is the contracting entity in Kern County for the SWP. The KCWA participates in various water management activities including water quality control, flood control, and groundwater banking to preserve and enhance Kern County's water supply.

The KCWA is the second largest participant in the SWP, a water storage and delivery system for water supplies from Northern California. The KCWA has contracts with 13 local water districts, referred to by KCWA as Member Units for SWP water. Since 1968, about 33 million acre-feet of SWP water has been delivered to Kern County using SWP facilities. The KCWA does not have a contract with a local water agency in the IWVGB; therefore, the KCWA does not provide SWP water to the IWVGB.

Due to low rainfall in a semi-arid region, surface water supplies in Kern County must be augmented by groundwater supplies. The KCWA works to improve groundwater levels and to monitor groundwater quality throughout Kern County, especially in the areas surrounding groundwater banking projects.

The KCWA collects, interprets, and distributes groundwater data for the IWVGB. Since 1989, the KCWA has measured depth to groundwater in the IWVGB biannually during October (peak historical groundwater demand) and March (lowest historical groundwater demand). KCWA analyzes the resulting measurements to generate maps of groundwater elevation and depth to groundwater throughout the IWVGB. The KCWA was also a signatory to the Indian Wells Valley Cooperative Groundwater Management Group.

2.4.3 East Kern County Resource Conservation District

The EKCRCD is a California Special District that assists local landowners and interested citizens in voluntary, cooperative, incentive-based approaches to solve natural resource concerns (including water resources) in eastern Kern County. The EKCRCD's jurisdiction covers approximately 1.2 million acres in eastern Kern County, including all portions of the IWVGB within Kern County. EKCRCD's services in water resources management include distributing information on and offering assistance in water conservation practices such as installing efficient irrigation systems; watering plants, trees, and crops during droughts; and choosing vegetation with low water demands.

Historically, the EKCRCD has actively participated in the study and sustainable management of the IWVGB. Since the 1990s, the EKCRCD has engaged in a continuous educational effort in water conservation practices in the IWVGB through events such as poster contests. The EKCRCD has hosted and continues to host Xeriscape seminars in the IWVGB and encourages water-efficient landscaping by selling drought-tolerant plants to IWVGB residents. In 2003, the EKCRCD secured a Local Groundwater Assistance Fund Grant (AB 303) to conduct studies characterizing groundwater resources and hydrostratigraphic conditions in the IWVGB, and to carry out groundwater monitoring activities in accordance with the Groundwater Management Plan of the Indian Wells Valley Cooperative Groundwater Management Group (see Section 2.4.6). More recently, the EKCRCD secured a partial grant for installation of a California Irrigation Management Information System (CIMIS) station at the NAWS China Lake golf course to monitor local evaporation trends.

2.4.4 Lahontan Regional Water Quality Control Board

The Lahontan Regional Water Quality Control Board (LRWQCB) is a seven-member decision-making body appointed by the Governor of California for the purpose of protecting the water quality and ensuring the proper allocation and efficient use of water resources in the Lahontan Region. The Lahontan Region is divided into the North and South Lahontan Basins and includes over 700 lakes, 3,170 miles of streams, and 1,581 square miles of groundwater basins. The IWVGB is located within the South Lahontan Basin, which includes three major surface water systems (Mono Lake, Owens River, and the Mojave River watersheds) and multiple separated groundwater basins. A map of the LRWQCB boundaries is provided in Figure 2-7.

The LRWQCB's general duties include approving Water Quality Control Plans and Salt and Nutrient Management Plans; setting regional water quality standards; issuing waste discharge requirements;

determining compliance with those standards and requirements; and taking appropriate enforcement actions. The LRWQCB has established the "Water Quality Control Plan for the Lahontan Region, North and South Basins" (Basin Plan) as the regulatory document that sets forth water quality standards and control measures for surface water and groundwater in the Lahontan Region (including the IWVGB). The LRWQCB has also approved the IWVGB Salt and Nutrient Management Plan in 2018 (see Section 2.7.2 for additional information).

2.4.5 Inyo-Mono Integrated Regional Water Management Program

The Inyo-Mono Integrated Regional Water Management Program (Inyo-Mono IRWMP) is a regional water resource planning organization which formed in 2008 as part of the statewide Integrated Regional Water Management collaborative effort. Over 30 organizations are members of the Inyo-Mono IRWMP, including the County of Kern, the County of Inyo, the Inyokern CSD, the Indian Wells Valley Water District, the U.S. Bureau of Land Management, and the EKCRCD. The Inyo-Mono IRWMP has obtained more than $2.5 million through DWR grants made available through Proposition 84 funding to assist essential water management projects and research efforts for Inyo, Mono, and Kern Counties, and includes the IWVGB. A map of the area included in the Inyo-Mono IRWMP is included in Figure 2-8.

The "Inyo-Mono Integrated Regional Water Management Plan" dated October 2014 states:

> "The purpose of the Inyo-Mono IRWM Program is to foster coordination, collaboration, and communication among water-related stakeholders in the region for the purpose of developing water management strategies and projects that will benefit multiple entities and enhance water supply, water quality, and watershed health."

2.4.6 Indian Wells Valley Cooperative Groundwater Management Group

The Indian Wells Valley Cooperative Groundwater Management Group (Cooperative Group) was created in 1995 as a public water data-sharing group to consolidate and coordinate voluntary water management efforts in the Indian Wells Valley. The Cooperative Group collected and shared information regarding groundwater resources and uses of groundwater in the IWVGB. At various times, members of the Cooperative Group included the NAWS China Lake, Searles Valley Minerals, Indian Wells Valley Water

District, Bureau of Land Management, City of Ridgecrest, KCWA, Kern County, Inyokern CSD, EKCRCD, and Inyokern Airport District. These members provided materials and services as in-kind donations to support the Cooperative Group's goals. In addition to in-kind services, the Cooperative Group received state funding from DWR for groundwater basin studies.

The Cooperative Group developed a "Cooperative Groundwater Management Plan for the Indian Wells Valley" (CGMP) dated March 2006 that established planning objectives to address conditions of overdraft and the resulting consequences for stakeholders in the Indian Wells Valley. The CGMP was not intended to alter or affect any existing water rights, but rather served as a set of guidelines to encourage participation in voluntary water management efforts among the Cooperative Group members. The water management efforts listed in the CGMP included:

- Working towards and encouraging limitation of additional large scale pumping in areas that appear to be adversely impacted;
- Distributing new groundwater extractions within the Indian Wells Valley in a manner that will minimize adverse effects to existing groundwater conditions (levels and quality), and maximize the long-term supply within the Indian Wells Valley;
- Aggressively pursuing the development and implementation of water conservation policy and education programs;
- Encouraging the use of treated water, reclaimed water, recycled, gray, and lower quality water where appropriate and economically feasible;
- Exploring the potential for other types of water management programs that are beneficial to the Indian Wells Valley;
- Continuing cooperative efforts to develop information and data which contributes to further defining and better understanding the groundwater resources in the Indian Wells Valley;
- Developing an interagency management framework to implement and enforce the objectives of the CGMP.

The Cooperative Group is no longer a functional entity due to the withdrawal of members over time. The IWVGA has since assumed responsibilities for data collection and exchange as well as water resources management in the IWVGB.

2.5 LAND USE

2.5.1 Background

California Government Code Section 65040.2 requires cities and counties to establish a General Plan as a guideline to determine growth patterns, land use, land development, etc. A municipal General Plan addresses the following elements for its city or county: land use, circulation, housing, conservation, open space, noise, safety, environmental justice, and other optional topics of local interest. The General Plan elements of greatest relevance to this GSP and the IWVGA's water supply issues are land use, housing, conservation, and open space.

Implementation of this GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA will coordinate with the relevant land use planning agencies (i.e. the counties of Kern, Inyo, and San Bernardino, as well as the City of Ridgecrest and the U.S. Navy) during implementation of this GSP.

2.5.2 Summary of General Plans and Other Land Use Plans

2.5.2.1 *Kern County*

The majority of land overlying the IWVGB is within Kern County. The Kern County General Plan, adopted September 22, 2009, is a policy document that, along with its amendments, guides the development and/or preservation of the county's natural resources not directly managed by the federal government. The Kern County General Plan was prepared by the Kern County Planning and Community Development Department.

Page viii of the Introduction to the Kern County General Plan states:

> "This planning document recognizes that the relationship between water supply and land use planning is important to promoting future growth and a strong economy for Kern County's future. Recent State laws require local governments to ensure that development approvals occur with

substantive, realistic assessments of the availability of a reliable water supply. The new laws require the verification of sufficient water supplies as a condition for approving certain developments and compel urban water suppliers to provide more information on the reliability of groundwater for a long-term time frame. Long-term water supply planning is important to ensuring that rural and urban economic growth can be accommodated into the future."

The Kern County General Plan acknowledges that water supply is a critical issue for Kern County's residents and economy. For this reason, the Kern County General Plan requires that General Plan amendments subject to environmental review and not otherwise subject to California Water Code Section 10910 demonstrate through a water supply assessment that a long-term water supply for a 20-year timeframe is available. Additionally, all development proposals are required to be reviewed by County staff to ensure that adequate water supplies are available to accommodate projected growth. To sustain long-term economic stability in Kern County, Chapters 1.9 and 1.10.6 of the Kern County General Plan encourage effective groundwater resource management through the following actions:

- Promoting groundwater recharge activities in various zone districts;
- Supporting the development of Urban Water Management Plans and promoting Department of Water Resources grant funding for all water providers;
- Supporting the development of groundwater management plans;
- Supporting the development of future sources of additional surface water and groundwater including conjunctive use, recycled water, conservation, additional storage of surface water and groundwater, and desalination;
- Requiring water-conserving design and equipment in new construction;
- Encouraging water-conserving landscaping and irrigation methods;
- Encouraging the retrofitting of existing development with water-conserving devices.

A total of 277,204 acres of land overlying the IWVGB is located within Kern County. 201,003 acres (73%) of the overlying land within Kern County is federal land managed by the Bureau of Land Management (BLM) (129,032 acres, or 47%), or controlled by the NAWS China Lake (71,971 acres, or 26%). Most of the BLM-managed land in the IWVGB is open space managed for natural and economic resources, including mineral resources and rights-of-way for powerlines and pipelines (Todd Engineers, 2014). The land controlled by the NAWS China Lake is used for weapons research, development, acquisition, testing, and evaluation ~~through~~ for the U.S. Navy.

Near the westerly and southeasterly City of Ridgecrest boundaries, the permitted zoning consists of residential zoning generally with a minimum lot size at 2.5 acres per dwelling unit, light industrial zoning, open space zoning, etc. The area between the City of Ridgecrest boundaries and the community of Inyokern contains primarily residential zoning districts with varying densities, while the areas northwest of Inyokern are residential and resource (primarily agriculture) zoning districts.

Zoning in the southwest portion of the IWVGB, commonly referred to as the El Paso area, consists primarily of open space, recreation (forestry), limited agriculture, and mobile homes. Lands in the El Paso area are largely uninhabited and are managed by BLM. As a result, significant groundwater extraction does not occur in this area due to the lack of water demands.

A breakdown of the Kern County lands overlying the IWVGB and their associated land use designations is provided in Table 2-5 and is shown in Figure 2-9.

Table 2-5. Zoning Districts in the Kern County lands overlying the IWVGB

Zoning District	Area (acres)	Area (%)
China Lake / Military Ownership	14,875	5.65%
Estate District 0.25 Acre	178	< 0.10%
Estate District 0.5 Acre	315	0.12%
Estate District 1 Acre	616	0.23%
Estate District 2.5 Acre	4,905	1.86%
Estate District 5 Acre	2,844	1.08%
Estate District 10 Acre	1,986	0.75%
Estate District 20 Acre	9,542	3.62%
Estate District 40 Acre	576	0.22%
Estate District 80 Acre	762	0.29%
Limited Agriculture	111,152	42.19%

Exclusive Agriculture	850	0.32%
General Commercial	149	< 0.10%
Neighborhood Commercial	1	< 0.10%
Highway Commercial	154	< 0.10%
Light Industrial	1,524	0.58%
Medium Industrial	683	0.26%
Low-Density Residential	105	< 0.10%
Medium-Density Residential	7	< 0.10%
MH Subdivision 2.5 Acres	8	< 0.10%
Mobilehome Park	16	< 0.10%
Mobilehome Subdivision	8	< 0.10%
Floodplain Primary	10	< 0.10%
Open Space	74,085	28.12%
Recreation Forestry	38,094	14.46%
Total	**263,445**[1]	**100%**

Section 1.6 of the Kern County General Plan projects that the population of Kern County will continue to grow at a rate of less than 2 percent annually over the 20 years after publication in 2009. This population growth is attributed to a continuing influx of new residents from outside the County, as well as the natural increase of the population in the County. The City of Ridgecrest General Plan provides the growth trends for the City, which indicate that population growth in the City is anticipated to be lower than that of Kern County. The water demands of the Indian Wells Valley Water District are projected to increase at a rate of 1.0% percent annually (ESA, 2009) over the planning and implementation horizon of this GSP to account for population growth in the IWVGB.

[1] Kern County zoning data was obtained from the County of Kern Geodat Open Data Portal. Updated as of September 24, 2019. Note that the City of Ridgecrest (located within the Kern County portion of the IWVGB) is not under the zoning jurisdiction of Kern County.

2.5.2.2 *Inyo County*

The Inyo County General Plan was approved by the Inyo County Board of Supervisors in 2001. In accordance with the 2001 General Plan, the Inyo County Planning Department is currently updating its Zoning Code and has subsequently released draft General Plan updates associated with the proposed updates to the Zoning Code. The Inyo County General Plan Update dated May 2013 was used to complete this GSP, which will be appropriately updated in accordance with all updates to the Inyo County General Plan.

Section 8.5 of the 2001 Inyo County General Plan provides planning goals related to water resources including:

- Providing an adequate and high quality water supply to all users within the County;
- Protecting and preserving water resources for the maintenance, enhancement, and restoration of environmental resources; and
- Protecting and restoring environmental resources from the effects of export and withdrawal of water resources.

In October 2017, the Inyo County Planning Department updated Section 18.67 of the Inyo County Code to create a non-groundwater neutral agricultural use overlay district that requires agricultural uses within the district that will adversely impact the underlying groundwater basin to have a conditional use permit. The community of Pearsonville is the primary community in the Inyo County portion of the IWVGB to which this update applies. The conditional use permit process is discretionary, allowing Inyo County (through the Inyo County Planning Commission) to prohibit agricultural uses that would be detrimental to Inyo County's interests and to the groundwater basin in general, while still allowing the possibility of agricultural uses that can be shown to be sustainable and have minimal impacts to the groundwater basin.

The vast majority of land in Inyo County is owned by either the federal government (~92%), the City of Los Angeles (~4%), and the state of California (~2.5%) (Inyo County Planning Department, 2013). Approximately 96% of the Inyo County land overlying the IWVGB is either owned by the US Navy as part of NAWS China Lake, or managed by the BLM (see Table 2-3 above). Approximately 98% of the Inyo County land overlying the IWVGB is zoned as open space (see Table 2-6 below). The community of Pearsonville, occupying approximately four-square miles, is zoned for various residential densities as well as some commercial and industrial zoning to compliment the community's highway-oriented businesses.

A breakdown of the Inyo County lands overlying the IWVGB and their associated zoning is provided in Table 2-6 and shown in Figure 2-10.

Table 2-6. Zoning Districts in the Inyo County lands overlying the IWVGB

Zoning District	Area (acres)	Area (%)
Commercial Recreation	5	< 0.1%
General Industrial and Extractive	167	0.3%
Heavy Commercial	15	< 0.1%
Highway Services and Tourist Commercial	25	< 0.1%
Light Industrial	29	< 0.1%
Multi-Family Residential	23	< 0.1%
Open Space	65,038	98.2%
Public	65	0.1%
Rural Residential	848	1.3%
Total	**66,215**[2]	**100%**

2.5.2.3 *San Bernardino County*

The General Plan for San Bernardino County was last updated in 2007 and is currently in the process of being revised. The land just adjacent to the City of Ridgecrest's eastern boundary is designated as Rural Living, allowing for a maximum of one dwelling unit per 2.5 acre lot. This area contains less than one

[2] Inyo County zoning data was obtained from the County of Inyo Public Geographic Information Systems Page. Updated as of January 31, 2019. Note that not all Inyo County lands overlying the IWVGB were given zoning district categories in the dataset.

square mile of residential lots. Areas with a Resource/Land Management designations span over several miles to the east of China Lake and north of the Inyo County line. A majority of the land overlying the IWVGB within San Bernardino County is within the NAWS China Lake boundaries, as shown above in Table 2-3.

A breakdown of the San Bernardino County lands overlying the IWVGB and their associated zoning is provided in Table 2-7 and shown in Figure 2-11.

Table 2-7. Zoning Districts in the San Bernardino County lands overlying the IWVGB

Zoning District	Area (acres)	Area (%)
Resource Conservation	37,411	98.5%
Rural Living	574	1.5%
Total	**37,985**[3]	**100%**

2.5.2.4 *City of Ridgecrest*

The City of Ridgecrest has direct land use jurisdiction within its city limits with the exception of the small portion of the city within NAWS China Lake. The community within and surrounding the City of Ridgecrest is strongly linked to supporting NAWS China Lake by providing housing and services for personnel and contractors working at NAWS China Lake; accordingly, the City of Ridgecrest General Plan emphasizes both achieving growth and sustainably supporting the military installation.

The City of Ridgecrest's General Plan was last updated in 2009. The City's General Plan discusses the City's goals for a number of elements, including public facilities and public services. The following goals stated in the City's General Plan are related to and in alignment with the implementation of this GSP:

[3] San Bernardino County zoning data was obtained from the ArcGIS Hub – Open Data, in conjunction with the San Bernardino County Land Services Department. Updated as of May 3, 2018.

- Goal LU-10.13: Ensure that all General Plan updates, specific plans, and planned developments in the City consider impacts to water availability and quality;
- Goal CD-2.11: Develop a long range plan for the distribution of reclaimed waste water to be used in place of fresh water where applicable.
- Goal OSC-4.2: Develop programs to encourage water conservation in conjunction with the Indian Wells Valley Water District and other interested agencies.
- Goal OSC-6.1: Require a construction plan prior to groundbreaking that uses site design and grading techniques to reduce the amount of impervious surface and runoff for all new urban commercial or residential developments proposed projects.
- Goal OSC-6.2: Require the disposition of solid and liquid wastes in a manner consistent with state and federal regulations to prevent aquifer contamination.
- Goal OSC-6.3: Work in partnership with the Indian Wells Water Valley Water to establish a reasonable population limit for the City and Indian Wells Valley in order to reflect the basin's capacity for sustainable yield of groundwater.
- Goal OSC-6.4: Investigate methods of expanded reuse or tertiary treatment of wastewater for groundwater recharge, industrial use and landscape irrigation, and implement effective methods where feasible.
- Goal OSC-6.5: Discourage further increases in groundwater extraction for water intensive uses such as non-native landscaping and water-intensive agricultural crops.
- Goal OSC-6.6: Encourage water conservation on a city-wide basis.
- Goal OSC-6.7: Investigate and implement water efficient devices for existing and future municipal buildings.
- Goal OSC-6.8 Evaluate, define, and correct water losses on City property that are detrimental to conservation efforts.
- Goal OSC-6.9: Encourage using water efficient landscaping practices, where possible, for all City landscaping.
- Goal OSC-6.10: Update the building code to encourage the use of recycled or grey water for landscaping.
- Goal OSC-6.11: Support and adopt the goals of the Indian Wells Valley Water District Urban Water Management Plan.

- Goal OSC-6.12: Support efforts to more accurately determine the groundwater dynamics of the Indian Wells Valley groundwater basin.
- Goal OSC-6.13: Support the IWVWD and NAWS efforts to identify and secure alternative sources of water supply.
- Goal OSC-6.14: Support efforts by the IWVWD, NAWS and other water purveyors to develop sound pumping patterns through well field redesign, and, where possible, consolidate systems.
- Goal OSC-6.15: Support the efforts of the Indian Wells Valley Water District toward consideration of the creation of a valley wide water policy to control the exportation of water from the Indian Wells Valley.
- Goal OSC-6.16: Identify flood plains, aquifer recharge areas and natural drainage courses, where possible, as open space to aid groundwater recharge.
- Goal OSC-11.5: Develop park areas utilizing xeriscape practices, wastewater reuse and other water conserving measures as a demonstration and educational opportunity for residents to learn water conservation practices.

2.5.2.5 *Federal Lands*

The US Department of Interior Bureau of Land Management prepares Resource Management Plans (RMPs) that serve as land management blueprints. The majority of southern California, including the Indian Wells Valley, is within the California Desert Conservation Area (CDCA). The CDCA comprehensive land-use management plan was completed in 1980 and revised in 1999. Additionally, the Indian Wells Valley is within the BLM's West Mojave Plan area which established a Habitat Conservation Plan for sensitive plants and species in the region.

The US Department of Interior has assigned land management responsibility of NAWS China Lake to the Navy. Consequently, the Navy has developed a Comprehensive Land Use Management Plan (CLUMP) for land use management and environmental resources management for NAWS China Lake.

2.5.3 Agricultural Land Use

There are approximately 3,086 acres of actively farmed land overlying the IWVGB[4]. Typically, each farm has its own well system and water delivery system for its respective crops. The primary crops grown in the Indian Wells Valley are pistachios (2,027 acres) and alfalfa (985 acres), with other miscellaneous crops (74 acres) such as miscellaneous grain and hay constituting a minority of production. A map of actively farmed land overlying the IWVGB is provided in Figure 2-12.

2.5.4 Industrial Land Use

There are no large-scale industrial land uses in the Indian Wells Valley. Since the 1920's, Searles Valley Minerals, Inc. (SVM) has exported groundwater from five (5) wells located in Ridgecrest and west of the Ridgecrest city limits to Searles Valley (located outside of the Indian Wells Valley) to support both its industrial operations and the domestic needs of the unincorporated communities of Trona, Westend, Argus, and Pioneer Point. Section V.C of the San Bernardino County General Plan maintains a countywide goal of promoting conservation of water and maximizing the use of existing water resources by promoting activities and measures that facilitate the reclamation and reuse of water and wastewater, including for industrial uses.

2.6 EXISTING WATER RESOURCES MONITORING PROGRAMS

2.6.1 Background

Multiple entities have been measuring depth to groundwater in the IWVGB since the 1920's. Monitoring programs were first initiated in the IWVGB by the United States Geological Survey (USGS) and have been primarily conducted by KCWA since 1989 with the assistance of the Water District, the United States Bureau of Reclamation (USBR), and the NAWS China Lake. Additionally, many of these entities have constructed wells dedicated to monitoring groundwater levels and water quality in the IWVGB.

[4] Actively farmed land in the IWVGB was determined using the California Department of Water Resources' Crop Mapping 2014 GIS dataset. Updated as of March 13, 2018.

Prior to formation of the IWVGA, monitoring efforts in the IWVGB were often duplicated due to a lack of communication among interested parties. In 1995, the Cooperative Group was formed to coordinate monitoring and management efforts, share data, and avoid the redundancy of groundwater study efforts. As a public data-sharing group consisting of the major water producers, government agencies, and concerned citizens in the IWVGB, the Cooperative Group compiled numerous study efforts in the IWVGB including a basin-wide recharge study, the construction of weather and stream gages, and a monitoring program involving over 100 monitoring wells. The Cooperative Group published its compiled monitoring data, including historical reported pumping and basin studies, on its website:

http://iwvgroundwater.org/

The Cooperative Group was designated as the California Statewide Groundwater Elevation Monitoring (CASGEM) monitoring entity for the IWVGB per a DWR letter dated November 18, 2011. With the formation of the IWVGA and the subsequent withdrawal of several key signatories from the Cooperative Group, the status of CASGEM monitoring entity was transferred to the IWVGA in January 2018 as part of the IWVGA's initial SGMA compliance efforts.

The following sections summarize the existing water resources monitoring programs that are on-going within the IWVGB. These programs are conducted by a variety of agencies and are now being incorporated into the SGMA compliance efforts overseen and managed by the IWVGA. Data obtained through the existing water resource monitoring programs helped populate the IWVGA's Data Management System (see Section 2.8), and the data was used to develop alternative groundwater basin management strategies (see Section 5).

2.6.2 KCWA Groundwater Monitoring Programs

The KCWA measures depth to groundwater in over 200 monitoring wells in the IWVGB consisting of a network of private and public water production wells and monitoring wells. Field measurements of water levels are conducted semiannually in October and March at periods of historical groundwater demand peaks and minimums. The water level data is collected, analyzed, and plotted onto contour maps to depict groundwater depths, groundwater elevations, and changes in groundwater elevation over time. The contour maps portray how the IWVGB spatially reacts to groundwater extractions across the Indian Wells Valley. The contour maps and hydrographs are updated annually by KCWA and can be viewed at the IWVGA's Data Management System (see Section 2.8), which can be accessed at www.iwvgsp.com.

KCWA also collects water quality samples at monitoring wells for analysis. The water quality results can then be plotted on contour maps and a variety of other types of diagrams and graphs.

The data collected from monitoring groundwater levels and water quality are archived in the IWVGA's Data Management System, which contains groundwater level data dating back to 1946 and water quality data dating back to 1952.

The locations of the KCWA monitoring wells and other monitoring wells in the IWVGB are provided in Figure 2-13.

2.6.3 California Statewide Groundwater Elevation Monitoring

A subset of the data from 20 of the over 200 wells monitored throughout the IWVGB are submitted to DWR as part of their California Statewide Groundwater Elevation Monitoring (CASGEM) program. CASGEM requires each individual groundwater basin to develop a representative groundwater level monitoring program to assist with tracking change in groundwater levels, and consequently changes in the volume of water stored in the groundwater basin. The CASGEM program aides in identifying the seasonal and long-term trends in the IWVGB. The locations of the IWVGB CASGEM wells are provided in Figure 2-13. A selection of these CASGEM wells served as representative monitoring sites while evaluating impacts and management actions and subsequently served as the locations where sustainability criteria were set (see Section 5).

2.7 EXISTING WATER RESOURCES MANAGEMENT PROGRAMS

2.7.1 Background

It has been well documented that the IWVGB has been in overdraft since the 1960s and that current basin outflows exceed basin inflows by approximately four times (see Section 3.3.4.4). Water resources management programs in the IWVGB have been implemented by a variety of entities to address conditions of basin overdraft. In many instances, these water resources management programs have resulted in reduction of historical pumping to reduce the impacts of over-pumping.

The water resources management programs that are **not** currently practiced in the IWVGB include replenishment of groundwater extractions; conjunctive use and underground storage; and diversions to storage. The following section summarizes the existing and on-going water resources management programs administered in the IWVGB. Proposed water resources projects and management actions that will be primarily managed by the IWVGA are discussed in Section 5.

2.7.2 Salt and Nutrient Management Plan

A Salt and Nutrient Management Plan (SNMP) for the IWVGB was finalized in March 2018 and accepted by the LRWQCB. The SNMP (RMC, et al., 2018) was prepared as a high-level planning document to inform the monitoring and implementation elements being developed for this GSP. The SNMP was also prepared in compliance with the requirements of the State Water Resources Control Board 2009 Recycled Water Policy, including addressing the National Pollutant Discharge Elimination System (NPDES) permitting for the existing City WWTF. The SNMP provides an overview of basin characteristics, groundwater conditions, historical groundwater production, and existing groundwater quality. In addition, the SNMP:

- Identifies sources of additions/withdrawals of both salts (Total Dissolved Solids) and nutrients (such as nitrate);
- Analyzes current assimilative capacity for salts and nutrients;
- Projects trends in water quality and loading;
- Analyzes water quality conditions against the water quality objectives described in the Basin Plan;
- Discusses existing and potential water resources practices that do and may impact basin water quality; and
- Provides a proposed preliminary water quality monitoring program for inclusion in the GSP groundwater monitoring program.

2.7.3 Conservation Programs

2.7.3.1 *Water District Demand Management Measures*

The Water District has implemented a number of successful water conservation programs in an attempt to reduce annual groundwater extractions and in response to state-mandated conservation goals. The Water District has achieved a 30% reduction in total water demand as a result of implementing a four-tier water rate structure along with various water conservation Ordinances issued by the Water District. The current Water District Ordinances that are in effect include:

- Water District Ordinances 98 and 99 (adopted in 2015)
  - Implementation of an Approved Plant List for landscaping
  - Mandated use of low volume irrigation systems, high efficiency sprinkler heads, pressure regulators, and master shut-off valves
    - Subsurface drip irrigation required on areas less than 10 feet wide
- Water District Ordinance 101 (adopted in 2017)
  - Implementation of the 2017 Water Shortage Contingency Plan
    - Actions for two stages of local water shortages and a drought state of emergency
- Water District Ordinance 103 (adopted in 2017)
  - Irrigation limited to 3 days per week during all months
  - No water user shall waste water; prohibits washing down hard or paved surfaces for strictly aesthetic purposes
  - Prohibit vehicle washing except by use of a hand-held bucket or hand-held nose equipped with a shut-off nozzle or device
  - Irrigation only between 8:00 PM – 8:00 AM; irrigation limited to 3 days per week based on addresses (1 day per week from November through February)
  - Restaurants shall only serve water on request
  - Turf or ornamental landscapes shall not be irrigated within 48 hours after measureable precipitation
  - Hotel/motel operators shall provide guests the option of choosing not to have towels and linens laundered daily
  - Prohibits recreational fountains or decorative water features

The Water District has hosted community outreach events (e.g. school education programs) to raise awareness of water conservation practices such as the use of appropriate desert landscaping. At these and other local events, the Water District has distributed water conservation fixtures including 3,746 low-flow showerheads; 5,256 low-flow hose nozzles; 880 shower timers; 2,480 faucet aerators; 3,514 water tumblers; and 2,339 moisture meters. The Water District's "Cash for Grass" Rebate Incentive Program offers rebates to property owners who elect to replace lawns with eligible low water-use landscaping. To supplement its ongoing conservation practices, the Water District manages a digital customer engagement portal that allows the Water District and its customers to track and analyze customer water use, conservation practices, ordinance violations, leakage incidents, etc.

2.7.3.2 *City of Ridgecrest Demand Management Measures*

Similar to the Water District, the City of Ridgecrest has adopted water conservation Ordinances to reduce demands. The Ordinances include:

- City of Ridgecrest Ordinance 09-05 (adopted in 2009)
    - Similar irrigation restrictions to Water District Ordinance 100
- City of Ridgecrest Ordinance 16-01 (adopted in 2016; supersedes Ordinance 09-05)
    - Water-efficient landscaping and irrigation scheduling
    - Promoted use of recycled water and greywater
    - Promoted stormwater management practices

2.7.3.3 *Navy Water Use*

As documented by NAWCWD-TP-8842, the Navy has historically been a major pumper in the IWVGB.~~The Cooperative Group's recorded production data indicates that the Navy has historically been a major pumper in the IWVGB~~. The Navy has since reduced its historic groundwater pumping through a combination of instituted conservation measures and a shift from on-base housing of Navy personnel to off-base housing within Ridgecrest.

Commented [KJDCNSA1]: This document represents an official, comprehensive pumping history for NAWS China Lake; the Cooperative Group's data does not.

While a member of the Cooperative Group, the NAWS China Lake committed to explore the potential for water resources management programs that would benefit the IWVGB, including water conservation efforts. In its "Water Conservation Public Advisory" dated June 2008, the Cooperative Group (including the Navy) developed strategies to reduce unnecessary and/or excessive water uses to support the sustainable management of the IWVGB.

The NAWS China Lake's Integrated Natural Resources Management Plan (INRMP) dated June 2014 describes the Navy's implementation of natural resources programs at NAWS China Lake, including water resources management. In its 2014 INRMP, the Navy emphasizes a water conservation program focused on xeriscaping, a landscaping method based on the use of native or drought-resistant plants, in addition to efficient irrigation practices that require less water. Principles of xeriscaping include using gravel or plastic/rubber-based products to preclude weed growth and enhance water retention; using ground cover to prevent blowing dust and soil erosion; watering using automatically controlled cycles during low evaporation periods; and using drip irrigation whenever possible. The 2014 INRMP discourages the addition of new lawn areas except where functionally essential (i.e. in areas used for ceremonies, family housing, recreation fields, and children's playgrounds).

Per California Water Code Section 10720.3(d), SGMA recognizes that federally reserved water rights to groundwater must be respected in full and that federal law shall prevail in the case of any conflict between federal and state law. NAWS China Lake considers groundwater resources (or lack thereof) to be the number one encroachment concern with the potential to impact missions enabled on and around the NAWS China Lake. NAWS China Lake has agreed to voluntarily participate in the preparation and administration of this GSP, which considers the interests of all beneficial uses and users of groundwater—including the federal government, military, and managers of federal lands—in accordance with California Water Code Section 10723.2. In November 2018, the Navy provided a figure of 2,041 acre-feet as the ammount of water the installation could agree to use under a GSP. ~~At an IWVGA Pumper Group Allocation meeting on October 1, 2018, the Navy indicated its short-term future water needs on the installation to be approximately 2,041 AFY, which includes a 25% increase in current water use.~~ This estimation is **not** indicative of the Navy's federally reserved water right, which has yet to be quantified and is not subject to the provisions of SGMA.

2.7.3.4 *Opportunities for Additional Conservation*

Opportunities for implementation of additional conservation measures are discussed in Section 5.

2.7.4 Efficient Water Management Practices

The Water District prepared its "2015 Urban Water Management Plan" (2015 UWMP), dated June 2016, which includes a discussion of efficient water management practices in Section 6.B.7 "Prohibitions, Penalties, and Consumption Reduction Methods". The following is a brief summary of these efficient water management practices.

2.7.4.1 *Mandatory Prohibitions on Wasting Water*

The Water District has adopted Ordinance No. 103 implementing emergency water conservation through mandatory restrictions. The City of Ridgecrest adopted a Water Efficient Landscape Ordinance (Ordinance No. 16-01). These ordinances have common requirements, including but not limited to:

- Prohibiting runoff from landscape irrigation;
- Prohibiting wash down of hard or paved surfaces;
- Prohibiting water leaks;
- Prohibiting use of a hose without a shut-off nozzle;
- Prohibiting landscape irrigation on the surface, except for hand watering or the use of a drip irrigation system, between the hours of 8:00 P.M. and 8:00 A.M. during the months of May, June, July, August, September, and October, unless a special permit is issued to accommodate newly planted material;
- Requiring new plumbing fixtures to conform to requirements of law as to flow capacity.

2.7.4.2 *Water Efficient Landscaping*

The Water District has implemented numerous water-efficient landscape requirements for customers within its service area, including:

- Prohibiting turf in the front yard;
- Limiting plants in front yards to those provided in a Water District-approved list;
- Prohibiting front yard irrigation systems that are not low-volume;
- Requiring use of high-efficiency irrigation sprinkler heads;
- Prohibiting irrigation runoff.

2.7.4.3 *Excessive Use Penalties*

Based on the actual cost to produce and distribute water, the Water District has adopted a tiered water rate structure which rewards customers that conserve water through lower water rates. Customers that consistently waste water may be subject to having flow restrictions placed on their meters.

2.7.5 Recycled Water Use

California Water Code Section 13050(n) defines "recycled water" as water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. There are currently two wastewater treatment facilities (WWTFs) within the IWVGB: The City of Ridgecrest WWTF[5], and the Inyokern CSD WWTF. IWVGB residents that do not contribute flow to either of these WWTFs use septic tanks to dispose of wastewater.

Prior to 1974, the City of Ridgecrest Sanitation District operated a small WWTF in the eastern portion of the City, near the eastern City limits. At that time, the Navy operated its own separate WWTF on the NAWS China Lake. To address capacity problems, the City abandoned its old WWTF and consolidated the two treatment facilities to treat combined flow from the City and from the NAWS at a common plant. The City has since operated the existing 3.6 million gallon per day (MGD) WWTF located on the NAWS base, approximately 3.5 miles northeast of the City center. Annual average day flows at the WWTF were approximately 2.44 MGD (2,739 AFY) in 2017. The City WWTF provides primary wastewater treatment

[5] A Memorandum of Agreement dated April 1, 1993, between the Navy and the City states that the City owns and operates the WWTF, though there is a general lack of consensus among the IWVGB stakeholders regarding the ownership and operations of the WWTF. The term "City WWTF" is used in this GSP for the sole purpose of distinguishing between the two existing WWTFs in the IWVGB.

through a series of headworks and sedimentation tanks. Secondary treatment occurs in a series of on-site facultative ponds with clay linings.

The City of Ridgecrest's WWTF is currently the only facility which generates a recycled water supply for direct beneficial or controlled use within the IWVGB. The City WWTF produces recycled water that is applied at a City site for alfalfa irrigation and at the NAWS China Lake for golf course irrigation. The remaining treated wastewater generated at the City WWTF is discharged to evaporation/percolation ponds at the City WWTF site.

Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City plans to abandon and demolish the existing City WWTF for construction of a new oxidation ditch secondary treatment plant with new evaporation/percolation ponds and new solids handling facilities (Provost & Pritchard, 2015). The City has evaluated constructing new recycled water facilities including tertiary treatment trains (filtration and disinfection) at the new WWTF, a recycled water storage tank, a recycled water pump station, and a purple pipe distribution system. The new recycled water facilities would provide up to 1.8 MGD (2,016 AFY) of recycled water for City use in landscape irrigation and/or groundwater recharge (Provost & Pritchard, 2015). The City is considering two (2) potential sites for the new WWTF: (1) the existing WWTF site, or (2) the old City WWTF site. The new WWTF location will depend on ongoing easement and land use negotiations between the City and the Navy.

The Inyokern CSD also operates a small WWTF with an approximate capacity of 0.035 MGD to treat wastewater from residents within its service area. The final effluent generated at the Inyokern WWTF is currently not of sufficient quality for any beneficial uses of recycled water and is instead disposed of through evaporation/percolation ponds located at the Inyokern WWTF site.

2.7.5.1 *Alfalfa Irrigation*

Approximately 220 AFY of recycled water (secondary-treated wastewater) from the City WWTF has been historically used to irrigate 30 acres of alfalfa located at the old City WWTF site. The alfalfa is commonly sold by the City for use in cattle feed. The July 2019 Salt Wells Valley earthquakes caused disruptions to the City WWTF and prevented the City from irrigating its alfalfa for the 2019 growing season. The City plans to continue its alfalfa irrigation with recycled water until the new WWTF with recycled water facilities is constructed, at which point the City plans to instead apply recycled water (tertiary-treated wastewater) for landscape irrigation and/or groundwater recharge.

2.7.5.2 *NAWS China Lake Golf Course*

The Navy receives secondary-treated effluent from the City WWTF and provides additional treatment for beneficial use on a golf course. The Navy uses a chlorine contact basin to provide additional treatment of the effluent. A Negotiated Sewer Service Contract between the City and the Navy reserves up to 750 AFY of treated wastewater from the City WWTF for irrigation of the golf course located at the NAWS China Lake. However, it has been noted that the golf course only uses approximately 500 AFY of water (Provost & Pritchard 2015).

2.7.5.3 *Evaporation/Percolation Ponds*

The City WWTF site contains four (4) evaporation/percolation ponds which may receive secondary-treated effluent that is not supplied for alfalfa irrigation or golf course irrigation. Wastewater stored in these ponds evaporates or percolates into either the underlying shallow groundwater aquifer or the Mohave Tui Chub habitat located north of the City WWTF.

The Mohave Tui Chub are an endangered species of fish native to the Mohave River. Due to numerous alterations to its native habitat in the Mojave River, a small population of the Tui Chub were relocated to the NAWS China Lake during the 1970s. The current Tui Chub habitat at China Lake consists of two seeps, referred to as Lark Seep and G-1 Seep. The two seeps are connected through a series of man-made channels, which were originally constructed during the 1950s and 1960s to divert seeping groundwater away from nearby roads and facilities. The habitat inflows include seepage from the City WWTF ponds, irrigation percolation from the China Lake golf course, and various contributions from the City of Ridgecrest area (e.g. irrigation percolation, wash-down, commercial water discharge, and transmission line leaks) (ERS 1991).

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 3 – BASIN SETTING

DRAFT

November 4, 2019

SECTION 3: BASIN SETTING

3.1 INTRODUCTION

The GSP Emergency Regulations Guide “GSP Guide” (DWR 2016a) calls for development of a Basin Setting that includes a description of the static physical characteristics of the basin and the dynamic groundwater and water budget conditions. The descriptive hydrogeologic conceptual model (HCM) of the IWV presented herein will be used to describe basin setting static conditions. The HCM will provide stakeholders with an “understanding of the basin’s physical characteristics related to hydrology, land use, geology and geologic structure, water quality, principal aquifers, and principal aquitards…” (DWR 2016b). The HCM will also provide an understanding of how “aquifers react to hydrologic stresses over time, and the interaction of surface water and groundwater systems within the basin” (DWR 2016a). The intent is for the HCM to be used as an informational tool to facilitate a shared understanding among all parties regarding groundwater behavior and cause and effect relationships of actions affecting the IWV such as the implementation of projects and management actions.

The GSP Guide (DWR 2016a) also states that dynamic groundwater conditions should be described by historical and present-day groundwater conditions *related to undesirable results*, and that the GSP should include a description for conditions as of January 1, 2015. Data gaps and data uncertainty that limit basin understanding or evaluation of GSP performance must be noted (DWR, 2016a).

In addition to the HCM, the Basin Setting should also include a quantitative water budget that accounts for inflows and outflows. Groundwater basins subject to critical overdraft, such as the IWVGB, must quantify the amount of overdraft. Baseline conditions related to supply, demand, hydrology, and surface water supply reliability are established for the purpose of understanding future projected conditions and for development of management actions and projects.

In keeping with requirements in the GSP Guide, this section provides background and discussion of: 1) the HCM; 2) the historical water budget and sustainable yield; 3) the current and historical groundwater conditions and hydrology; 4) the numerical groundwater model of the IWVGB; and 5) the existing monitoring network and data gap evaluation.

3.2 HISTORY OF WATER USE IN THE INDIAN WELLS VALLEY

The first water use in the IWV corresponds with the first habitation of the valley by Native Americans more than 10,000 years ago (Giambastiani, 2017). Evidence of prehistoric village sites in the IWV suggest a stable, long term resident population. The region during that time was different than it is today, characterized by a cooler and wetter climate with numerous springs, lakes, and streams. The Owens River flowed through the valley and on into Searles Valley, and China Lake was a large fresh-water lake. The valley was surrounded by conifer forests similar to the forests seen today along the Sierra Crest, in areas above the elevation ~~a~~ at Walker Pass (Harris, 2013).

Approximately 7,000 years ago, the region's climate started to warm and dry, causing the gradual appearance of the present-day Mojave Desert landscape (Bacon, 2006 and Bacon, 2014). Research indicates the creosote bush, which is prevalent in the IWV today, had arrived around that time.

The first Europeans arrived in the valley in the first half of the 1800s, consisting of trappers, adventurers and explorers. Joseph Walker passed through in the early 1830s, and then returned with the Fremont party in 1845, which included famous explorers Kit Carson, Richard Owens, and Ed Kern. These early European arrivals in the IWV were transient, with many of these parties making use of the perennial Indian Wells Spring, where the lodge and brewery along Highway 14 are today, as they passed through the IWV. (See Figure 2-2 for the location of IWV landmarks.) Travelers during the California Gold Rush, the infamous Death Valley 49'ers Parties, and the Whitney Geological Party are all thought to have utilized perennial springs during their travels (Farquhar, 1946).

The second half of the 19th century brought more permanent settlements along the Eastern Sierra with the development of mining operations. Given the arid climate, fresh water was a valuable commodity and exclusively came from surface flows at springs and streams. Sites such as Coyote Holes near Freeman Junction, Indian Wells, and Little Lake became noted water stops. Borax and soda deposits were mined along Searles Lake and China Lake, gold and silver in the Panamint and Coso Ranges, creating additional freight and stagecoach routes running between water sources. Basque sheepherders also arrived in the IWV during the late 1800's, and drove their sheep though the valley every year in route to their summer ranges north of Bishop (Harris, 2013).

The composition of the community and water landscape changed toward the end of the 1800s when a large gold discovery in Randsburg attracted thousands of people into regions surrounding the IWV. Additional mines were developed in the Rademacher Hills at the south edge of the IWV, and many operations required ground or spring water to supply the milling needs. The infrastructure became part of the support for the future construction of the Los Angeles Aqueduct that supplies water from the Owens Valley to the City of Los Angeles. The "~~jaw bone~~Jawbone" branch of the Southern Pacific Railway was constructed in 1910 partly to aid in the construction of the LA Aqueduct (Complete Report on the Construction of the Los Angeles Aqueduct, 1916). These projects and operations encouraged an influx of miners, farmers and teamsters into the valley for work, which led to land and farming promotions that fostered to the establishment of the communities of Inyokern and Brown. As development in late 1800s continued, it became necessary to develop groundwater supplies to support the increased population, infrastructure, and operations in the IWV.

Commented [KJDCNSA1]: This implies IWV had development in the late 1800s, which is too early – IWV development is really in the post-turn of the 20th century. See Herbert, and DiPol references.

The beginning of the 20th century saw an even greater migration of people into the IWV to homestead and farm. As a significant number of government land titles were issued, agriculture land use increased, which resulted in an estimated 1,000 acre-feet (AF) of groundwater use to support local farms by 1912 (Lee, 1912). Typically, alfalfa and oats were grown in the IWV for dairy cattle and for horses and mules for the extensive freighting operations.

Industrial groundwater use also increased during the first decades of the 20th century. Westend Chemical Company (previously Pacific Coast Borax Company) began transporting water from the IWV in the 1920's. A pipeline was built in 1930 to transport water from a well at the Windy Acres Ranch location to Searles Valley. In 1942, an additional pipeline was constructed by American Potash and Chemical Company (previously known as American Trona Corporation) to transport water from its wells in the IWV to Searles Valley. After multiple acquisitions, the mining company in Trona became Searles Valley Minerals Incorporated in 2004, as it is known today. Searles Valley Minerals Inc continues to be the largest industrial user and only exporter of water from the IWVGB.

World War II brought permanent changes to the IWV by introducing the U.S. Navy into the region. In 1943, the U.S. Navy began development of the Naval Ordnance Test Station, which included construction of hundreds of industrial and residential buildings, roads, runways, and other necessary infrastructure. As development by the U.S. Navy continued, more groundwater wells were drilled to supply the increased water demands. Most of the IWV's new permanent residents were associated with the naval operations and lived on Navy property during the 1940s and into the 1970s. The growth of the naval operations led to the incorporation of the City of Ridgecrest in 1963. In the 1970s and 1980s, Navy personnel began shifting to off-Base housing in the City of Ridgecrest, which transferred water demands from the U.S. Navy service area to the Indian Wells Valley Water District.

Water use in the IWV over the past 70 years has been documented, first by the U.S. Geological Survey (USGS) with U.S. Navy participation and then by the U.S. Bureau of Reclamation (USBR). For a period of about 20 years starting in the mid 1990's the annual production tally was maintained by the IWV Cooperative Group. Water use data from 1975 records show total groundwater production of 15,980 AF, with the U.S. Navy accounting for 31% of pumping (Table 3-1). Data from the Cooperative Group (see Appendix 3-A) suggests peak water usage in the IWV at approximately 29,500 AF in 2007. After significant conservation efforts, primarily by the Navy and the IWVWD, groundwater production in the IWV has been reduced to approximately 25,300 AF in 2015. The water use category distribution in 2015 had changed significantly from 1975 as shown by the following tabulated distribution.

Table 3-1 Historical Pumping Distribution by Water Use

Water Use	**1975** 15,980 AF	**2007** 29,433 AF	**2015** 25,285 AF
Agriculture	22%	50%	50%
Industrial	17%	10%	10%
City/Municipal/Domestic	29%	34%	34%
U.S. Navy	31%	6%	6%

3.3 HYDROGEOLOGIC CONCEPTUAL MODEL[1]

The geology and hydrogeology of the IWVGB have been studied since the early 1900's. The California Conservation Commission (Lee, 1912) wrote one of the first reports to estimate available groundwater resources within the IWVGB. The USGS and DWR completed multiple studies of the IWVGB to delineate the geologic and hydraulic features (Moyle, 1963; Kunkel and Chase, 1969; Dutcher and Moyle, 1973; Berenbrock, 1987). Further geologic work was completed by the USBR in 1993 including the first deep fully characterized Basin borings and installation of multi-level wells. Important recharge investigations[2] were undertaken by the EKCRCD[3] (Tetra Tech EM, 2003b) and Cooperative Group[4] (2008) with AB303 grant funding. In 2014, a comprehensive survey of existing IWV Basin groundwater research and yearly documented water production was undertaken with Kern County funding (Todd, 2014). In 2016 and 2017, the Navy funded a groundwater flow model update[5], performed by the Desert Research Institute (DRI), that is providing key technical support including groundwater level predictions for pumping scenarios identified in this GSP (DRI: McGraw et al., 2016; Garner et al, 2017). More recently a SkyTEM (Transient Electro-Magnetic,) geophysical survey was completed and analyzed under Prop1 Funding (Thorn, et al., 2019) to develop a detailed hydrogeologic conceptual model for the basin[6]. In May 2019, detailed geomorphic landforms were mapped for the Navy[7]. Following is a general description of the HCM that has been a foundation for the numerical groundwater model and development of the GSP water budget analysis.

IWV is located in the western edge of the Basin and Range Physiographic Province, characterized by a topography of isolated mountain ranges separated by desert basins (TtEMI, 2003b). IWVGB is bounded

[1] CCR §354.14 Hydrogeologic Conceptual Model that characterizes the physical components and interaction of the surface water and groundwater systems in the basin.

[2] USBR (1993) recommended the recharge study completed by EKCRCD, 2013 study was

[3] EKCRCD, Eastern Kern County Resources Conservation District managed the AB303 grant from State of California Water Resources Department.

[4] IWVCWMG, IWV Cooperative Water Management Group managed the second phase of an AB303 grant.

[5] DRI updated model structure and input data and re-calibrated the numerical MODFLOW model developed by Brown and Caldwell (2009) for IWVWD.

[6] Thorn et. al., March 2019. This document was draft at the time of initially writing the GSP, and was finalized in the same timeframe this document was being written. SkyTEM data was calibrated to existing lithologic logs to develop subsurface cross sections and a three-dimensional HCM of the IWVGWB. Some of the initial findings have been incorporated into this GSP. Data and analysis from the SkyTEM study will be evaluated and incorporated into the 5-year plan review and model update for this GSP.

[7] Bullard et. al, May 2019.

on the west by the Sierra Nevada Mountains to the west, the Coso Range to the north, the Argus Range to the east, and the El Paso Mountains and Spangler Hills to the south. The highest elevation in the IWV watershed occurs in the Sierra Nevada reaching 5,350 feet mean sea level (msl) at Blue Max Mountain. Mountain slopes dip steeply to the valley floor that in turn slopes gently to China Lake, which is usually a dry playa, except following significant rainfall. The location map (Figure 3-1) shows the watershed extents, the groundwater basin boundary (also known as the GSA boundary), land ownership, and existing monitoring wells for reference in this discussion. The elevation of the valley floor ranges from about 2,790 feet msl at the far southwest El Paso area to approximately 2,150 feet msl at China Lake playa (TtEMI, 2003b). The USGS topographic map shown on Figure 3-2 displays how the GSA boundary encompasses the valley floor and alluvial stream channels of the surrounding mountains.

The HCM shown in Figure 3-3 provides an illustration of the general structure of the basin with the primary recharge in and discharge out of the groundwater aquifer. Natural recharge occurs along the mountain-front areas and as subflow from Rose Valley. The main discharge of groundwater occurs from pumping wells, evapotranspiration (ET) at the playa, and estimated (small) subflow to Salt Wells Valley. The general flow direction of the groundwater system is from the mountains (recharge area) towards the playa (discharge area). This section describes the soils, geology, hydrogeology, and hydrology of the basin, followed by a description of the historical water budget and current understanding of the sustainable yield for the IWVGB.

3.3.1 Geology and Hydrogeology

Indian Wells Valley lies within the northern portion of the Eastern California Shear Zone (ECSZ) or the southern Walker Lane Belt, in a transitional zone of east-west extensional faulting of the Great Basin Province and dominant right-lateral strike-slip faulting common to the Sierra Nevada Mountains (TriEcoTt, 2013). From the Late Miocene through the Pliocene, IWV was down-faulted along the Sierra Nevada frontal fault resulting in the structural half-graben of present-day (Monastero et. al., 2002; Kunkel & Chase, 1969). Based on historical groundwater levels, the Little Lake fault zone (LLFZ) and El Paso fault (EPF) (mapped by Kunkel and Chase, 1969 and Garner et al., 2017) have been shown to impede movement of groundwater within the basin. Figures 3-4a and 3-4b show the surficial geology in the IWVGB and Figures 3-5a and 3-5b show two cross-sections through the valley.

Commented [KJDCNSA2]: Add age range.

Formatted: Highlight

During the Pleistocene epoch (1.8 million to 12,000 years ago), the region was much wetter and surrounding basins were all connected via the ancestral Owens River (Bacon, 2006). Active alluvial fan movement from the Sierra Nevada Mountains, deposition of finer material from Owens Valley and subsequent reworking of basin sediments by the Owens River and mountain streams resulted in a complex distribution of well sorted to poorly sorted deposits within the IWV Basin (Dutcher and Moyle, 1973). Deposition of lacustrine sediments developed in lakes connected by the ancestral Owens River. Dryer conditions developed following the Pleistocene and into recent time. Previously connected basins evolved into isolated basins through decreased precipitation and streamflow, subsequent faulting, and volcanic activity.

Commented [KJDCNSA3]: An additional reference for this section should be NAWCWD-TP-8839, " Geomorphic Map of the China Lake Basin Below 700 m in Support of Cultural Resource Management at Naval Air Weapons Station China Lake"

Because of the low permeability bedrock of surrounding mountain ranges, IWVGB receives no significant recharge from beyond the topographic divides of the watershed boundary, except for subflow from Rose Valley. Large alluvial fan complexes stemming primarily from the Sierra Nevada, and to a lesser degree from other mountain ranges, allow groundwater flow into the basin as mountain block recharge (Dutcher and Moyle, 1973). Dutcher and Moyle (1973) estimated the depth of water-bearing alluvial deposits could locally reach to 2,000-feet. These sediments consist mainly of gravel and sand in alluvial fans near the mountains and grade to silt and clay beneath the playa. There is significant irregular cemented and relatively impervious shallow zones at different locations within the IWVGB.

Lithologic units were taken from Berenbrock and Martin (1991) who based their work on units mapped by Von Huene (1960), Zbur (1963), and Kunkel and Chase (1969). The geologic units include consolidated bedrock and unconsolidated sediments (Figures 3-5a and 3-5b). Bedrock is typically low in permeability and porosity, and may yield some water to wells completed in fractures. These rocks include Mesozoic igneous and metamorphic rocks in the surrounding mountains, as well as Miocene basalts near the El Paso Mountains.

For the GSP, the groundwater depletion that is of concern in the IWVGB is from the water in unconsolidated alluvial deposits. These water-bearing sediments store and transmit water, and are divided into the following hydrostratigraphic features that are important for analyzing sustainability criteria and groundwater budgets. Unconsolidated units are mapped across the project site as alluvium, lacustrine, and playa. Berenbrock and Martin (1991) describe these units as follows:

- Alluvium consists of moderately to well-sorted gravel, sand, silt, and clay of Pleistocene and Holocene age (12,000 years to present) and is considered to have a high permeability. The percentage of silt and clay tends to increase toward the central portion of the IWVGB, which reduces permeability in most areas. These deposits include both older and younger alluvial deposits, alluvial fans, and elevated pediment veneers and stream terrace deposits. Alluvium extends across the entire IWV and is thickest along the western and southern edges of the basin (Figures 3-5a and 3-5b).
- Lacustrine deposits were described by Kunkel and Chase (1969) as containing silt and silty clay of Pleistocene age and exhibiting low permeability. This unit is interbedded with the alluvial deposits in the southeast, western and central portion of the basin.
- Playa deposits of low permeability are of Holocene and Pleistocene age and contain silt and clay with an occasional sand lens.

There are two principal aquifer units defined by Kunkel and Chase (1969). The shallow aquifer contains coarse sediments near the Sierra Nevada with increased interbedded silts and clays towards the center of the basin associated with the lacustrine and includes China Lake's playa deposits. The best quality of water is at shallow to medium depths in the southwestern part of the valley, closer to the Sierra Nevada (Dutcher and Moyle, 1973). The deeper aquifer is also composed of gravel, sand, silt and clay. It is strongly connected to the shallow aquifer in the west and southwest of the basin; and is confined in other parts of the basin. Existing multi-level CASGEM monitoring wells show semi-confined artesian conditions within the deeper aquifer where it occurs beneath the lacustrine and other fine-grained sediments.

Historical well drilling and aquifer testing results were reviewed and compiled for background hydraulic conductivity data throughout the IWVGB. Hydraulic conductivity has been determined to range from < 5 feet per day (ft/day) to > 50 ft/day based on slug and aquifer testing. The distribution of measured hydraulic conductivity values throughout the IWVGB is shown in Figure 3-6 and testing results are shown in Appendix 3-B. In general, the shallow and deep aquifer zones are associated with higher hydraulic conductivity. USBR (1993) slug test data show lower hydraulic conductivity that impedes flow within the lacustrine/playa deposits.

3.3.2 Soils

Limited surface soil data were publicly accessible and available for IWV. The Natural Resource Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) mapped arid to semi-arid soil types occurring in the southwest El Paso area (Figure 3-7). Soil data for the main area of IWVGB were not present from NRCS, and are considered a data gap requiring further research of non-public databases.

Desert soils found in arid[8] regions cover most of the undisturbed land on the valley surface not occupied by vegetation or development. Arid soils are stabilized by a biological soil crust formed as a veneer on the surface that is important for reducing wind and rain erosion of underlying sediments. This soil crust also increases water retention during sporadic heavy rainfall events. The desert crust can be damaged when disturbed, resulting in clay, silt, and sand being mobilized by wind. One of the minor water uses in IWV is for dust suppression. The IWV natural desert environment also includes active and inactive (vegetated) sand dunes and playa deposits. The basin's primary discharge area is the China Lake playa, where surface water collects at the lowest elevation in the basin and evaporates, developing a salt pan. The Navy recently completed a detailed geomorphic survey of surface landforms (Bullard et al, 2019) that provides an indication of soil types that occur on Base. Predominant landforms include alluvial fan, eolian, fluvial, deltaic, lacustrine, and playa features. Other landform features from this study include bedrock and developed land.

Soil data available for the southwest El Paso region of IWV (Figure 3-7, USDA, 2019) include aridisols on the valley floor, entisols on the steeper sloped alluvial fans and canyons west of the valley floor, and mollisols at higher elevations near the watershed divide. Aridisols are the desert soils of 'arid' regions with only enough natural recharge to support adapted desert plants. Entisols occur in environments where erosion or deposition rates are faster than soil development rates and typically occur on dunes, steep slopes, and flood plains (USDA NRCA, 2019). Mollisols occur in semi-arid[9] mountain valleys where detritus from vegetation and organisms (worms, ants) help to develop a rich soil profile. These three soil types develop under different conditions – (1) the valley floor is relatively flat with very limited rainfall (average 4 inches/year) forming a desert soil crust, (2) the steep canyons are reworked unconsolidated

[8] Arid regions typically average less than 10 inches/year of precipitation.
[9] Semi-arid regions typically receive between 10 inches/year and 20 inches/year of precipitation.

sediments/rock that have a very limited to no soil profile, and (3) higher elevations with more rainfall allow for development of vegetation and a limited soil profile.

3.3.3 Hydrology

3.3.3.1 *Climate and Precipitation*

The IWVGB is part of the Mojave Desert and has an arid, high desert climate characterized by hot summers, cold winters, and irregular and usually little precipitation. The basin is bounded by mountains to the north, south, and west, which drain internally to the playa. Summer high temperatures on the playa are typically greater than 100 degrees Fahrenheit (°F) and winter lows are typically in the 20s and 30s °F.

Average annual precipitation on the valley floor is about 4 inches per year; snowfall, if any, typically occurs in December and January, with an average of less than 1 inch per year (WRCC, 2018c; PRISM, 2012). Mountain areas receive more precipitation than the playa and are the primary source of recharge for the groundwater basin. The average annual precipitation for the IWVGB and mountain areas ranges from about 4 inches per year up to about 20 inches per year (PRISM, 2012) (Figure 3-8). The annual precipitation and cumulative departure from mean at two stations near the IWV are shown in Figure 3-9.

With high temperatures, high winds, and low humidity the IWVGB has high ET rates. Average annual evaporation from a shallow water body in the playa is about 80 inches per year (Farnsworth et al, 1982). NOAA maps of evaporation (Farnsworth et al 1982) show that, in general, annual evaporation from a free water surface is greater on the valley floor than in mountainous areas of the basin. For example, in the Sierra Nevada mountains on the west side of the IWVGB, annual evaporation from a free water surface ranges from about 45 in/yr to 65 in/yr (Farnsworth et al, 1982).

3.3.3.2 *Streamflow and Mountain-Front Recharge*

Streamflow gaging stations in and near the IWVGB are shown on the map in Figure 3-8. The USGS historically collected data at three Sierra canyon streams. The stations were active starting in the 1960's and 1970's and have more than twenty years of observations. The daily hydrograph at Ninemile Creek (USGS gage 10264878), which drains a 10.4-square mile area of the Sierra Nevada, is shown in Figure 3-10. Daily discharge at the gage was flashy and sporadic, with short peaks and zero flow between storms. In two years (1964 and 1968), flow was nearly zero for the entire year.

Streamflow observations at Sand Canyon and Grapevine Canyon have been collected through a monitoring effort by the EKRCD (Ribble and Haslebacher, 2000; Haslebacher, 2016). Sand Canyon has a drainage area of about 18 square miles. Flow is measured with a compound rectangular weir and datalogger, with recent records dating back to 1999. The annual gaged streamflow at Sand Canyon is given in Table 3-2 and ranges from dry during drought conditions to 3,783 AFY. The average annual streamflow is 647 AFY and the median is 209 AFY. Grapevine Canyon, with a drainage area of about 10 square miles, is gaged with a v-notch weir and datalogger, with recent records dating back to 1997. As shown in Table 3-2, annual flows at Grapevine Canyon range from 4 AF to 2,275 AF, with average annual streamflow of 237 AFY and a median of 90 AFY. At both gages, flow during wet years, i.e. 1998 and 2005, skews the average toward high flows.

Table 3-2. Annual Gaged Streamflow at Sand Canyon and Grapevine Canyon.

Calendar Year	Sand Canyon Gaged Streamflow (AF)	Grapevine Canyon Gaged Streamflow (AF)
1997	--[1]	49
1998	--[1]	2,275
1999	200	394
2000	217	95
2001	150	43
2002	69	19
2003	329	16
2004	102	4
2005	3,783	1,160
2006	585	193
2007	171	35
2008	--[2]	--[2]
2009	--[2]	--[2]
2010	--[2]	--[2]
2011	184	--[2]

Calendar Year	Sand Canyon Gaged Streamflow (AF)	Grapevine Canyon Gaged Streamflow (AF)
2012	286	90
2013	--[2]	--[2]
2014	--[2]	--[2]
2015	--[2]	--[2]
2016	--[2]	--[2]
2017	1,683	563
2018*	86	32
Complete Years	12	13
Average	647	237
Median	209	90

Source: Haslebacher, 2018

1. No data available; gage not yet active.

2. No data available; measurements were not reported for these years.

**Total through March 2018; value for 2018 not included in statistics.*

Mountain front recharge is believed to be the dominant source of inflow to the groundwater basin. In 2014, Todd Engineers prepared a study that reviewed previous recharge studies and made new estimates (Todd Engineers, 2014). In 2016, DRI conducted a comprehensive review of recharge estimates for the basin (McGraw et al, 2016). They reviewed fourteen previous studies and then updated the recharge estimates using an empirical relationship between precipitation and groundwater recharge. The average annual recharge developed by DRI is 7,650 AF per year (McGraw et al, 2016; Garner et al, 2017). The recharge zones identified by DRI are shown in Figure 3-11. The total area of recharge is about 770 square miles. The area and estimated annual recharge in each zone are shown in Table 3-3.

Table 3-3. Recharge Zones and Estimated Annual Recharge.

Recharge Zone	Area (sq miles)	Annual Recharge[1] (AFY)
Rose Valley	193	2,400
Sierra Nevada N	116	2,100
Sierra Nevada S	101	1,500
El Paso	56	50
Argus and Coso	302	1,600

Total	768	7,650

1 Recharge areas and annual volumes as developed by DRI (McGraw et al, 2016; Garner et al, 2017)

There are no significant interconnected surface water systems which interact with groundwater in IWVGB. Generally, streams in the valley are ephemeral and recharge occurs as mountain block recharge. Surface water in Little Lake, located in the Rose Valley recharge area, is thought to infiltrate into groundwater and then contribute as subflow into the basin. Estimates of losses from Little Lake are included in the annual recharge amount in Table 3-3 (McGraw et al, 2016). The IWVGB has many natural springs, shown in Figure 3-11, generally located in the mountain areas. Each point represents a spring or seep as mapped by the USGS in the National Hydrographic Dataset (NHD) (USGS, 2019). Springs in the IWVGB have historically been used for human water supply, cattle, and wildlife. Spring water quality and geochemistry have been studied previously (Stoner et al, 1995; Houghton HydroGeo-Logic, 1996). The water quality of the spring/surface water samples collected is relatively good. Although TDS concentrations range from 199 mg/L to 1,300 mg/L, the average TDS concentration for these samples is 533 mg/L. The majority of samples collected from springs/surface water sources fall within the recommended TDS Secondary maximum contaminant level (MCL) and the upper TDS Secondary MCL for potable water, 500 mg/l and 1,000 mg/L, respectively. Data are included in Appendix 3-C.

3.3.4 Water Budget and Overdraft Conditions

A water budget is an accounting tool that quantifies inflows (sources) and outflows (sinks) occurring within a groundwater basin (or specified management area) using the following equation:

Inflows – Outflows = Change in Storage

The water budget is a key component of overall understanding of the IWVGB and contributes to developing the following GSP elements:

- Identifying data gaps
- Evaluating monitoring requirements

- Evaluating potential projects and management actions
- Estimating the sustainable yield
- Evaluating undesirable impacts
- Informing water management decision-making

3.3.4.1 *Water Budget Elements*

The elements contributing to the IWVGB water budget include recharge, groundwater pumping, ET, and interbasin flow.

Recharge

Mountain front recharge, predominantly from the Sierra Nevada Mountains, is the primary inflow into the IWVGB. The Coso Range, Argus Range, and the El Paso Mountains contribute to the natural recharge to a lesser degree. Numerous basin studies have been prepared to estimate natural recharge to the IWVGB with various methods and with varying results. The methodology used in selected previous studies is described in McGraw et al. (2016). The historical natural recharge estimates from selected previous recharge studies are shown below in Table 3-4. In addition, the USGS is currently revising an existing Basin Characterization Model to refine the recharge estimates in the IWV.

Table 3-4: Natural Recharge Estimates from Selected Recharge Studies (AFY).

Recharge Study	Natural Recharge Estimate (AFY)
Brown and Caldwell (2009)	8,900
Epstein et al. (2010)	5,800 to 12,000
Todd Engineers (2014) [1]	6,100 to 8,900
Desert Research Institute (McGraw et al. 2016)	7,650

1 Excludes estimates of recharge from excess irrigation and distribution system leakage.

Studies by Austin (1988), Ostdick (1997) and Thyne et al (1999) estimated a total recharge volume from three to four times the quantity estimated by the natural recharge used in this study. These studies suggested that IWVGB was an "open basin" with a large recharge component coming through the Sierra

Nevada batholith from a neighboring watershed (to the west of the watershed divide, possibly through fractures). At that time, there were limited data to explain large groundwater gradients from the west and southwest into the IWVGWB, and limited laboratory methods to quantify isotope data. With AB303 funding, Cooperative Group[10] (2008) drilled and fully characterized nine borings in T27S/R38E, installed eight monitoring wells, and collected 27 isotope samples[11] throughout the basin to re-analyze these higher recharge estimates. Further re-analysis was completed by Todd Groundwater[12] (2014). Newer lithologic, water quality, and groundwater level data refuted the "open basin" recharge estimates. More recently, some of the data gaps from these earlier studies have been addressed by the Navy's (Garner et al, 2017) fault zone mapping that explain observed groundwater gradients, and KCWA's measured groundwater level trends since 1995 (Section 3.5).

Groundwater Pumping

DRI developed a groundwater pumping database to represent historical pumping and to assist with making future pumping projections (McGraw et al., 2016). The database contains pumping from 1920 to 2013. The USGS and the USBR provided pumping estimates from 1920 to 1995 and the Cooperative Group provided pumping estimates from 1995 to 2016. Pumping wells were assigned to one of the following water use categories:

- Private domestic
- Municipal
- City of Ridgecrest
- Industrial Searles Valley Minerals
- U.S Navy (NAWS China Lake)
- Agriculture

[10] See referenced report, Section 5 for a more detailed discussion of intermountain recharge and re-calculation of Ostdick's (1997) and Thyne's (1999) methodologies.

[11] The isotope samples included the same wells that Ostdick and Thyne et al based their analysis on. The repeated sampling did not reproduce the earlier results.

[12] See Todd, 2014, Appendix A.5 Additional Recharge: the Open Basin Hypothesis.

Well locations and water use were cross-referenced and verified using published existing databases and aerial photographs. In situations where historical data for individual wells were not available, pumping rates were evenly distributed among appropriate wells within each water use category (McGraw et al., 2016).

The Cooperative Group has assembled annual production data dating back to 1975, organized by large users and primary categories. Groundwater production estimates from 1975 through 2016 as compiled by the Cooperative Group are provided in Appendix 3-A. The location of all groundwater production wells in the IWV is shown in Figure 2-3.

Approximately 800 private domestic wells exist in the IWV outside of the City of Ridgecrest and community of Inyokern. These wells serve individual residences and typically pump around 1 AF per year with an approximate water use of 800 AF in 2015. Additionally, many private residences have formed small mutual water companies and co-ops with a single well serving multiple residences. Water use by these mutuals and co-ops was approximately 300 AF in 2015[13].

Since 1975, the IWVWD's service area and population have expanded, resulting in corresponding increases in groundwater extractions; however, the Water District has implemented several demand management programs and conservation measures to bring their water use down to 7,050 AF in 2015, from a peak of approximately 9,200 AF in 2007. (See Section 2.7.3 for discussion of Water District conservation). The Inyokern Community Services District produced approximately 91 AF in 2015. The City of Ridgecrest, which irrigates recreational parks and sports complexes, produced approximately 427 AF in 2015. Total domestic, municipal water and City use was 7,568 AF in 2015.

Since 1975, the reported industrial water use within the IWV by Searles Valley Minerals has remained fairly constant at approximately 2,600 AFY on average. Water uses at Searles Valley Minerals include potable water for office buildings, laboratories and industrial processes, primarily boiler feed water for the power generation. Additionally, Searles Valley Minerals provides potable water to the Searles

[13] Appendix 3-A lists a category of water users called "Private Wells". "Private Wells" in this context also includes water use from mutual water companies and co-ops; therefore, the combined total of private domestic wells and mutual water companies and co-ops is 1,100 AF in 2015.

Domestic Water Company (SDWC) which services the communities of Trona, South Trona, Westend, Argus and Pioneer Point, including schools and government buildings.

Water reliability is critical to military sustainability and resiliency. The U.S. Navy operates production wells in the IWVGB that supply water needs on-Station. Production wells operated and maintained by the IWVWD and domestic wells in unincorporated areas of the IWV provide water to Navy affiliated staff (made up of scientists, engineers, technicians, and professionals) and their dependents that reside off-Station. These personnel are critical to supporting the mission at NAWS China Lake. Water uses on NAWS China Lake include potable water for office buildings, laboratories, residences, and schools. In 1970, the U.S. Navy reported their highest groundwater use at 7,988 AF. Over decades, as base personnel increasingly moved to off-base housing in Ridgecrest and after implementation of aggressive water conservation programs beginning in 2007, the U.S. Navy reduced their water use to 1,595 AF in 2015.

Agricultural water use has increased significantly in recent decades as new ranches, orchards, and farms have been developed in the IWV. Alfalfa and pistachios are the largest crops by volume grown in the IWV, with the production of olives, tomatoes, and other crops significantly less. Pistachios typically require a water application rate of approximately 5 feet per year (AF/acre/year), while alfalfa requires a higher rate of 7 feet per year or more (Todd, 2014; McGraw et al., 2016). Total agriculture water use in 2015 was over 12,000 AF, comprising almost 50% of the total water use that year. Unless restricted, agricultural use is expected to increase significantly.

Formatted: Highlight

Commented [KJDCNSA4]: Recommend using exact extraction values, saying "over" makes it appear like the real values are being hidden. In addition, totaling all of the extraction values listed in this section for each pumper does not add up to the "groundwater extraction" value provided in table 3-7 which undermines that value.

Evapotranspiration

The ET that occurs at the China Lake Playa and nearby phreatophytic area is the primary natural discharge for the IWVGB. Prior to development of well fields around the 1920s, ET from the China Lake Playa was the predominant outflow from the IWVGB. Todd Engineers (2014) noted that estimates of ET have decreased over time; "[some] of the decrease is attributable to revised estimates of recharge based on model calibration, but most of it reflects the interception of playa outflow by wells." Declines in water levels alter and reduce phreatophyte vegetation, reducing transpiration, and reduce bare surface evaporation rates. Vegetation changes have been assessed by comparing maps of the current vegetation distribution to the pre-development vegetation map of Lee (1912). The major difference is the addition of greasewood in areas north and east of the playa, and also in a small area to the southwest, where pickleweed and saltgrass occurred previously (McGraw et al., 2016). The pickleweed and saltgrass vegetation zone is associated with a shallower water table with a maximum ET rate of 5.7 ft/yr, and ET effectively terminates when the water table is greater than 10 ft bgs. The greasewood unit that develops as water levels decline has a maximum ET rate of 2.4 ft/yr and a maximum rooting depth of 33 ft. Current bare playa evaporation rates have been estimated from data from an eddy covariance station at the south end of China Lake playa and suggest annual ET of 4.5 inches for the adjacent bare playa area (McGraw et al., 2016). This measurement removes rainy days from the calculation, but bare playa groundwater ET could be as low as 2.4 inches per year, if ET is included after significant precipitation events. Current overall ET loss from the IWVGB is estimated at 4,850 AFY.

Interbasin Flow

Previous studies on the IWVGB have primarily considered the IWVGB to be a closed basin with little to no subsurface outflow to Salt Wells Valley. Nonetheless, DRI concluded "the absence of a large accumulation of salinity in Indian Wells Valley suggests that the basin may not be hydrologically closed" (McGraw et al., 2016). Furthermore, DRI noted that water levels within IWV "are higher than in Salt Wells Valley, which indicates that interbasin groundwater flow is a possibility given large enough transmissivities" (McGraw et al., 2016). DRI performed a hydraulic analysis of the Salt Wells Valley and concluded that it is possible that approximately 50 AFY of the groundwater flow in the Salt Wells Valley originates as underflow from the IWV as distinguished from mountain front recharge from the Argus Range.

3.3.4.2 *Historical Water Budgets*

As discussed previously in Section 3.2, groundwater extractions began around the 1920s when farmers and industrial users began large scale operations in the IWV. Prior to the development of well fields, it is assumed the IWVGB was in hydraulic equilibrium, with inflows in balance with outflows. The estimated water budget during pre-development conditions[14] (i.e. prior to the 1920s), is shown below in Table 3-5.

[14] Originally developed by DRI (McGraw et al., 2016), and confirmed during recalibration for the IWVGA. Recharge estimates were discussed confirmed by the IWV TAC Model Ad Hoc Group.

Pre-development conditions were also used to establish steady state conditions for model calibration discussed in Appendix 3-H.

Table 3-5. Steady-State Water Budget (Pre-Development Conditions).

Water Budget Element	Estimated Volume (AFY)
Inflows	
Mountain Front Recharge	
Sierra Nevada, North	2,100
Sierra Nevada, South	1,500
Rose Valley	2,400
Coso/Argus Ranges	1,600
El Paso	50
Total Inflow	**7,650**
Outflows	
ET	7,450
Interbasin Subsurface Flow	200
Groundwater Extractions	0
Total Outflow	**7,650**
Change of Groundwater in Storage	**0**

Source: IWV Groundwater Model (Model Documentation Appendix, Pohlmann, et al.; DRI, 2019).

As industrial, agricultural, and residential development expanded beginning in the 1920s, groundwater extractions increased which reduced the ET occurring at China Lake Playa and reduced subsurface flow to the Salt Wells Valley. The historical average post 1920 estimated water budget since IWV was developed is shown below in Table 3-6.

Table 3-6. Historical Water Budget (1922 to 2016)

Water Budget Element	Estimated Volume (AFY)
Inflows	
Mountain Front Recharge	7,650

Total Inflow	**7,650**
Outflows	
ET	6,580
Interbasin Subsurface Flow	60
Groundwater Extractions	15,240
Total Outflow	**21,880**
Change of Groundwater in Storage	**-14,230**

Source: IWV Groundwater Model (Model Documentation Appendix, Pohlmann, et al.; DRI, 2019).

3.3.4.3 *Current Water Budget*

In more recent years, agricultural water demands have increased resulting in higher groundwater extractions compared to the long-term average. Reductions in the ET occurring at China Lake Playa and subsurface flow to the Salt Wells Valley also require water balance adjustments. The current average estimated water budget for IWV is defined as the years 2011 to 2015 and is shown below in Table 3-7.

Table 3-7. Current Water Budget (2011 to 2015).

Water Budget Element	Estimated Volume (AFY)
Inflows	
Mountain Front Recharge	7,650
Total Inflow	**7,650**
Outflows	
ET	4,850
Interbasin Subsurface Flow	50
Groundwater Extractions	27,740
Total Outflow	**32,640**
Change of Groundwater in Storage	**-24,990**

Source: IWV Groundwater Model (Pohlmann, et al.; DRI, 2019).

Commented [KJDCNSA5]: Value does not reflect the total of the stated use by each pumper described in section 3.3.4.1 “groundwater pumping.”

Formatted: Highlight

3.3.4.4 *Overdraft Conditions*

An IWVGB water budget is defined by the difference between inflows and outflows (see Section 3.3.4). Overdraft occurs when outflows exceed inflows, and there is a loss of groundwater in storage; in the case of the IWV, long-term pumping exceeded local inflow. It is well documented that IWV has been in overdraft since the 1960s and before (Dutcher and Moyle, 1973). Currently (2011 to 2015), outflows are approximately four times the estimated inflows. The magnitude of the overdraft results in an average annual loss of storage of approximately 25,000 AFY (See Table 3-7 Current Water Budget).

This loss of storage equates to the measured decline of groundwater levels near pumping centers at a rate of approximately 1.0 to 2.5[15] feet per year. Todd (2014) characterized the evidence of overdraft in the IWV by stating "[the] ubiquitous, long term and ongoing decline in water levels is the most definitive evidence of groundwater overdraft." Hydrographs of eleven CASGEM wells displayed on Figure 3-12 show historical groundwater level trends throughout the IWVGB. Eight of these CASGEM wells (NR-1, Sandquist Spa, USBR-02, -03, -05, -06, MW 32, and 27S/40E-01K02 demonstrate significant prolonged groundwater level declines near pumping centers. Other CASGEM well hydrographs show little or no decline of groundwater levels in the El Paso area (USBR-01, southwest of a fault), and in the upper northwest (USBR-10, near the Rose Valley subflow into the basin). Groundwater elevation data, including groundwater elevation contour maps and selected well hydrographs from wells distributed throughout the IWV, are provided in Appendix 3-D.

According to California Water Code Section 12924, DWR is required to investigate groundwater extractions and recharge patterns within California's groundwater basins and identify groundwater basins in critical conditions of overdraft. DWR has determined the IWVGB meets their definition of critical overdraft defined in DWR Bulletin 118-80 (1980) as when "continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."

Consequences of prolonged overdraft, beyond the loss of groundwater in storage, include chronic lowering of groundwater levels, increased pumping costs, loss of well yields[16], water quality degradation, and land subsidence. These consequences of overdraft, characterized as significant and unreasonable, will

[15] Shallow well impact analysis (Appendix 3-E) compared 2010 and 2015 groundwater level contours to develop a map of average annual historical changes to groundwater levels for these pumping conditions.

[16] Loss of well yields includes the need to re-drill or deepen a well to produce water (i.e. shallow well impact).

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 4 – SUSTAINABLE MANAGEMENT CRITERIA

DRAFT

November 4, 2019

SECTION 4: SUSTAINABLE MANAGEMENT CRITERIA

4.1 INTRODUCTION

Sustainable Groundwater Management is defined as the "…management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results…" (California Water Code 10721 (v)). The GSP regulations collectively include four GSP requirements for Sustainable Management Criteria which include: 1) **Sustainability Goal** (see Section 4.2); 2) **Undesirable Results** (see Section 4.3); 3) **Minimum Thresholds** (see Section 4.4); and 4) **Measurable Objectives** (see Section 4.5).

The development of these criteria relies upon information about the IWVGB developed in the hydrogeologic conceptual model, the description of current and historical groundwater conditions, and the water budget. The impacts estimated changes to future IWVGB conditions from the projects and management actions proposed in Section 5 were considered when developing the sustainable management criteria for the IWVGB. As discussed in Section 3, the IWVGB has been in overdraft for decades and the resulting reduction of useable groundwater in storage, chronic lowering of groundwater levels resulting in wells going dry, and water quality degradation in some wells continue to threaten the long-term viability of the IWVGB. In addition, although the amount of land subsidence due to declining groundwater levels in the IWVGB is relatively small, the SNORT facility at NAWS China Lake, which is a significant asset, has been impact by subsidence due to both reduction of groundwater levels and tectonic activity. The sustainable management criteria are used to establish thresholds and objectives to ensure the IWVGB does not experiencing undesirable results in the future.

4.1.1 Sustainability Indicators

SGMA has identified six sustainability which refer to effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results (Water Code Section 10721(x)). Basin sustainability, and the effectiveness of the proposed plans and programs will be judged by the ability to eliminate the undesirable results and conditions represented by the six sustainability indicators, as applicable to the IWVGB:

- Reduction of Groundwater in Storage
- Chronic Lowering of Groundwater Levels
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

4.1.2 Representative Monitoring Sites

The IWVGA has selected representative monitoring sites to be used to measure ~~monitor~~ groundwater conditions caused by the sustainability indicators applicable to the IWVGB. These sites were selected based on evaluation of the best available data. As more data becomes available through monitoring and data collection, the representative sites will be reevaluated for effectiveness at representing basin-wide conditions. Data from these sites, along with measured and verified groundwater production, will be used as the basis for confirming the proposed project and management actions are having the desired effect on IWVGB management.

4.2 SUSTAINABILITY GOAL

4.2.1 Background

DWR states that "SGMA requires local agencies to develop and implement GSPs that achieve sustainable groundwater management by implementing projects and management actions intended to ensure that the basin is operated within its sustainable yield by avoiding undesirable results" (DWR, 2016). As discussed in Section 3.3.5, the sustainable yield is a crucial and fundamental element of GSP development, including establishing sustainable management criteria. The importance of the IWVGB sustainable yield is magnified by the fact that groundwater is the sole source of potable water in the IWV. The results of the water balance analysis indicate the natural long-term average recharge of 7,650 AFY as the sustainable yield.

As discussed in Section 3.3.4.4, it is well documented that IWV has been in overdraft since the 1960s and before (Dutcher and Moyle, 1973). Current IWVGB outflows are approximately four times the inflows (see Section 3.3.4). The IWV community is currently experiencing the consequences of prolonged overdraft and will continue to experience increasing environmental, social, and economic impacts if sustainability is not achieved (see Section 4.3).

Water reliability is critical to sustain the community and the diverse interests that operate in the IWV. It is also critical to military sustainability and resiliency at NAWS China Lake. The current overdraft conditions indicate groundwater resources in the IWVGB are not currently sustainably managed and water supply and demand management projects must be implemented in order to preserve the water resource and maintain the community.

4.2.2 Description of Sustainability Goal

The sustainability goal is to preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of IWV residents, and sustain the mission at NAWS China Lake. The absence of significant and unreasonable undesirable results throughout the planning horizon will be indicative the sustainability goal has been achieved. The sustainability goal will be accomplished by achieving the following objectives:

- Operate the IWVGB groundwater resource within the sustainable yield.
- Implement projects and management actions to reduce IWVGB groundwater demands, increase reuse of current supplies, obtain supplemental water supplies, and mitigate undesirable results.
- Monitor the IWVGB actively and thoroughly and adaptively manage the projects and management actions to ensure the plan is effective and undesirable results are avoided.

4.2.3 Sustainability Measures

The IWVGA is developing a series of projects and management actions that will reduce demands and increase supplies, helping achieve the sustainability goal. These projects are briefly summarized below and described in greater detail in Section 5. If one or more of the planned measures to achieve the sustainability goal are not able to be realized, the proposed projects and management actions may need to be modified, including potentially additional measures to reduce groundwater production to reach sustainability.

- Implement Annual Pumping Allocation Plan, Transient Pool and Voluntary Fallowing Program. A Pumping Allocation Plan, Transient Pool Allocation, and Voluntary Fallowing Program will be implemented in 2020. Pumping allocations will be implemented consistent with existing groundwater rights and priorities including health and safety, municipal and industrial, and the federal reserve of water necessary for military purposes.
- Optimize recycled water use. The City's current recycled water supplies will be optimized for direct and indirect reuse to reduce groundwater demands. The expanded recycled water project is anticipated to be online in 2025.
- Continue emphasis on water conservation. Conservation pilot projects in severely disadvantaged communities will be implemented in 2020. In addition, the IWVGA and beneficial users of groundwater in the IWV will continue to evaluate and implement additional measures to reduce groundwater demands.
- Obtain an imported water supply. After all projects and management actions that use IWVGB water supplies are fully implemented (Pumping Limitations, Recycled Water Project, and Conservation), it is anticipated groundwater demands will continue to be greater than the current sustainable yield. Accordingly, the IWVGA will continue to develop a firm imported water supply no later than 2040 to ensure groundwater pumping equals sustainable yield (including imported water replenishment.) The goal is to have the imported water project online by 2035.
- Pumping Optimization. Pumping will be optimized throughout the IWVGB by moving pumping from areas with high volumes of pumping to areas with lesser pumping in order to mitigate undesirable results caused by pumping depressions and chronic lowering of groundwater levels by 2025.

- Shallow Well Mitigation. Shallow wells impacted by degraded water quality and/or lowering of groundwater levels will be mitigated on an ongoing basis.
- Dust Control Mitigation. Potential undesirable results caused by potential increased windblown dust and sand resulting from agriculture fallowing will be mitigated on an ongoing basis.

4.2.4 Explanation of How Goal will be Achieved

The sustainability goal is described in Section 4.2.2 with the specific measures to achieve the goal listed in Section 4.2.3 above. The following is a description of how those measures will achieve the sustainability goal by 2040. (See Section 5.2 and Section 6.3 for additional information including discussion on project costs, funding, and schedule.)

- Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. This management action will have a direct impact in achieving sustainability and will be directly quantified through reported groundwater production and verified through groundwater elevation measurements. There is a direct relationship between reduced extractions and a decrease in the rate of decline of groundwater levels in the IWVGB. Furthermore, reduced groundwater pumping will reduce or eliminate localized pumping depressions, minimize impacts to shallow wells, reduce annual overdraft, minimize or eliminate adverse impacts to groundwater water quality (which will be quantified through groundwater quality sampling), and minimize land subsidence caused by excessive groundwater extraction.
- Optimize recycled water use. A recycled water project to optimize reuse of the City's recycled water supply will be implemented by 2025. This project will have a direct impact in achieving sustainability through reduced groundwater demands which will be directly quantified through reported groundwater production and metered use of recycled water use and verified through groundwater elevation measurements.
- Continue emphasis on water conservation. As discussed previously, the U.S. Navy, IWVWD, and others have already implemented successful conservation measures. Additional conservation will have a direct impact toward achieving sustainability through reduced groundwater demands which will be quantified directly through reported groundwater pumping and indirectly through

Formatted: No underline

groundwater elevation measurements. Individual groundwater savings resulting from the conservation programs will be measured and documented.

- Obtain an imported water supply. It is anticipated that the IWVGA will have an imported water supply by 2035. The addition of imported water for either direct use and/or groundwater replenishment will have a quantifiable benefit which will be identified through reported groundwater pumping, groundwater level measurement, and metered use or delivery of imported water. Furthermore, increased use of imported water to offset pumping of water from the IWVGB will help to reduce or eliminate localized pumping depressions, reduce impacts to shallow wells, reduce annual overdraft, reduce or eliminate adverse impacts to groundwater water quality (which will be quantified through groundwater quality sampling), and minimize land subsidence caused by excessive groundwater extraction.
- Pumping Optimization. The pumping optimization project will be implemented by 2025. It will directly contribute to mitigation of undesirable results caused by chronic lowering of groundwater levels and results will be verified by groundwater level measurements.
- Shallow Well Mitigation. The Shallow Well Mitigation Program will directly contribute to mitigating undesirable results caused by reduction of groundwater in storage, chronic lowering of groundwater levels, and degraded water quality.
- Dust Control Mitigation. The Dust Control Mitigation Program will directly contribute to mitigating secondary undesirable results caused by the fallowing of agriculture lands.

4.3 UNDESIRABLE RESULTS

Undesirable results occur when any of groundwater conditions related to the six sustainability indicators become significant and unreasonable. SGMA requires that groundwater sustainability agencies determine what constitutes significant and unreasonable undesirable results for each groundwater basin.

As applicable and related to the IWVGB, the six sustainability indicators can be organized into three categories: 1) Indicators with documented current and/or historical undesirable results that will continue in the future if not addressed, 2) Indicators with no known undesirable results and no current data to determine likelihood of future undesirable results, and 3) Indicators not applicable to the IWVGB.

There are four sustainability indicators with documented current and/or historical significant and unreasonable undesirable results: reduction in groundwater in storage, chronic lowering of groundwater levels, degraded water quality, and land subsidence. The reduction of groundwater in storage is directly related to the chronic lowering of groundwater levels. Hydrographs of wells taken throughout the IWV demonstrate significant and unreasonable prolonged drawdown causing undesirable results (see Appendix 3-D and Section 3.4.2). As discussed in Section 3.4.4.1, TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred and indicative of groundwater water quality degradation undesirable results. As discussed in Section 3.4.5, land subsidence has historically caused undesirable results to facilities at NAWS China Lake, particularly the Supersonic Naval Ordnance Research Track (SNORT) alignment.

As discussed in Section 3.5.4, the numerical model was used to simulate future IWVGB conditions (Baseline conditions) under a no action scenario assuming the GSP was not implemented. Baseline condition model results shown in Appendix 3-H indicate continuing and worsening conditions are anticipated for reduction in groundwater in storage, chronic lowering of groundwater levels, and degraded water quality. The numerical model was also used to simulate future conditions if the GSP proposed projects and management actions described in Section 5 are implemented to use as a tool for establishing sustainable management criteria (Scenario 6.2). Section 3.5.5 and Appendix 3-H provide the description and results of that numerical model simulation.

Depletion of interconnected surface water is the one sustainability indicator with no known undesirable results and no current data to determine likelihood of future undesirable results. There are no major or significant surface water bodies within the IWVGB. Streams in the valley are typically ephemeral and contribute to mountain front recharge, but typically do not flow past the mouths of the canyon except for in very wet years. When the streams do flow into the IWVGB during very wet years the surface waters are not interconnected with groundwater in the basin.

Due to the location of the IWVGB, seawater intrusion is not currently applicable to the IWVGB and is not of concern in the future. Consequently, Minimum Thresholds, Measurable Objectives, and Interim Milestones are not established for this sustainability indicator.

SGMA requires three components to be addressed for each potential undesirable result (California Water Code § 354.26). Those components and a brief description are included below:

1. The cause of groundwater conditions occurring within the IWVGB which may lead to, or has led to, undesirable results based on information described in the basin setting. It is recognized that the IWVGB may not have any undesirable ~~any~~ results for some sustainability indicators.
2. The criteria used to define undesirable results for each sustainability indicator which is relevant and applicable to the IWVGB.
3. The potential effects on the IWVGB of the undesirable result of continued groundwater use including potential impacts on beneficial uses and users.

4.3.1 Reduction of Groundwater in Storage Undesirable Results

4.3.1.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable reduction of groundwater in storage. Modeling results simulating baseline conditions (no action) indicate a continued drastic reduction of groundwater in storage. (See Appendix 3-H.)

4.3.1.2 *Criteria to Define Undesirable Results*

Baseline conditions model results indicate that useable groundwater in storage could be depleted to the point that potential future demands could not be met if the IWVGB is not managed, which would jeopardize all beneficial uses and users in the IWVGB. Scenario 6.2 model results, simulating the proposed projects and management actions, indicate approximately 215,000 acre-feet of groundwater would be removed from storage over the planning horizon, compared to approximately 1.6 million acre-feet estimated to be removed from storage under Baseline conditions.

Due to data gaps that limit the understanding of the basin and the uncertainties related to the availability and implementation schedule for supplemental water supplies, the preservation of groundwater in storage is a high priority for the IWVGA. By preserving the groundwater in storage, the IWVGA can protect the future of the community, quality of life for the residents of the basin and sustains the mission at NAWS China Lake. In a letter to the IWVGA, the U.S. Navy identified groundwater resources as the number one encroachment concern that has the potential to affect the mission enabled on and around NAWS China Lake (see Appendix 4-A).

~~The available groundwater in storage is a significant groundwater management consideration for the IWVGA also because IWVGB groundwater resources must be preserved as a sustainable water supply for NAWS China Lake. In a letter to the IWVGB, the U.S. Navy deemed groundwater resources as the primary encroachment concern for NAWS China Lake (see Appendix 4-A). Furthermore, any future major conflict could require expansion of the NAWS China Lake mission and could require additional water use from the IWVGB. In addition, preserving groundwater in storage is a high priority due to uncertainties including general basin knowledge uncertainties, model uncertainties, and uncertainties related to availability and implementation schedule of supplemental water supplies.~~

In areas in the IWV where the groundwater levels have been steadily declining, the water levels have dropped enough to impact shallow wells, requiring wells to be deepened, re-drilled, or abandoned as a water source. As discussed in Section 3.4.2, an analysis was conducted on the IWVGB well inventory to estimate the number of shallow wells impacted due to the chronic lowering of groundwater levels, which is related to the unreasonable and significant reduction of groundwater in storage (Appendix 3-E). It is estimated 97 shallow wells were impacted by 2018 based on preliminary analysis. ~~An additional approximately~~ By 2070, under the baseline "no action" alternative, approximately 800 wells would be impacted.~~800 wells are estimated to be impacted by 2070 under the baseline, "no action", conditions.~~

The number of wells estimated to be impacted is the ~~criterium~~criterion to define significant and unreasonable reduction of groundwater in storage because it is significantly beyond what could reasonably and feasibly be mitigated. The number of shallow wells that would to be impacted if the proposed projects and management actions are implemented is estimated to be 22, which is a feasible number of wells that can be mitigated.

The amount of groundwater estimated to be removed from storage with the proposed projects and management actions is the maximum amount of useable groundwater reserves than can be extracted to prevent undesirable results while still providing a margin of safety for future use, uncertainties, and potential changes to the NAWS China Lake mission.

4.3.1.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the significant reduction of groundwater in storage if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Reduction of buffer from loss of production for deeper wells, both for municipal/domestic use, industrial use, and agriculture use
- Impacts to shallow wells due to lowering of groundwater levels which would require deepening or replacement
- Encroachment on mission of NAWS China Lake
- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Land subsidence causing impacts to infrastructure
- Jeopardy to beneficial uses due to lowering of groundwater levels and degraded water quality including domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs and supplemental supplies (including de minimis groundwater users and members of disadvantaged communities)
- Desertification and airborne sand/dust as surface vegetation dies from declining water tables. Increased airborne dust and sand impact health and safety of the community and Navy mission capabilities.

4.3.2 Chronic Lowering of Groundwater Levels Undesirable Results

4.3.2.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable chronic lowering of groundwater levels. Modeling results simulating Baseline conditions (no action) indicate a continued drastic lowering of groundwater levels if appropriate projects and management actions are not implemented (see Appendix 3-H.)

4.3.2.2 *Criteria to Define Undesirable Results*

The results of the shallow well impact analysis (see Appendix 3-E) is the criteria to define significant and unreasonable chronic lowering of groundwater levels.

4.3.2.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the chronic lowing of groundwater levels if not addressed through projects and management actions. The potential basin impacts include:

- Impacts to shallow wells directly caused by lowering of groundwater levels which would require deepening or replacement
- Impacts to shallow wells due to degraded water quality indirectly caused by lowering of groundwater levels which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Land subsidence causing impacts to infrastructure
- Jeopardy to beneficial uses including domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)

- Desertification and airborne sand/dust as surface vegetation dies from declining water tables. Increased airborne dust and sand impact health and safety of the community and Navy mission capabilities.
-

4.3.3 Degraded Water Quality Undesirable Results

4.3.3.1 *Cause of Undesirable Results*

As discussed in Section 3.4.4.1, the groundwater movement in the IWVGB causes dissolution of evaporites, resulting in increased TDS concentrations. Groundwater production can exacerbate the process, and TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred. TDS concentrations in areas of the IWVGB are indicative of groundwater degradation.

After considering several factors including the past, present, and probable future beneficial use of the groundwater, economic considerations, and environmental considerations, the LRWQCB has removed the designation for Municipal and Domestic Supply for a large portion of the IWVGB underlying NAWS China Lake due to existing poor water quality. The water quality in this area is considered a pre-SGMA undesirable result and will not be addressed by projects and management actions and will not have sustainable management criteria established for it. Figure 4-1 provides a map showing the de-designated area on NAWS China Lake.

4.3.3.2 *Criteria to Define Undesirable Results*

Degradation to groundwater quality is considered significant and unreasonable if the quality is degraded such that it is unsuitable for the current beneficial uses in the IWVGB.

4.3.3.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the degraded water quality if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Jeopardy to beneficial uses including domestic supplies, industrial supplies, and agriculture supplies which could results in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)

4.3.4 Land Subsidence Undesirable Results

4.3.4.1 *Cause of Undesirable Results*

As discussed in Section 3.4.5 and Appendix 3-G, the IWVGB is partially underlain by extensive fine-grained materials which have a high to very high susceptibility to land subsidence. These fine-grained materials are prone to inelastic compaction when the groundwater table is lowered below historical levels. Consequently, the current overdraft conditions, resulting in lowering of groundwater levels, contribute to land subsidence conditions in the IWVGB. Additionally, due to the high tectonic activity in the IWV, the IWVGB is also subject to direct tectonic changes in ground elevation, as well as soft sediment deformation and compaction of fine-grained units due to seismic activity.

4.3.4.2 *Criteria to Define Undesirable Results*

Land subsidence is considered significant and unreasonable if the rate and amount impacts current facilities and infrastructure.

4.3.4.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the land subsidence if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Encroachment on mission of NAWS China Lake
- Damage to infrastructure including high value sensitive facilities at NAWS China Lake (For example, the SNORT alignment)

4.3.5 Depletions of Interconnected Surface Water Undesirable Results

Ephemeral streams exist in the mountain canyons, but typically do not flow past the mouths of the canyon except for in very wet years. There are multiple natural springs in the IWV (see Figure 3-11). There is currently no data documenting any undesirable results or basin impacts related to depletions of interconnected surface water. Groundwater is critical to sustaining springs, wetlands, and perennial flow (baseflow) in streams as well as to sustaining vegetation such as phreatophytes that directly tap groundwater. As discussed in Section 3.4.7, GDEs on the valley floor are vulnerable and susceptible to impacts related to the chronic lowering of groundwater levels. Model results simulating Baseline conditions (no action) indicate continued drastic lowering of groundwater levels in the vicinity of the GDEs near the China Lake Playa if appropriate projects and management actions are not implemented (see Appendix 3-H). Critical information on the relationship between groundwater levels and the health of GDEs is currently not known; therefore, GDE monitoring, currently a data gap, is proposed as part of the GSP monitoring program. Due to limited data on the relationship of interconnected surface water (springs) to GDEs and GDE's direct use of groundwater, no additional sustainable management criteria are proposed at this time.

4.4 MINIMUM THRESHOLDS

A Minimum Threshold is defined as "a numeric value for each sustainability indicator used to define undesirable results" (§ 351 (t)). DWR's Sustainable Management Criteria BMP further clarifies that the

Minimum Threshold is "…the quantitative value that represents the groundwater conditions at a representative monitoring site that, when exceeded individually or in combination with Minimum Thresholds at other monitoring sites, may cause an undesirable result(s) in the basin…" SGMA requires that each Groundwater Sustainability Agency determine the value for each sustainability indicator at which undesirable results occur. Impacts to groundwater pumpers, land uses, and other interests within the IWVGB were considered when developing the Minimum Thresholds.

Minimum Thresholds for the applicable sustainability indicators are established at monitoring sites that are representative of overall IWVGB conditions. It is recognized that exceeding a Minimum Threshold at a single monitoring site may not be indicative of an undesirable result. Any Minimum Threshold exceedance will be evaluated to determine the cause and if corrective action is necessary. There is inherent uncertainly when predicting water levels and the IWVGB anticipated response to planned projects and management actions intended to eliminate undesirable results, but groundwater levels that exceed the established Minimum Thresholds will be used as an indication that additional or more aggressive actions may need to be implemented. If planned project and management actions are unable to be realized or the intended IWVGB benefits are not achieved, sustainable management criteria, including Minimum Thresholds and Measurable Objectives, will need to be revaluated and additional or more aggressive management actions may need to be implemented.

GSP Regulations § 354.28 require six components of information to be documented for each Minimum Threshold. The six components are as follows:

1. The criteria used to establish Minimum Thresholds including elements of the basin setting and/or modeling results used to establish the thresholds.
2. The relationship to other sustainability indicators and a comparison to thresholds in adjacent representative monitoring sites, and the relationship between the selected Minimum Threshold and Minimum Thresholds for other sustainability indicators.
3. The relationship to adjacent basins and how Minimum Thresholds have been selected to avoid unintended undesirable results in an adjacent basin or impacting the ability of an adjacent basin to achieve its sustainability goals. The groundwater basins surrounding the IWVGB are Rose

Formatted: No underline

Valley, Coso Valley, Salt Valley, and Fremont Valley. These basins are not required to submit a GSP in accordance with SGMA.

4. The potential effects and how an identified Minimum Threshold may impact groundwater conditions, beneficial uses, and consequently groundwater users.
5. The relationship with Federal, State and Local Standards and the justification for any differences between the selected Minimum Threshold and other regulatory standards.
6. The method of quantitative measurement and the data collection schedule.

4.4.1 Reduction of Groundwater in Storage Minimum Threshold

4.4.1.1 *Criteria used to Establish Minimum Thresholds*

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Minimum Threshold for the reduction of groundwater in storage is set at the ~~stimulated~~ simulated estimated value of the total loss of groundwater in storage at year 2070 after the projects and management actions are implemented (Scenario 6.2) plus an additional 10 percent buffer for the purposes of operational flexibility. The purpose of the operational flexibility is to account for uncertainties related to availability and implementation schedule of supplemental water supplies.

4.4.1.2 *Relationship to Other Sustainability Indicators*

Reduction of groundwater in storage is related to sustainability indicators for chronic lowering of groundwater levels, degraded water quality, and land subsidence for the IWVGB. By preserving groundwater in storage, the Minimum Threshold for reduction of groundwater in storage will additionally minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land subsidence.

4.4.1.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley for the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY on average between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to reduce the reduction of storage are not expected to impact adjacent basins.

4.4.1.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the total volume of groundwater allowed to be removed from storage through the establishment of the Minimum ~~Threshold which~~Threshold that will subsequently protect beneficial users and uses from undesirable results. The Minimum Threshold for reduction of groundwater in storage will minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land ~~subsidence which~~subsidence, which will benefit beneficial users and uses in the IWVGB. Reserve groundwater resources will be preserved for potential increased groundwater use to support the mission of NAWS China Lake. Impacts to deeper wells from impacts due to chronic lowering of groundwater levels and degraded water quality will be reduced. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold impacts and limits the volume of groundwater that can be produced by beneficial users and used for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to reduce the reduction of groundwater in storage have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.1.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the reduction of groundwater in storage. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.1.6 *Representative Monitoring Sites*

The Minimum Threshold, and other sustainable management criteria, for the reduction of groundwater in storage is not set at representative monitoring sites but is set for the entire IWVGB. According no representative monitoring sites have been selected. The procedure for determining the reduction of groundwater in storage in discussed in Section 4.4.1.7 below.

4.4.1.7 *Method of Quantitative Measurement*

The change of groundwater in storage will be estimated using the Thiessen polygon method. The IWVGB will subdivided into discrete polygons drawn to represent the area closest to each measurement point. The measurement points will be the wells monitored semi-annually by the KCWA for groundwater levels. Discretization of the polygons will be performed using the Thiessen weighted average polygon method to proportion data that is not uniformly spaced. The polygons will be drawn to represent the area closest to a measuring point that provides physical data of the basin. The change in groundwater in storage will be calculated annually based on bulk hydrogeologic parameters and measured fall groundwater levels for each polygon. The change in groundwater in storage will be monitored as 5-year rolling averages to determine if Minimum Thresholds are exceeded.

The following equation is used to estimate the change in storage for each polygon:

Change of Groundwater in Storage (feet^3) =
[area (feet^2)] x [specific yield (unitless)] x [change in depth to water (feet)]

4.4.2 Chronic Lowering of Groundwater Levels Minimum Threshold

4.4.2.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for chronic lowering of groundwater levels are historical groundwater elevation levels/trends and simulated predicted water levels. The numerical model was used to estimate and predict water levels throughout the IWVGB under the conditions of the proposed projects and management actions. The simulated data was compared to extrapolated trends of historical data. Operational flexibility is an important consideration when setting the Minimum Thresholds for chronic lowering of groundwater levels because groundwater levels respond to groundwater production and also changes in hydrologic cycles.

The approach for setting Minimum Thresholds is dependent on groundwater level historical groundwater elevations and trends in specific representative monitoring sites and the simulated predicted water levels at those monitoring sites. The simulated predicted water levels were adjusted within the numerical model margin of error in order for the common point between the historical data and the simulated data to have the same value. At wells with highly variable water levels, the simulated predicted water levels were adjusted to the most recent 3-year average of historical data. Groundwater levels for some representative monitoring sites near pumping centers experience high seasonal variability. For these wells, the amplitude of the seasonal troughs extends significantly below the historical trendline. The lower value between the following data was used to determine the Minimum Threshold:

1. 5 feet below the minimum of the simulated groundwater level before groundwater level recovery is anticipated due to the implementation of projects and management actions; or
2. 5 feet below recent minimum historical value.

By using the lower value of the above-mentioned data, a more appropriate Minimum Threshold is established with greater operational flexibility.

4.4.2.2 *Relationship to Other Sustainability Indicators*

The chronic lowering of groundwater levels is related to other sustainability indicators for reduction of groundwater in storage, degraded water quality, and land subsidence for the IWVGB. By limiting the decline of groundwater levels in the IWVGB, the Minimum Threshold for chronic lowering of groundwater levels will additionally minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence.

4.4.2.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley for the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY on average between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to address chronic lowering of groundwater levels are not expected to impact adjacent basins.

4.4.2.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the decline of groundwater levels. The Minimum Threshold for the chronic lowering of groundwater levels will minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence which will subsequently protect beneficial users and uses from undesirable results. The risk to wells going dry, along with the associated financial impacts, will be mitigated by limiting the chronic decline of groundwater levels. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold for the chronic lowering of groundwater levels impacts and limits amount of groundwater production that can occur for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to mitigate the chronic lowering of groundwater levels have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.2.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the chronic lowering of groundwater levels. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA ~~to~~ will need to coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.2.6 *Representative Monitoring Sites*

Ten monitoring wells have been selected to be representative key wells to monitor chronic lowering of groundwater levels. The locations of these wells are provided in Figure 4-2. To determine the selection of representative monitoring sites, groundwater levels throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted water levels over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the decline of groundwater levels. Monitoring wells with a good ~~period of~~ record of historical data were prioritized over wells with little recorded historical data.

Formatted: Highlight

Commented [KJDCNSA1]: What period? How long? Date ranges?

Table 4-1 provides the list of representative monitoring sites to monitor chronic lowering of groundwater levels.

Table 4-1. Representative Monitoring Sites for Chronic Lowering of Groundwater Levels.

Well Name	T/R-S	Depth	Screen Intervals	Latitude (NAD83)	Longitude (NAD83)
USBR-01	27S/38E-23F01 27S/38E-23F02 27S/38E-23F04	635 1060 1770	615-635 1040-1060 1750-1770	35.569683	-117.863691
USBR-03	27S/39E-11D01 27S/39E-11D02 27S/39E-11D03	670 1340 1870	650-670 1320-1340 1850-1870	35.607183	-117.755633
USBR-04	26S/39E-26A03	1200	1190-1200	35.649682	-117.743133
USBR-05	25S/38E-34G01 25S/38E-34G02 25S/38E-34G03	870 1610 1980	850-870 1590-1610 1960-1980	35.718013	-117.871749
USBR-06	25S/38E-12L01 25S/38E-12L02 25S/38E-12L03	350 1210 1660	330-350 1190-1210 1640-1660	35.776068	-117.842027
MW 32	26S/39E-27D02 26S/39E-27D03	900 1260	880-900 1240-1260	35.648571	-117.775912

	26S/39E-27D04	1920	1900-1920		
NR-2	25S/38E-36G01 25S/38E-36G02 25S/38E-36G03	350 1560 1930	330-350 1540-1560 1910-1930	35.718739	-117.834723
Kerr McGee	26S/39E-17G02			35.676348	-117.804524
Sandquist Spa	26S/39E-11E02	191	135-191	35.688570	-117.756468
Steele 31L01	26S/39E-32L01			35.629935	-117.811488

4.4.2.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring chronic lowering of groundwater levels is direct measurement of groundwater levels. Groundwater levels will be monitored at the representative monitoring sites semiannually. Groundwater levels will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.3 Degraded Water Quality Minimum Threshold

4.4.3.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for degraded water quality are historical TDS concentrations and historical trends. The numerical model was also used to estimate TDS concentrations throughout the IWVGB under the conditions of the proposed projects and management actions (Numerical Model Scenario 6.2). The simulated data was compared to extrapolated trends of historical data when available; however, there are many areas of the IWVGB that have limited TDS data or do not have long periods of record. Operational flexibility is an important consideration when setting the Minimum Thresholds due to current uncertainties. Likewise, there are areas where there is not enough reliable data to establish Minimum Thresholds at this time until baseline TDS conditions are established.

Formatted: Highlight

Commented [KJDCNSA2]: What period of time considered long enough?

The approach for setting Minimum Thresholds is dependent on historical TDS concentrations and trends in specific representative monitoring sites. In areas of the IWVGB with generally good water quality, the Minimum Threshold is set at the Secondary TDS MCL (500 mg/l) in order protect current beneficial uses for domestic supply. After looking at historical data and trends, Minimum Thresholds were established in some areas with poorer water quality at 600 mg/l and at 1,000 mg/l. The northwest area of the IWVGB has documented poor quality that is still designed for domestic use and is also used for agricultural uses. This area of the IWVGB is of particular concern for water quality degradation; however, limited water quality data indicate that this area has already documented high TDS concentrations that are pre-SGMA undesirable results. Due to the limited data, Minimum Thresholds (and other sustainable management criteria) will need to be established after baseline TDS concentrations are established.

4.4.3.2 *Relationship to Other Sustainability Indicators*

Degradation of water quality is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and chronic lowering of groundwater levels. The Minimum Thresholds established for the reduction of groundwater in storage and the chronic lowering of groundwater levels minimize undesirable results caused by degraded water quality. The Minimum Threshold established for degraded water quality does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.3.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley from the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY (see Appendix 3-H). Consequently, the Minimum Thresholds selected to address degraded water quality are not expected to impact adjacent basins.

4.4.3.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by establishing Minimum Thresholds to limit and mitigate the degradation of groundwater ~~quality which~~quality, which will subsequently protect beneficial users and uses from undesirable results. By maintaining TDS concentrations below Minimum Threshold, the number of wells that would require well abandonment or treatment due to water quality degradation will be reduced and beneficial uses will be protected. As discussed in Section 5, projects and management actions implemented to mitigate the degraded water quality have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.3.5 *Relationship with Federal, State and Local Standards*

The LRWQCB issues water quality objectives that apply to all groundwater in the Lahontan region. In general, the groundwater quality objectives are set to be protective of beneficial uses. ~~Groundwaters~~Groundwater designed for municipal and domestic use should not contain concentrations above MCLs or SMCLs based on drinking water standards. The water quality objectives for the Lahontan region are provided in Appendix 4-B. As discussed in Section 3.4.4, groundwater concentrations already exceed MCLs and SMCLs for TDS and arsenic in certain areas of the IWVGB are pre-SGMA undesirable results. Consequently, the proposed projects and management actions are intended to improve water quality, but will not necessarily reduce concentrations in every area of the IWVGB to below MCLs and SMCLs. As discussed in Section 2.5.2, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA to coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.3.6 *Representative Monitoring Sites*

Eleven monitoring wells and production wells have been selected to be representative key wells to monitor water quality degradation. The locations of these wells are provided in Figure 4-3. To determine the selection of representative monitoring sites, historical TDS concentration data in wells throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted TDS concentrations over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the degradation of water quality, with a higher density of representative wells in sensitive and/or vulnerable areas of the IWVGB that is put to greater beneficial uses. Wells with historical increasing TDS trends are intended to be used as "sentinel" wells in the monitoring network, with the intention that by monitoring these wells for water quality degradation, additional IWVGB wells will likewise be protected. Monitoring wells with good period of record of historical data were prioritized over wells with little recorded historical data. Other factors, including accessibility and reliability of data, were also considered in the section of representative monitoring well sites.

One representative monitoring well has been selected in an area of poor water quality on NAWS China Lake that is no longer designed for municipal or domestic use. Additional data will be collected to establish Baseline TDS conditions before setting sustainable management criteria at that well.

One representative monitoring well has been selected in the El Paso subbasin due to there only being minimal beneficial uses in that area and stable groundwater levels and water quality.

Table 4-2 provides the list of representative monitoring sites to monitor water quality degradation.

Table 4-2. Representative Monitoring Sites for Degraded Water Quality.

Well	T/R-S	Depth	Screen Intervals	Latitude (NAD83)	Longitude (NAD83)
USBR-01	27S/38E-23F01 27S/38E-23F02 27S/38E-23F04	635 1060 1770	615-635 1040-1060 1750-1770	35.56968	-117.86369
IWVWD Well 33	27S/39E-08L01	1020	560 - 1000	35.60051	-117.80419
Owens Peak South Well 01	26S/39E-32N	n/a	366 - 376	35.62377	-117.80867
IWVWD Well 30	26S/39E-27D	1200	600-1200	35.65024	-117.77578
Hometown Water Association Well 01	26S/39E-26B1	n/a	263-323	35.64835	-117.74803
IWVWD Well 11	26S/40E32-K01	620	260-310, 340-380, 470-500, 520-600	35.62833	-117.69602

Sandquist Spa	26S/39E-11E02	191	135-191	35.68857	-117.75647
22B	26S/40E-22B	651.5	531-631	35.661433	-117.666783
West Valley Mutual 01	26S/39E-07M1	n/a	200-400	35.68696	-117.83003
USBR 6	25S/38E-12L01 25S/38E-12L02 25S/38E-12L03	350 1210 1660	330-350 1190-1210 1640-1660	35.77607	-117.84203
NR-2	25S/38E-36G01 25S/38E-36G02 25S/38E-36G03	350 1560 1930	330-350 1540-1560 1910-1930	35.71874	-117.83472

4.4.3.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring degraded water quality is TDS sampling. Groundwater samples will be collected at the representative monitoring sites annually and analyzed for TDS at qualified laboratories. TDS concentrations will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.4 Land Subsidence Minimum Threshold

4.4.4.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish the Minimum Threshold for land subsidence are historical data on land subsidence rates in the area of most concern and susceptibility to land subsidence: the southern subsidence area, specifically near the SNORT alignment on NAWS China Lake (see Appendix 3-G). The Minimum Threshold for land subsidence is set at the rate from the most recent data period that has been analyzed (2005-2010) which is a value of 2.2 mm/year or 0.09 inches/year, due to declines in water levels and not tectonic processes, based on a 5-year running average in order to avoid additional undesirable results occurring at SNORT due to increased rates of land subsidence as compared to the current rates.

Commented [KJDCNSA3]: What exactly does "minimum threshold" for subsidence mean? Is this the minimum value to allow subsidence to progress before action is taken? As defined, the minimum threshold is 3x the maximal misalignment allowance for SNORT. At 0.090"/year, the track is potentially out of alignment every 4 months, and is out of adjustment range within a few years. Recommend rethinking this definition; as written, it assumes that this rate of change is acceptable. Also, this is a bigger issue than just at SNORT -- this impacts the laboratory complex as well. Subsidence thresholds need to be carefully considered -- are they a maximal value across the basin? An average across the basin? What's the allowable gradient of subsidence?

4.4.4.2 *Relationship to Other Sustainability Indicators*

Land subsidence is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and the chronic lowering of groundwater levels. By establishing Minimum Threshold to preserve groundwater in storage and limit the decline of groundwater levels in the IWVGB, the aquifer materials that may be subject to compaction will not be dewatered and therefore undesirable results caused by land subsidence will be minimized. The Minimum Threshold established for land subsidence does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.4.3 *Relationship to Adjacent Basins*

The Minimum Thresholds selected to address land subsidence are not expected to impact adjacent basins.

4.4.4.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved and impacts caused by land subsidence will be reduced by establishing Minimum Thresholds to limit land subsidence.

4.4.4.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the reduction of land subsidence.

4.4.4.6 *Representative Monitoring Sites*

Data from future ~~level line~~geodetic surveys for existing monuments along the SNORT alignment conducted by the U.S. Navy will be reviewed if available. The IWVGA will evaluate new surveying, InSAR data and Light Detection and Ranging (LiDAR) data for the IWVGB, as available, to analyze basin-wide land subsidence rates and to determine if additional monitoring locations are necessary and if additional Minimum Thresholds are required for additional IWVGB locations.

4.4.4.7 *Method of Quantitative Measurement*

Common land subsidence measurement techniques include level-line surveys, InSAR and LiDAR measurements, and extensometers. The U.S. Navy periodically performs ~~level-line~~geodetic surveys across the China Lake ranges and~~at~~ the SNORT alignment to monitor land subsidence. The U.S. Navy has proposed establishing additional geodetic control points on NAWS China Lake. ~~In additional~~Additionally, InSAR and airborne LiDAR, a pulsed laser sensing method, data has been collected for NAWS China Lake following the significant earthquakes that occurred in the IWVGB in July 2019. The IWVGA will coordinate with the U.S. Navy to obtain data related to land subsidence in order to evaluate potential Minimum Threshold exceedances. As discussed in 4.4.4.6, surveying, InSAR, and LiDAR data will be analyzed, as available.

4.5 MEASURABLE OBJECTIVES AND INTERIM MILESTONES

Measurable Objectives are defined as the "…quantitative goals that reflect the basin's desired groundwater conditions and allow the GSA to achieve the sustainability goal within 20 years…" This GSP Measurable Objectives are established at the same representative monitoring sites selected for monitoring conditions for potential Minimum Threshold exceedance. The planned Projects and Management Actions have been selected to achieve the Measurable Objectives. In addition to the Measurable Objective, Interim Milestones are identified in five-year increments at each monitoring site.

4.5.1 Reduction of Groundwater in Storage Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objective for the reduction of groundwater in storage is set at the simulated estimated total loss of storage at the end of the planning horizon in 2070. The value for the Measurable Objective is 213,474 acre-feet of groundwater removed from storage.

As discussed in Section 3.3.5, although the IWVGB will be operating within the current estimated sustainable yield of 7,650 AFY by 2040, additional losses will continue due to ET losses occurring in the China Lake Playa region causing additional reductions of groundwater in storage. Modeling has indicated that additional recharge of imported water in the recharge zone by the Sierra Nevada Mountains does not substantially reduce the ET losses occurring in the China Lake Playa within the time frame of the 50-year planning horizon. Accordingly, the Measurable Objective will be met by 2040, despite some additional losses occurring from 2040 through the planning horizon.

The Interim Milestones for 2025, 2030, and 2035 are the simulated estimated values of total cumulative volume of groundwater removed from storage at January 1 of those years: 81,952 acre-feet, 119,661 acre-feet, and 131,896 acre-feet of groundwater removed from storage, respectively.

4.5.2 Chronic Lowering of Groundwater Levels Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the groundwater levels over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objectives for each representative well for the chronic lowering of groundwater levels is set at the simulated estimated value at that well at year 2040, after the projects and management actions are implemented and sustainability is reached. The Interim Milestones for 2025, 2030, and 2035 are the simulated groundwater levels at January 1 of those years.

Groundwater levels will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.3 Degraded Water Quality Measurable Objective and Interim Milestones

At representative monitoring sites that have historical TDS data, the Measurable Objective for degraded water quality is set at the highest most recent TDS concentration. At wells where the TDS concentrations at the representative monitoring sites are anticipated to generally be stable or stabilize after projects and management actions are implemented based on simulated TDS concentrations, the Interim Milestones are established at the same value as the Measurable Objective. For wells with increasing historical trends, Interim Milestones are established at the extrapolation of the historical trend to the year 2030, at which time some stabilization of TDS trends is anticipated. At representative monitoring sites in areas of the IWVGB were there is not enough historical data to set criteria, Measurable Objectives and Interim Milestones will be established after baseline TDS conditions are established through monitoring.

TDS concentrations will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.4 Land Subsidence Measurable Objective and Interim Milestones

Due to implementation of projects and management actions that will result in stabilization of groundwater levels, the current rate of land subsidence is not anticipated to increase from the most data period (2005-2010). Accordingly, the Measurable Objective is set at the historical rate of subsidence of approximately 1.1 mm/year (0.04 inches/year) over an 18-year period from 1992 to 2010. The Interim Milestones for 2025, 2030, and 2035 are set at the same rate as the Measurable Objective at 1.1 mm/year (0.04 inches/year).

Commented [KJDCNSA4]: Much like the discussion, the objective and interim milestones for subsidence need to be thought through. As written, the measurable objective value for subsidence still exceeds the allowable misalignment tolerance for SNORT. Subsidence thresholds need to be carefully considered -- are they a maximal value across the basin? An average across the basin? What's the allowable gradient of subsidence?

4.6 SUMMARY OF SUSTAINABLE MANAGEMENT CRITERIA

4.6.1 Reduction of Groundwater in Storage

Table 4-3 below shows the numerical sustainable management criteria established for the reduction of groundwater in storage. Figure 4-4 provides a graph of predicted simulated reduction of storage along with the sustainable management criteria.

Table 4-3. Sustainable Management Criteria Summary: Reduction of Groundwater in Storage.

Sustainable Management Criteria	Value (acre-feet of groundwater removed from storage)
Minimum Threshold	234,821
2025 Interim Milestone	81,952

2030 Interim Milestone	119,661
2035 Interim Milestone	131,896
Measurable Objective	213,474

4.6.2 Chronic Lowering of Groundwater Levels

Table 4-4 below shows the numerical sustainable management criteria established for representative monitoring sites for chronic lowering of groundwater levels. Figure 4-5a through Figure 4-5j provide graphs of historical and simulated groundwater levels along with the sustainable management criteria.

Table 4-4. Sustainable Management Criteria Summary: Chronic Lowering of Groundwater Levels.

Representative Monitoring Site	Minimum Threshold (ft msl)	2025 Interim Milestone (ft msl)	2030 Interim Milestone (ft msl)	2035 Interim Milestone (ft msl)	Measurable Objective (ft msl)
USBR-01	2,659	2,667	2,667	2,666	2,664
USBR-03	2,139	2,145	2,148	2,151	2,153
USBR-04	2,110	2,118	2,123	2,125	2,126
USBR-05	2,151	2,157	2,156	2,156	2,156
USBR-06	2,166	2,179	2,175	2,173	2,171
MW 32	2,119	2,125	2,131	2,132	2,134
NR-2	2,150	2,157	2,155	2,155	2,155
Kerr McGee	2,138	2,145	2,144	2,144	2,145
Sandquist Spa	2,162	2,168	2,167	2,167	2,167
Steele 31L01	2,140	2,146	2,148	2,150	2,152

4.6.3 Degraded Water Quality

Table 4-5 below shows the numerical sustainable management criteria established for representative monitoring sites for degraded water quality. Figure 4-6a through Figure 4-6f provide graphs of historical TDS concentrations along with the sustainable management criteria.

Table 4-5. Sustainable Management Criteria Summary: Degraded Water Quality.

Representative Monitoring Site	Minimum Threshold (mg/l)	2025 Interim Milestone (mg/l)	2030 Interim Milestone (mg/l)	2035 Interim Milestone (mg/l)	Measurable Objective (mg/l)
USBR-01	ND	ND	ND	ND	ND
IWVWD Well 33	500	310	310	310	310
Owens Peak South Well 01	500	300	300	300	300
IWVWD Well 30	500	341	341	341	240
Hometown Water Association Well 01	500	448	448	448	370
IWVWD Well 11	600	546	546	546	530
Sandquist Spa	ND	ND	ND	ND	ND
22B	ND	ND	ND	ND	ND
West Valley Mutual 01	600	511	511	511	500
USBR-06	ND	ND	ND	ND	ND
NR-2	ND	ND	ND	ND	ND

ND = not determined at this time. As baseline TDS sampling data is gathered, these criteria will be established.

4.6.4 Land Subsidence

Table 4-6 below shows the numerical sustainable management criteria established for land subsidence.

Table 4-6. Sustainable Management Criteria Summary: Land Subsidence.

Sustainable Management Criteria	Value at SNORT Alignment (inches/year)
Minimum Threshold	0.09 inches/year
2025 Interim Milestone	0.04
2030 Interim Milestone	0.04
2035 Interim Milestone	0.04
Measurable Objective	0.04

4.7 GSP PROPOSED MONITORING NETWORK

4.7.1 Proposed Monitoring Network and Schedule

The existing groundwater level monitoring network is very robust for establishing changes in groundwater levels over time throughout the Indian Wells Valley basin and will continue throughout the planning horizon. The ten monitoring wells that have been selected to be representative key wells to monitor sustainable management criteria for chronic lowering of groundwater levels will be monitored semi-annually and reported specifically to track progress toward sustainability. Groundwater level monitoring in the vicinity of GDEs will be added to the existing monitoring network. As data gaps in the groundwater level monitoring program outside of the pumping areas are filled, additional monitoring points will be added to the groundwater level monitoring network.

As discussed in Section 3.6.1.3, the existing TDS database has water quality data from 1920 to present; however, the dataset includes only a limited number of wells, or a one-time sample when the well was drilled. Baseline sampling will be conducted to fill water quality data gaps. Wells reporting under the GAMA program will continue to be monitored. The 11 monitoring wells that have been selected to be representative key wells to monitor sustainable management criteria for degraded groundwater quality will be monitored annually and reported specifically to track progress toward sustainability.

Land subsidence is not currently monitored in the IWVGB, with the exception of infrequent monitoring conducted by the U.S. Navy at established monuments on NAWS China Lake. The IWVGA will coordinate with the U.S. Navy to obtain data related to land subsidence as monitored.

See Section 3.6.1 for discussion of the data gap evaluation of the existing monitoring network for additional information on the proposed changes to the existing monitoring network.

4.7.2 Monitoring Protocols

An integral part of each GSP is to collect, process, and store data necessary to assess the physical condition of the groundwater basin. The data collection and reporting standards shall also be consistent with the Data Management System (DMS) used to support the implementation of the GSP for the IWV. The goal of the IWV monitoring protocol and reporting standards is to establish a set of monitoring protocols and reporting standards with respect to groundwater levels, groundwater production, groundwater quality, precipitation, streamflow, and evapotranspiration within the IWV watershed. The standards allow IWVGA to assess the sustainable yield for IWVGB to effectively manage groundwater use and production. These standards were developed and maintained in accordance with the BMPs established by DWR. The standards will be re-evaluated by the IWVGA at least every five years to provide for continued efficacy and relevance.

A copy of the full Technical Memorandum entitled "Monitoring Protocols and Reporting Standards", dated October 26, 2018 is included in Appendix 4-C.

4.8 REFERENCES

California Regional Water Quality Control Board Lahontan Region, 2016. *Water Quality Control Plan for the Lahontan Region*. January 2016.

California Regional Water Quality Control Board Lahontan Region, 2016. *Proposed Basin Plan Amendment to Remove the Municipal and Domestic Supply (MUN) Beneficial Use Designation from Certain Ground Water Beneath Naval Air Weapons Station China Lake, Kern, Inyo, and San Bernardino Counties.* Resolution R6V-2015-0005. February 2015.

Dutcher L.C. and W.R. Moyle, 1973. *Geologic and Hydrologic Features of Indian Wells Valley, California.* USGS Water Supply Paper 2007. Prepared in cooperation with the California Department of Water Resources.

California Department of Water Resources (DWR), 2016. *Water Budget Best Management Practice.* Sustainable Groundwater Management Program BMP, 53pp. December, 2016.

J:\2652 IWVGA\08 GSP\Draft_Chapters\Section_4_\Draft text\Section 4\IWVGA_GSP_Section4_SMC_TAC_PAC_review_draft_redline_rev.docx

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 5– PROJECTS AND MANAGEMENT ACTIONS

DRAFT

November 4, 2019

SECTION 5: PROJECTS AND MANAGEMENT ACTIONS

5.1 INTRODUCTION

As established in Section 3, the IWVGB is in critical overdraft. Projects and management actions are required to be implemented in order to respond to changing conditions in the groundwater basin such that undesirable results are avoided and/or mitigated. Groundwater pumping estimates for 2016 indicate that groundwater production in the IWVGB is approximately four times the estimated Current Sustainable Yield of the basin. This level of overdraft, and the current depletion rates of groundwater reserves (see Sections 3.3.4 and 4.3), has already resulted in undesirable results in the basin and it will continue to do so until the IWVGB is brought within the Future Sustainable Yield of the basin. As stated by DWR, "SGMA requires local agencies to develop and implement GSPs that achieve sustainable groundwater management by implementing projects and management actions..." Implementation of the management actions and projects presented below will bring operation of the IWVGB within its Future Sustainable Yield.

While it would be beneficial to immediately reduce all pumping to the Current Sustainable Yield of 7,650 AFY, it is not feasible for the community to make such immediate and drastic reductions without extreme lifestyle changes, alteration of the community character, loss of livelihoods, great financial costs, and other significant negative impacts. Water demands in 2015 for municipal and domestic use alone were greater than the Current Sustainable yield of the IWVGB. A high percentage of the municipal and domestic water demands support the domestic needs of the staff needed to support the mission of NAWS China Lake.

It is anticipated that with the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production will reduce to approximately 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation, anticipated to be 2021. This program will greatly reduce the amount of annual overdraft that will continue until supplemental water supplies, Project No. 1 – Imported Water Supply Project, and Project No. 2 – Optimization of Recycled Water Use are implemented.

Demand management measures, Project No. 3 – Conservation, will be implemented to reduce demands on groundwater.

There will potentially be continuing shallow domestic well impacts, either lost well production capacity due to lower groundwater levels or increasing TDS concentrations, until the IWVGB is operated within the Future Sustainable Yield. Project No. 4 – Shallow Well Mitigation Program, will be implemented to mitigate impacted wells.

The implementation of Augmentation Fees and the Fallowing Program, discussed in Management Action No. 1 below, will lead to a reduction of agricultural operations in the IWVGB. Project No. 5 – Dust Mitigation Plan, discussed below, will be implemented to mitigate secondary impacts caused by windblown dust due to fallowed agricultural land.

Evaluation of groundwater management and project scenarios showed that some current pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells. Project No. 6 – Optimization of Basin Pumping will be implemented mitigate these localized conditions.

According to CWC § 354.44, the GSP shall include a description of the projects and management actions that include the following:

1. **A list of projects and management actions** proposed in the GSP with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The GSP shall include the following:
    a. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which an agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.
    b. The process by which an agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

2. If overdraft conditions are identified through the analysis required by Section 354.18, the GSP shall describe projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
3. A summary of the **permitting and regulatory process** required for each project and management action.
4. The status of each project and management action, including a **time-table** for expected initiation and completion, and the accrual of expected benefits.
5. An **explanation of the benefits** that are expected to be realized from the project or management action, and how those benefits will be evaluated.
6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of an agency, an explanation of the source and reliability of that water shall be included.
7. A description of the **legal authority** required for each project and management action, and the basis for that authority within an agency.
8. A description of the **estimated cost** for each project and management action and a description of how the Agency plans to meet those costs.
9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or deletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The proposed projects and management actions are supported by the best available information and best available science and have considered the level of uncertainty associated with the IWVGB basin setting during development.

The IWVGA planned projects and management actions and the potential projects and management actions are discussed in the subsections below. Given the magnitude of overdraft and the current basin conditions, the planned projects and management actions shall be implemented with the earliest feasible timetable.

5.2 PLANNED MANAGEMENT ACTIONS

5.2.1 Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program

5.2.1.1 *Management Action Description*

The primary initial management action is the establishment of annual groundwater pumping allocations ("Annual Pumping Allocations"). These Annual Pumping Allocations will be used for the purpose of assigning pumping fees ("Augmentation Fees") that will in turn provide the funding for the development of supplemental water supplies and other projects and management actions to achieve sustainability. Accordingly, these Annual Pumping Allocations are not a determination of water rights in that they do not prohibit the pumping of groundwater. Rather, all groundwater pumpers continue to possess the right to produce groundwater provided they pay the Augmentation Fee. While this action will not directly limit groundwater extraction by any individual entity, it is anticipated that the costs associated with the Augmentation Fee will result in voluntary pumping reductions and the implementation of additional conservation measures to lower demands.

Commented [KJDCNSA1]: What happens if a pumper fails or pay the fee? What enforcement mechanism will be used?

In accordance with California law, water produced within the safe yield [1] of the basin, generally considered to be equal to the long-term average natural recharge of the basin, may be charged a General Administration fee but it shall be free of any Augmentation Fees. Water produced in excess of the safe yield shall be subject to an Augmentation Fee as set forth below. The Federal entities (NAWS China Lake and BLM) are exempt from these fees through the legal principles of sovereign immunity.

The Annual Pumping Allocation program will assign each qualified groundwater pumper an Annual Pumping Allocation of the safe yield, if any, after consideration of:

1) Federal Reserve Water Rights (FRWR) ~~of NAWS China Lake~~;
2) California water rights;
3) Beneficial use priorities under California Law;
4) Historical groundwater production; and,
5) Municipal requirements for health and safety.

SGMA recognizes FRWR as distinct from water rights that are based in state law and directs that FRWR be respected in full, and in case of any conflict between federal and state law, federal law shall prevail (Water Code Section 10720.3(d)). SGMA also directs that IWVGB consider the interests of all beneficial uses and

[1] The safe yield is equal to the long-term average natural recharge of the basin, currently estimated to be 7,650 AFY. The current estimate of the sustainable yield, defined by SGMA as the maximum quantity of water that can withdrawn annually without causing undesirable results, is also currently estimated to be 7,650 AFY. The sustainable yield may will change as projects and management actions are implemented that artificially recharge the basin and increase the volume of water that can be withdrawn annually without causing undesirable results.

users of groundwater, listing the federal government, including, but not limited to, the military and managers of federal lands among those interests (Water Code Section 10723.2).

While NAWS China Lake may voluntarily agree to an allocation under the GSP less than its full FRWR, the IWVGA has no legal authority to enforce such an allocation and NAWS China Lake has not provided a final accounting of its FRWR. In recognition of these facts and the acknowledgment of the limits on the IWVGA to regulate the federal government, any such allocation shall be directly assigned to the federal agency and shall not be subject to the requirements of any allocation ordinance, including but not limited to allocation carryovers, borrowing, transfers, reductions and/or variances and fees.

In accordance with SGMA and California Water law, a five-year base period defined as January 1, 2010 through December 31, 2014 ("Base Period") will be used to evaluate groundwater production for all groundwater pumpers, with the exception of NAWS China Lake and de minimis users. An Annual Pumping Allocation, based on California water rights law and historical pumping during the Base Period, will be assigned to groundwater pumpers. The Annual Pumping Allocations will be regularly reevaluated to ensure sustainability.

Commented [KJDCNSA2]: How often will the allocations be reevaluated? Is it annually, bi-annually, every five years? A more defined timeframe should be identified.

The IWVGA recognizes that the safe yield is significantly lower than current pumping and some groundwater pumpers with inferior rights will not be granted any Annual Pumping Allocations. As this groundwater may have been put to significant and important economic use and to ease the transition from current pumping levels to sustainable pumping levels, the IWVGA has determined that some additional loss of storage is acceptable and necessary to ease the transition from current pumping to the Future Sustainable Yield. See Section 4 for the sustainable management criteria for the reduction of groundwater in storage.

All groundwater pumpers who were producing groundwater during the Base Period and who are not given an Annual Pumping Allocation will be eligible to receive a Transient Pool Allocation. The Transient Pool, which consists of a limited non-transferable one-time allocation of water to be used prior to 2040, will be created to facilitate coordinated production reductions and to allow groundwater users to plan and coordinate their individual groundwater pumping termination. The Transient Pool Allocation water is a single use, non-transferable, one-time allocation of water, and once all water in the Transient Pool has been consumed (or sold through the Fallowing Program as set forth below), the Transient Pool will cease. Each party's share of the Transient Pool will be determined pursuant to the same principals of water law used to establish the Annual Pumping Allocations. The total allocations from Transient Pool will be limited to no more than 51,000 acre-feet.

Groundwater production in excess of Annual Pumping Allocations and Transient Pool Allocations will be subject to an Augmentation Fee in an amount that is determined to be sufficient for the acquisition of supplemental water supplies pursuant to this plan.

All groundwater pumpers who are assigned a Transient Pool Allocation may be enrolled, at their sole election, in a Fallowing Program. Pursuant to the Fallowing Program, the groundwater pumper may elect to sell their Transient Pool Allocation back to the IWVGA in exchange for a price equal to the fair market value of the overlying lands associated with their shares of the Transient Pool. This payment shall be made in three equal payments to be paid annually. In exchange for this payment, Transient Pool shareholders shall agree to transfer all property interests in their overlying land along with all water rights, if any.

Given the amount of overdraft and the cost and scarcity of supplemental water supplies (see Section 5.3.2), the IWVGA will allow some reasonable overdraft of the IWVGB due to groundwater production to continue until supplemental water supplies are acquired. It is anticipated that with the implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production is anticipated to reduce to around 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation. Some overdraft will continue until the augmentation program is able to increase supplies with estimated importation supplies becoming operational by 2035, but not later than 2040 to reach sustainability. Under baseline conditions, which assumes no GSP projects and management actions are implemented, annual average pumping from 2020 to 2070 is anticipated to be approximately 37,000 AFY. The Annual Pumping Allocation Plan is anticipated to significantly reduce pumping to an annual average of approximately 14,000 AFY from 2020 to 2070. The difference between pumping and the long-term natural recharge to the IWVGB will be augmented with supplemental water to bring operation of the basin within the Future Sustainable Yield.

5.2.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in significantly less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

The corresponding cumulative loss of groundwater in storage under Baseline conditions is estimated to be approximately 1.6 million acre-feet, while the cumulative loss of groundwater storage with the Annual Pumping Allocation Plan, and the proposed projects and management actions, is estimated to be approximately 215,000 acre-feet. These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program will assist the IWVGA to achieve the goal to preserve the character of the community, quality of life for the residents in the basin, and sustain the mission at NAWS China Lake ~~with the preservation of NAWS China Lake and the community~~ .

The metric for measuring management actions benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.2.1.3 *Justification*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program are a necessity to reach sustainability due to the current state of overdraft, the current unavailability of a supplemental water supply, and the costs of building the infrastructure and obtaining the supplemental supplies once they become available. The estimated Current Sustainable Yield of 7,650 AFY does not support current groundwater production. As discussed previously, it is infeasible for the community to make such immediate reductions to the Current Sustainable Yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. The distribution and volume of groundwater production in the IWVGB is such that proportional reductions to reach the Current Sustainable Yield are infeasible because the majority of individual groundwater users would not have a large enough allocation to maintain an acceptable quality of life and the drastic community changes would impact the support of NAWS China Lake. Economically viable agricultural operations cannot be sustained with a greatly reduced water supply (pumping allocation) as would be required with a proportional reduction to the Current Sustainable Yield. Similarly, domestic and municipal users would not be able to meet basic health and safety requirements under a proportional reduction allocation. Accordingly, the IWVGA is currently working with groundwater users in the IWV to determine an equitable process for assigning allocations. In order to implement the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, the IWVGA must consider and evaluate the following: 1) FRWR of NAWS China Lake, 2) California water rights, 3) beneficial use priorities, 4) historical groundwater production, and 5) municipal requirements for health and safety.

Under U.S. Supreme Court case law defining the FRWR, federal agencies have an implied right to water to support the primary mission for which Congress and the Federal government have designated that land, including a provision of water for growth to support that mission[2]. It is well established in the Supremacy Clause of the U.S Constitution, Article VI, Clause 2, that the Federal Government is not subject to state regulation, unless Congress clearly and unambiguously waives this sovereign immunity. There is no such waiver for state regulation of groundwater, except in the case of a comprehensive state court adjudication of all rights to water, as expressed in the McCarran Amendment (43 U.S.C § 666). SGMA does not meet the requirements set forth in the McCarran Amendment and the IWVGA is therefore unable to regulate NAWS China Lake.

Due to the NAWS China Lake FRWR being currently unquantified and not established, the IWVGA is faced with planning and management hurdles related to allocations. In June 2019, the U.S. Navy provided the IWVGA documentation regarding historical water use, workforce trends, and current water requirements.

[2] The FRWR was first recognized by the U.S. Supreme Court in the context of tribal interests (See Winters v. United States, 207 U.S. 564 (1908)) and subsequently expanded to federal agencies (See Cappaert v. United States, 426 U.S. 128 (1976)), Federal Power Commission v. Oregon, 349 U.S. 435 (1955)).

This letter, provided in Appendix 5-A, estimates the NAWS China Lake water requirement to be 6,530 AFY. While this U.S. Navy estimate is not NAWS China Lake's FRWR, it demonstrates that the majority, if not all, of the estimated safe yield of 7,650 could be held as a federal right and must be respected by the IWVGA and the GSP. For planning purposes, the U.S. Navy ~~recommended~~ requested the IWVGA use 2,041 AFY as a reasonable estimate of current and future annual groundwater production on the installation. The Navy's response also expressly provides that, because of the movement of Navy staff and dependents off-Station, "the water requirements of the Navy cannot be determined solely by the Navy's recent direct production amounts". The response further provides that "[s]ince the Navy mission at China Lake requires its workforce, the full Navy water requirements are the combination of the on-Station requirements and those of the Navy workforce and their dependents off-Station." The IWVGA does not have legal authority to restrict, assess, or regulate production for NAWS China Lake~~; therefore, NAWS China Lake groundwater production is considered of highest beneficial use.~~.

According to CWC 10723.2, the IWVGA must "consider the interest of all beneficial uses and users of groundwater…" The groundwater user categories in the IWV currently are:

- Municipal
- Domestic (De Minimis private well owners and mutuals/co-ops)
- City/County
- NAWS China Lake
- Industrial
- Large Agriculture
- Small Agriculture

CWC Section 106 expressly declares that it is "the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." Accordingly, aside from NAWS China Lake production, which cannot be regulated, and use by SGMA defined de minimis pumper, which also cannot be reduced, the highest beneficial use of water in the IWVGB is for domestic purposes including human consumption, cooking, and sanitary uses. In the IWVGB, groundwater pumpers in the domestic category which would provide the highest beneficial use include production by the IWVWD, Inyokern CSD, individual domestic well owners (de minimis pumpers), and mutual water companies serving domestic users. These groundwater pumpers can and should implement additional conservation measures (see Section 5.2.4); however, the allocations for these pumpers would be continual and annual. In addition, the City and Kern County overlying groundwater production rights are superior to all other overlying rights because public entity rights may not be prescribed against.

The beneficial uses of other groundwater users, including agricultural and industrial users, will subsequently be evaluated based on water rights priorities. The IWVGA will allow all IWVGB groundwater pumpers the opportunity to provide documentation on historical groundwater production and other pertinent information. Current groundwater production that has existed and has been continuous prior to the establishment of NAWS China Lake will be given a priority over more recent pumping that has occurred since the IWVGB has been documented to be in overdraft conditions. Accordingly, all groundwater users and uses will be equitably considered and prioritized, as required by SGMA.

5.2.1.4 *Costs*

The IWVGA will incur costs to develop the annual Pumping Allocations and Transient Pool Allocations. There will be administrative costs and engineering costs for conducting hearings, verifying pumping documentation, and preparing the final report to the IWVGA Board with the recommendations, among other implementation tasks, estimating to be $200,000.

The IWVGA will incur administrative costs to implement and manage the Fallowing Program. Additionally, the IWVGA may incur costs to purchase Transient Pool Allocations from groundwater pumpers electing to enroll in the Fallow Program estimated to be $9 million. These costs will be equal to the fair market value of the overlying lands.

Administrative costs to run all program components are estimated to be $40,000 annually.

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program costs will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof. See Section 6.3 for details of funding options.

5.2.1.5 *Permitting and Regulatory Process*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program does not require the IWVGA to obtain or issue any permits and the preparation and adoption of a GSP is exempt from Division 13 of the Public Resources Code.

5.2.1.6 *Public Notice*

The public will be given the opportunity and time to present historical pumping documentation provided to the IWVGA. The IWVGA will provide sufficient public notice of a public hearing to adopt the Annual Pumping Allocation and the Transient Pool Allocation. See Section 5.2.1.7 below for additional details.

5.2.1.7 *Implementation Process and Timetable*

The IWVGB shall determine each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation following the adoption of this plan. All groundwater pumpers shall be instructed to submit records of their historical pumping and any other relevant material to the IWVGA prior to March 1, 2020. On or before April 15, 2020, the IWVGA Water Resources Manager shall review these materials and provide a draft recommendation of each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation to each groundwater pumper who submitted materials and to the IWVGA TAC members. By April 30th, 2020, all groundwater pumpers shall submit comments on the draft recommendation to the Water Resources Manager. The Water Resources Manager shall consider these comments and present a final report and recommendation to the IWVGA Board for consideration at its June 2020 meeting. Those receiving a Transient Pool Allocation may elect to join the Fallowing Program by no later than August 1, 2020.

5.2.1.8 *Legal Authority*

SGMA broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, CWC Section 10726.2 provides the IWVGA with the authority to develop and implement an

Annual Pumping Allocation Plan, Transient Pool and Fallowing Program to meet the needs of the basin and CWC Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement the GSP management action set forth above.

Although not subject to formal regulation under SGMA, NAWS China Lake is committed to being a good steward of water resources and to exploring partnerships that help to achieve groundwater sustainability, including projects and management actions that benefit both the Navy and the community.

5.3 PLANNED PROJECTS

5.3.1 Project No. 1: Develop Imported Water Supply

5.3.1.1 *Project Description*

The IWVGA does not currently have access to any water supply from outside of the IWVGB. Procuring an imported water supply will require purchasing water supplies (with all required contractual and/or appurtenant water rights) as well as obtaining access to existing water conveyance facilities and constructing additional infrastructure to bring imported water to the IWVGB. The majority of the IWVGB is within the boundaries of the KCWA, a SWP Contractor. KCWA does not have unused SWP water that can be made available to the IWVGB. A small portion of the southern portion of the IWVGB is within the boundaries of Antelope Valley – East Kern Water Agency (AVEK). The nearest existing imported water conveyance facilities are the Los Angeles Department of Water and Power's (LADWP) Los Angeles Aqueduct (LA Aqueduct) and AVEK's water transmission pipeline that terminates near California City (California City Pipeline). The LA Aqueduct conveys ~~to LADWP's service area~~ surface water runoff and groundwater from the Owens Valley basin in the Eastern Sierra Nevada Mountains area in Inyo County as well as surface water runoff and groundwater from the Mono Basin in Inyo County (collectively referred to in this section as Owens Valley water). The LA Aqueduct extends through the western portion of the IWVGB, including through the Freeman-Dixie Wash and El Paso areas. The California City pipeline is located at California City, approximately 15 miles south of the IWVGB boundaries and 50 miles south of the City of Ridgecrest.

The IWVGA has identified the following two imported water project options as conceptually feasible for potential implementation. Each of the options is briefly described below, and a technical memorandum that more fully describes the projects is included in Appendix 5-B. It is anticipated that either one of the two imported water project options will be fully implemented by 2035.

Option 1: Direct Use Project with AVEK

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be wheeled through existing AVEK facilities, specifically through existing AVEK surface water treatment facilities and the California City Pipeline. AVEK staff has indicated that there is currently unused capacity in the California City pipeline. The California City Pipeline would require an extension of approximately 50 miles along Interstate Highway 14 into the populated centers of the IWVGB. Due to the elevation profiles of the proposed pipeline alignment, at least two (2) pump stations will be required to lift the IWVGA's imported water supplies over the El Paso Mountains and through the El Paso area. A potable water storage tank would also be required. The treated water would be used directly to meet water demands that exceed the long-term natural recharge to the IWVGB. A map of the facilities required for Imported Water Option 1 is shown on Figure 5-1, including approximate locations of pump stations.

Option 2: Groundwater Recharge Project with LADWP

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be delivered to MWD and subsequently provided to LADWP for use in LADWP's service area. In exchange, LADWP would provide Owens Valley water from the LA Aqueduct to the IWVGB for use in a groundwater recharge project. A new turnout from the LA Aqueduct would be required, along with a raw water pipeline conveying Owens Valley water to a potential new spreading grounds located northwest of the Inyokern Airport. The Owens Valley water would be recharged into the IWVGB at the spreading grounds and serve as a supplemental source of recharge to replace any groundwater pumping that exceeds the long-term natural recharge to the IWVGB. A map of the facilities required for the Option 2 project is shown on Figure 5-2, including a preliminary location of the surface spreading grounds.

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Option 1 project will directly meet groundwater demands above the current sustainable yield of the IWVGB. The proposed Option 2 project will replace any groundwater produced above the natural recharge to the IWVGB and allow the IWVGB to be operated within the Future Sustainable Yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. By reducing groundwater production in the IWWGB, development of imported water supplies will assist ~~with the preservation of China Lake NAWS and the community.~~the IWVGA to achieve the goal to preserve the character of the community, quality of life for the residents in the basin, and sustain the mission at NAWS China Lake.

The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.1.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Economically viable agricultural operations and industrial operations cannot be sustained without an augmented water supply. Similarly, current domestic and municipal users would not be able to demands without an augmented water supply. Accordingly, the IWVGA is currently working with potential water supply sellers and transfers partners to secure opportunities to purchase and convey imported water supplies to the IWVGB.

See Section 5.2.1.3 for additional justification.

5.3.1.4 *Costs*

A summary of the conceptual capital costs, water rights acquisition costs, annual operations and maintenance (O&M costs), and annual service costs for the necessary infrastructure for Imported Water Project Option 1 is shown in Table 5-1. Annual O&M for Imported Water Project Option 1 would primarily consist of maintenance on the two pump stations and power to lift water across the El Paso Mountains into the IWVGB. Annual service costs for Imported Water Project Option 1 would consist of transportation, wheeling, and treatment fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5-1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-1. Conceptual Costs for Direct Use Project with AVEK (Imported Water Project Option 1).

Item	Total
Capital Costs[1]	$177,975,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$2,280,000
Annual Service Costs[4]	$5,860,000

Notes:

1) Includes two 8,800 gpm pump stations; a 28" steel pipeline extension approximately 50 miles in length; and a one million gallon steel reservoir

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes pump station maintenance and pump station power supply.

4) Includes estimated State Water Project transportation charges, wheeling charges, and treatment charges.

A summary of the conceptual costs, water rights acquisition costs, annual O&M costs, and annual service costs associated with Imported Water Project Option 2 is shown in Table 5-2. Annual O&M for Imported Water Project Option 2 would primarily consist of maintenance on the IWVGA's new surface spreading grounds. Annual service costs for Imported Water Project Option 2 would consist of transportation and wheeling fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5.1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-2. Conceptual Costs for Option 2: Groundwater Recharge Project with LADWP.

Item	Total
Capital Costs[1]	$55,046,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$180,000
Annual Service Costs[4]	$4,260,000

Notes:

1) Includes a new turnout from the Los Angeles aqueduct; a new 28" steel pipeline approximately 10 miles in length; and an approximately 800-acre surface spreading grounds.

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes spreading grounds maintenance.

4) Includes estimated State Water Project transportation charges and wheeling charges.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.1.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. Imported Water Project Options 1 and 2 will require encroachment permits from Kern County Public Works to secure right-of-way for the IWVGA's new imported water pipelines. The Option 1 project will require an encroachment permit from the

California Department of Transportation to secure right-of-way for the new California City pipeline extension along Interstate Highway 14.

An application may need to be submitted to the Bureau of Land Management to secure a Land Use Permit for construction of the new imported water pipelines (Options 1 and 2) and surface spreading grounds (Option 2 only) on lands within the jurisdiction of the Bureau of Land Management.

Implementation of either Imported Water Option is subject to CEQA regulations and would require the preparation of a CEQA Initial Study to determine what, if any, further CEQA review will be required. Due to the presence of lands managed by the ~~China Lake NAWS~~Navy and by the Bureau of Land Management, implementation of either Imported Water Option may also be subject to National Environmental Policy Act (NEPA) regulations. ~~and would require the preparation of a NEPA Environmental Impact Statement~~. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

If treated water is delivered to the IWVWD for direct use through Imported Water Project Option 1, an amendment to the IWVWD's current Domestic Water Supply Permit from the State Water Resources Control Board – Division of Drinking Water will be required.

Transportation and wheeling of imported water supplies will need either approvals from or agreements with the Department of Water Resources; KCWA; AVEK (for Imported Water Project Option 1 only); and MWD and LADWP (for Imported Water Project Option 2 only).

Per the IWVGA's Joint Powers Authority Agreement, this GSP shall not authorize any water supply augmentation to the IWVGB with groundwater from a basin within the jurisdiction of a general member of the IWVGA without the approval of the Primary Director representing that general member. Any proposal to transfer groundwater from Inyo County to the IWVGB (i.e. under Imported Water Project Option 2) would require the approval of the Inyo County Board of Supervisors, who will consider the existing environmental, agricultural, business, and civic interests in Inyo County in their decision to approve such a proposal. Inyo County Code Section 18.77 requires that any transferor of water pursuant to California Water Code Section 1810 obtain a conditional use permit (CUP) from the Inyo County

Planning Commission (ICPC). The CUP would only be approved should the ICPC—as well as the Inyo County Water Commission and the Inyo County Water Department—find that the transfer of water does not unreasonably affect the environmental interests of Inyo County.

5.3.1.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the procurement of imported water supplies through the project's CEQA and NEPA processes.

5.3.1.7 *Implementation Process and Timetable*

The IWVGA has retained the services of Capitol Core Group, a water marketing and lobbying firm, to identify potential water supplies available for purchase as well as potential funding opportunities for the Imported Water Project Options. Capitol Core Group has provided the IWVGA with written deliverables outlining the potential future water supply opportunities available for the IWVGA to purchase and the potential strategic funding plans to pay for the infrastructure associated with the Imported Water Project Options. These written deliverables are confidential and are neither provided nor discussed in this GSP.

The IWVGA will continue to develop an imported water project as a post-GSP action. The IWVGA will meet with AVEK to discuss use of the existing California City pipeline capacity and the transfer agreements with DWR, KCWA, and AVEK. The IWVGA will also meet with LADWP to discuss Inyo County public approval, the nature of the exchanges with MWD and LADWP, and the transfer agreements with DWR, KCWA, LADWP, and MWD. The IWVGA will also conduct additional engineering studies of both Imported Water Project Options. It is anticipated that final selection of the most feasible Imported Water Project Option will occur in January 2023 after preparation of an engineering report and negotiation with the relevant transfer agencies. It is anticipated that the permitting and regulatory process will commence in January 2023 and will be completed in January 2026. Design, permitting, and construction of the infrastructure for the final Imported Water Project Option will begin in January 2026 and will be completed in January 2035.

5.3.1.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code Section 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface or groundwater into the agency, and conserve and store within or outside the agency that water for any purpose necessary or proper to carry out the provisions of this part, including, but not limited to, the spreading, storing, retaining, or percolating into the soil of the waters for subsequent use or in a manner consistent with the provisions of Section 10727.2."Accordingly, SGMA grants the IWVGA the legal authority to implement the development of imported water supplies as a GSP management action.

5.3.1.9 *Source and Reliability*

Imported Water Project Options 1 and 2 will require the IWVGA to secure temporary transfer(s) or a single permanent transfer of external water supplies from a water district or water rights holder. The water rights acquisition costs shown in Tables 5-1 and 5-2 assume that the IWVGA will be able to secure a permanent transfer of SWP Table A Entitlement. The annual availability of SWP water supplies is highly variable due to hydrologic conditions. From 2007-2016, total historical annual deliveries of Table A allocation ranged from 475 TAF in 2014 (approximately 11% of the total Table A entitlement) to 2,901 TAF in 2011 (approximately 70% of the total Table A entitlement). The ten-year average of Table A deliveries from 2007-2016 was 1,778 TAF, but the running long-term average of Table A deliveries is currently **2,571 TAF**, or approximately **62%** of the total Table A entitlement (DWR 2018).

The hydrologic variability of SWP and other external water supplies may be addressed through water banking. The IWVGA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the IWVGB. Participation in a groundwater banking program would improve the reliability of the IWVGA's purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries.

Participation in a groundwater banking program may also allow the IWVGA to purchase additional water supplies during wet periods. The potential groundwater banks in relative proximity to the IWVGB include:

- Willow Springs Water Bank
- Semitropic Water Storage District
- Rosedale Rio Bravo Water Storage District
- AVEK Water Banks
    - Westside Water Bank, Eastside Water Bank, and High Desert Water Bank
- Kern Water Bank

The IWVGA will continue to evaluate the availability and reliability of external water supplies, including SWP water supplies, in its effort to define the most feasible Imported Water Project Option. The IWVGA will also continue to evaluate potential groundwater banking opportunities to enhance the reliability of its purchased water supplies.

5.3.2 Project No. 2: Optimize Use of Recycled Water

5.3.2.1 *Project Description*

The IWVGA, working with the City of Ridgecrest (City), will optimize the use of recycled water supplies in the IWVGB. The City currently operates an existing 3.6 million gallon per day (MGD) WWTF[3] located on the NAWS base, approximately 3.5 miles northeast of the City center. Annual average day flows at the WWTF were approximately 2.44 MGD in 2017, or approximately 2,739 AFY. The City WWTF produces recycled water that is currently applied at a City site for irrigation of alfalfa fields with a recycled water demand of approximately 220 AFY, and at ~~the China Lake NAWS~~NAWS China Lake for irrigation of a golf course with a recycled water demand of approximately 500 AFY. The remaining treated wastewater generated at the City WWTF—approximately 2,010 AFY—is discharged to evaporation/percolation ponds

[3] A Memorandum of Agreement dated April 1, 1993, between the Navy and the City states that the City owns and operates the WWTF, though there is a general lack of consensus among the IWVGB stakeholders regarding the ownership and operations of the WWTF. The term "City WWTF" is used in this GSP for the sole purpose of distinguishing between the two existing WWTFs in the IWVGB.

at the City WWTF site. A portion of the treated wastewater discharged to the evaporation/percolation ponds serves as seepage flow to the Mojave Tui Chub habitat, located north of the City WWTF. It has been estimated that the annual water demands to maintain the habitat is approximately 805 AFY (ERS 1991). The existing uses of recycled water in the IWVGB are discussed further in Section 2.7.5 of this GSP.

The City of Ridgecrest's existing WWTF is currently the only facility which generates a recycled water supply for direct beneficial or controlled use within the IWVGB. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The new recycled water facilities would provide up to 1.8 MGD (2,016 AFY) of recycled water for City use in landscape irrigation and/or groundwater recharge (Provost & Pritchard, 2015).

The IWVGA will coordinate with the City to further optimize the use of recycled water in the IWVGB. The IWVGA has identified the following three (3) recycled water subprojects as conceptually feasible for potential implementation in accordance with this GSP.

- Recycled Water Subproject 1 – Landscape Irrigation in the City and ~~the China Lake NAWS~~NAWS China Lake
- Recycled Water Subproject 1a – Landscape Irrigation at Cerro Coso Community College
- Recycled Water Subproject 2 - Groundwater Recharge

Each of the IWVGA's recycled water subprojects is briefly described below. A technical memorandum that more fully describes the recycled water subprojects is included in Appendix 5-C. Further evaluation of the other potential opportunities for recycled water subprojects in the IWVGB (including industrial use of recycled water) will be conducted as a post-GSP action.

Recycled Water Subproject 1: Landscape Irrigation in the City and the ~~China Lake NAWS~~NAWS China Lake

The City currently operates five (5) groundwater wells that provide irrigation for approximately 53 acres of landscaping located at City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Indian Wells Valley Water District (Water District) serves a large portion of the City, and it is assumed that the Water District provides groundwater for landscape irrigation within City boundaries with the exception of City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Navy operates wells that provide groundwater for landscape irrigation within ~~the China Lake NAWS~~NAWS China Lake.

Under Recycled Water Subproject 1, the IWVGA will replace the groundwater currently used for landscape irrigation within the City ~~and the China Lake NAWS~~ with recycled water. While the IWVGA cannot require NAWS China Lake to use recycled water for irrigation, when practical and pending funds availability, NAWS China Lake will implement additional water conservation measures that could include the use of recycled water for irrigation of landscaping beyond that of the golf course. Approximately 119 acres of existing landscaping have been identified within the City (95 acres) and ~~the China Lake NAWS~~NAWS China Lake (24 acres) for potential landscape irrigation with recycled water (see Appendix 5-C). The estimated annual recycled water demand for landscape irrigation within the City and ~~China Lake NAWS~~NAWS China Lake for Recycled Water Subproject 1 is estimated to be 930 AFY. The new facilities for Recycled Water Subproject 1 include a new 5,100 gpm recycled water booster pump station; approximately 15 miles of new purple pipe distribution system; and site retrofits for existing landscape areas including connections to existing irrigation mains, recycled water meters, pressure-reducing valves, and backflow prevention devices. A map of facilities required for Recycled Water Subproject 1 is shown on Figure 5-3.

Recycled Water Subproject 1a: Landscape Irrigation at Cerro Coso Community College

Under Recycled Water Subproject 1a, the IWVGA will extend the recycled water distribution system from Recycled Water Subproject 1 to replace existing groundwater use for landscape irrigation at Cerro Coso Community College (Cerro Coso) with recycled water. Approximately 25 acres of landscaping at Cerro Coso have been identified for potential irrigation with recycled water, and the estimated annual recycled water demand at Cerro Coso is approximately 194 AFY. The facilities to be constructed under Recycled Water Subproject 1 as well as additional new facilities will be required to deliver 194 AFY of recycled water to Cerro Coso. The additional new facilities include an additional 900 gpm recycled water booster pump station; approximately 4 miles of additional purple distribution pipe; and appropriate site retrofits at Cerro Coso. A map of facilities required for Recycled Water Subproject 1a is shown on Figure 5-4.

Recycled Water Subproject 2: Groundwater Recharge

Under Recycled Water Subproject 2, the IWVGA will further treat the produced recycled water supplies at the City WWTF for groundwater recharge through subsurface applications (deep injection). A recycled water groundwater recharge project through surface applications (surface spreading grounds) would not be feasible due to the limiting geologic and hydrogeologic conditions in the vicinity of the City WWTF. The presence of thick lacustrine clay layers and the minimal groundwater flow between water-bearing zones would prevent surface application of recycled water in the vicinity of the City WWTF from recharging the active production zones in the IWVGB. For effective recharge of the IWVGB, deep injection facilities will be required for Recycled Water Subproject 2.

The IWVGA estimates that approximately 352 AFY of recycled water will be available for groundwater recharge under Recycled Water Subproject 2. Additional quantities of recycled water for groundwater recharge may become available should any of the existing recycled water practices, such as maintaining seepage flow to the Tui Chub habitat (see Section 2.7.5.3), be discontinued.

The new facilities for Recycled Water Subproject 2 include new advanced wastewater treatment facilities; a new 300 gpm recycled water booster pump station; approximately 3 miles of new transmission pipeline; and deep injection wells. The City has developed efforts independent of this GSP to construct a new WWTF including tertiary treatment facilities with the capacity to treat 1.8 MGD (2,016 AFY) of wastewater. In accordance with the provisions for subsurface applications of recycled water as published in Title 22 Section 60320.201 of the California Code of Regulations, the recycled water supplies produced for deep injection must undergo advanced treatment through reverse osmosis and advanced oxidation. The IWVGA will construct the appropriate advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation) solely for the recycled water produced for groundwater recharge through deep injection. A map of facilities required for Recycled Water Subproject 2 is shown on Figure 5-5.

5.3.2.2 *Project Benefits and Mitigation of Overdraft*

The proposed Recycled Water Subprojects 1 and 1a will directly reduce groundwater produced above the current sustainable yield of the IWVGB for landscape irrigation. The proposed Recycled Water Subproject

2 will replace some groundwater produced above the natural recharge to the IWVGB and contribute to allowing the IWVGB to be operated within the future sustainable yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. In addition, the proposed project will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, optimization of recycled water supplies will assist the IWVGA to achieve the goal to preserve the character of the community, quality of life for the residents in the basin, and sustain the mission at NAWS China Lake.~~with the preservation of China Lake NAWS and the community.~~

The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.2.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions to in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Accordingly, the IWVGA plans to work with the City to generate new recycled water supplies for replacement of existing groundwater uses in landscape irrigation and for augmentation of the current natural recharge to the IWVGB. Existing groundwater uses for landscape irrigation should be replaced with non-potable water supplies (i.e. recycled water) to the greatest extent feasible so that groundwater may be produced primarily for domestic purposes.

See Section 5.2.1.3 for additional justification.

5.3.2.4 *Project Costs*

The City's independent efforts to construct a new WWTF include construction of tertiary treatment facilities to treat up to 1.8 MGD (2,016 AFY) of wastewater. The tertiary treatment capacity developed as part of the City's independent efforts is sufficient to treat 930 AFY of recycled water for Recycled Water Subproject 1 as well as the quantities of recycled water for Recycled Water Subprojects 1a and 2 discussed below. Therefore, the conceptual costs for the recycled water subprojects described below do not include estimates to construct new tertiary treatment facilities.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1 is shown in Table 5-3. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1 include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-3. Conceptual Costs for Recycled Water Subproject 1: Landscape Irrigation with Recycled Water at City/~~China Lake NAWS~~NAWS China Lake.

Item	Total
Capital Costs [1]	$42,757,200
Annual Operations & Maintenance Costs [2]	$395,500

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1a is shown in Table 5-4. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1a include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-4. Conceptual Costs for Recycled Water Subproject 1a: Landscape Irrigation with Recycled Water at Cerro Coso Community College

Item	Total
Capital Costs[1]	$10,183,200
Annual Operations & Maintenance Costs[2]	$129,300

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

It should be noted that the required facilities for Recycled Water Subproject 1a are considered an extension of the facilities required for Recycled Water Subproject 1. The costs presented above and in Table 5-4 are considered incremental extensions of the costs listed in Table 5-3.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 2 is shown in Table 5-5. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 2 include annual maintenance and power supplies for the new recycled water pump station, annual maintenance of the purple pipe distribution system, and annual maintenance of the advanced wastewater treatment facilities.

Table 5-5. Conceptual Costs for Recycled Water Subproject 2: Deep Injection with Recycled Water for Groundwater Recharge

Item	Total

Capital Costs[1]	$22,798,000
Annual Operations & Maintenance Costs[2]	$480,300

Notes:

1) Includes new purple pipe distribution pipelines; a 300 gpm recycled water pump station; advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation with UV/H_2O_2); and a 500 gpm deep injection well.

2) Includes pump station maintenance, pump station power supply, distribution system maintenance, and advanced treatment facilities maintenance.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.2.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. The City will need to obtain a new National Pollutant Discharge Elimination System (NPDES) permit from the Lahontan Regional Water Quality Control Board (LRWQCB) for the new wastewater treatment facility. The IWVGA will need to prepare a Report of Waste Discharge for the new advanced wastewater treatment facilities and submit an application to the LRWQCB for a Waste Discharge Requirements/Water Reclamation Requirements (WDR/WRR) permit for a new groundwater replenishment project using recycled water. In accordance with the regulations for Groundwater Replenishment Reuse Projects (GRRPs) through subsurface application (per California Code of Regulations, Title 22, Division 4, Chapter 3, Article 5.2), the IWVGA will also need to submit and have approved by the State Water Resources Control Board – Division of Drinking Water a Title 22 Engineering Report to obtain the WDR/WRR permit.

The City's existing wastewater treatment facility is located within the boundaries of ~~the China Lake NAWS~~NAWS China Lake. An easement permit from the U.S. Navy may be required to modify the existing wastewater treatment facility and/or to construct the proposed recycled water pipelines for Recycled Water Subprojects 1, 1a, and 2.

Construction of the recycled water distribution system and transmission pipelines may require encroachment or excavation permits from the City.

Implementation of this project is subject to California Environmental Quality Act (CEQA) regulations and would require the preparation of a CEQA Initial Study. Due to of the need for easements on land managed by ~~the China Lake NAWS~~NAWS China Lake, implementation of this project ~~may also~~would be subject to National Environmental Policy Act (NEPA) regulations~~ and may require the preparation of a NEPA Environmental Impact Statement. ~~. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

5.3.2.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the optimization of recycled water supplies through the project's CEQA and NEPA processes.

5.3.2.7 *Implementation Process and Timetable*

Prior to implementing the optimization of recycled water supplies, the IWVGA will coordinate with and assist the City in its independent efforts to relocate, expand, and enhance the existing City WWTF. It is anticipated that the recycled water permitting and regulatory process will commence in January 2022 and will be completed in January 2023. Construction of the infrastructure for the Recycled Water Subprojects will begin in January 2023 and will be completed in January 2025.

5.3.2.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "transport, reclaim, purify, desalinate, treat, or otherwise manage and control polluted water, wastewater, or other waters for subsequent use in a manner that is necessary or proper to carry out the purposes of this part." Accordingly, SGMA grants the IWVGA the legal authority to implement the optimization of recycled water supplies as a GSP management action.

5.3.2.9 *Source and Reliability*

The IWVGA's recycled water subprojects will rely on the availability of treated effluent generated at the City WWTF. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The City ~~has taken steps to initiate the City WWTF modifications/relocation,~~ is working with the Navy to finalize a new easement to include additional acreage adjacent to the existing facility where the City could develop a new tertiary WWTF.~~but progress on the City WWTF modifications/relocation is currently at a halt pending land use negotiations with the NAWS China Lake~~. The IWVGA's recycled water subprojects will build upon the tertiary treatment facilities that the City plans to construct at its new WWTF. Before implementation of the IWVGA's recycled water subprojects can commence, the City must complete negotiations with the NAWS China Lake and construct the modified/relocated City WWTF.

5.3.3 Project No. 3: Basin-wide Conservation Efforts

5.3.3.1 *Project Description*

An additional project is to develop additional voluntary and rebate-based conservation efforts for domestic beneficial uses in the IWVGB, and to also promote additional conservation efforts for the other beneficial uses (primarily industrial) that rely on groundwater from the IWVGB.

The IWVGA will confer with domestic and municipal groundwater producers (namely the Water District, City, Navy, and private/domestic well owners) to discuss historical and current conservation measures, which will be used as a guide to establish the new voluntary conservation measures on a basin-wide level. Specifically, the IWVGA will review the current conservation measures governing landscape irrigation, wash-downs, and other practices that potentially waste water. The IWVGA may also determine the health and safety water use requirements for domestic water use in the IWVGB and use these requirements as another guide to establish the new voluntary conservation measures. The IWVGA will retain the services of a professional water conservation consultant to prepare a Water Conservation Strategic Plan that will incorporate the IWVGA's discussions with domestic and municipal groundwater producers as well as the IWVGA's evaluation of health and safety water use requirements in the IWVGB. The IWVGA will implement the Water Conservation Strategic Plan in all domestic and municipal uses of groundwater in the IWVGB.

Historically, the Water District, the City, and the Navy have implemented mandatory water use restrictions within their service areas/jurisdictions in an effort to reduce groundwater production in the IWVGB (see Section 2.7.3). The IWVGA will build upon the historical and current mandatory water use restrictions to potentially establish new basin-wide mandatory conservation measures that will reduce per-capita water demands for domestic and recreational (irrigation) uses of groundwater to the greatest extent feasible. The new basin-wide mandatory conservation measures would also be enforced in the communities outside of the IWVGB that rely on groundwater from the IWVGB—namely the communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley.

The results of the IWVGA's Water Conservation Pilot Project (Rebate Program and Water Audit, Leak Detection, and Leak Repair Program) for Severely Disadvantaged Communities will be evaluated for potential implementation on a basin-wide level. Pending evaluation of the Rebate Program, the IWVGA may implement a basin-wide rebate program to promote the installation of water-conserving fixtures and appliances. Pending evaluation of the Water Audit, Leak Detection, and Leak Repair Program, the IWVGA may oversee a basin-wide leak detection and repair effort to reduce system water losses in the IWVGB.

The IWVGA will also coordinate with Searles Valley Minerals, Inc. (SVM) to investigate the potential for and feasibility of conservation in the industrial water uses of SVM. The IWVGA will reach out to SVM staff to discuss the historical conservation measures that have been implemented in SVM's mineral recovery process. In coordination with SVM staff, the IWVGA will also determine if SVM's mineral recovery process may be supplied with non-potable water resources such as recycled water and/or brackish water. If so, the IWVGA will conduct a feasibility study on the infrastructure and cost required to convey non-potable water resources to SVM for use in the mineral recovery process, including all necessary retrofits to SVM's existing mineral recovery facilities. If SVM's use of recycled and/or brackish water is determined to be feasible, the IWVGA will construct new facilities for production and conveyance of recycled and/or brackish water to SVM, as well as all necessary retrofits to SVM's existing mineral recovery facilities.

5.3.3.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the IWVGA will preserve the character of the community, quality of life for the residents of the basin and sustain the mission at NAWS China Lake.~~the preservation of NAWS China Lake and the surrounding supporting communities will be upheld.~~

The metric for measuring management actions benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.3.3 *Justification*

Due to the current state of overdraft and the current unavailability of supplemental water supplies, further developing and expanding current conservation efforts are a necessity to reach sustainability. The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. In addition, the high cost to acquire and convey supplemental water supplies will impact the financial status of the IWVGB's residents and local entities. Accordingly, the IWVGA must work with groundwater users in the IWVGB to implement basin-wide conservation measures that will minimize groundwater production and therefore minimize the quantity (and cost) of supplemental water required to reach future basin sustainability.

5.3.3.4 *Project Costs*

At this time, there are no capital costs anticipated with implementing basin-wide conservation efforts. The IWVGA will dedicate approximately $20,000 annually to find opportunities for additional conservation and implement the new basin-wide conservation measures. The associated costs will consist of evaluating current conservation measures, determining opportunities for additional conservation, conducting public outreach, meeting with groundwater producers, and drafting and adopting conservation ordinances.

The costs for implementing basin-wide conservation efforts may increase should the IWVGA determine that the Water Conservation Pilot Project for Severely Disadvantaged Communities be implemented at a basin-wide level. The costs associated with a basin-wide Rebate Program would consist of advertising, marketing, customer service, processing rebate applications, purchasing water-conserving fixtures and appliances, vendor coordination, and issuing rebates. The costs associated with a basin-wide Water Audit, Leak Detection, and Repair Program would consist of conducting water audits, conducting leak detection surveys, reporting distribution system and storage leak occurrences, and repairing identified leaks.

The costs for implementing basin-wide conservation efforts may also increase should the IWVGA pursue conservation efforts in SVM's mineral recovery process. The associated costs would consist of coordination, meetings, and site tours with SVM staff; review of SVM's historical conservation measures; and analysis of opportunities for additional conservation in the mineral recovery process. Should the IWVGA conclude that SVM's mineral recovery process may use non-potable water supplies (recycled and/or brackish water), other associated costs would consist of preparing a feasibility study and engineering report, permitting, construction of recycled/brackish water production facilities, construction of recycled/brackish water conveyance facilities, and installation of all necessary retrofits to SVM's existing mineral recovery facilities.

Costs may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.3.5 *Permitting and Regulatory Process*

This management action currently does not require the IWVGA to obtain approved permits. However, should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, construction of infrastructure to convey recycled and/or brackish water to SVM may be subject to the CEQA and NEPA regulatory processes.

5.3.3.6 *Public Notice*

The public will be given notice of the IWVGA's adoption of ordinances that would enforce any additional conservation measures. As part of marketing the new voluntary conservation measures, the public will be provided with materials documenting the opportunities for voluntary conservation as well as the associated rebates issued by the IWVGA.

Should the IWVGA implement a Rebate Program on a basin-wide level, the public will be provided with materials documenting the methods by which domestic and municipal groundwater producers may apply for rebates for water-conserving fixtures and appliances. Should the IWVGA implement a Water Audit, Leak Detection, and Leak Repair Program, members of the public that own or operate a groundwater production and distribution system will be provided with opportunities for a consultant to conduct system water audits with leak detection surveys and repairs to minimize system water losses.

Should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, the public will be provided with the opportunity to participate in the required CEQA and NEPA regulatory processes.

5.3.3.7 *Implementation Process and Timetable*

Prior to implementing basin-wide conservation measures, the IWVGA will determine acceptable conservation measures based on an analysis of historical and current conservation measures enforced by the Water District, the City, and the Navy, as well as health and safety requirements for water use in the IWVGB. The IWVGA will confer with domestic and municipal groundwater producers to discuss opportunities for additional water conservation. The IWVGA will also retain its professional water conservation consultant to develop a Water Conservation Strategic Plan. It is anticipated that the Water Conservation Strategic Plan will be completed by no later than January 2023 and will be implemented over the GSP planning and implementation horizon.

The IWVGA's Water Conservation Pilot Program for Severely Disadvantaged Communities is expected to be completed by December 2020. The results of the Pilot Program will be evaluated by IWVGA staff for potential basin-wide implementation, which is tentatively planned for no later than January 2023.

IWVGA will coordinate with SVM staff starting as soon as practical regarding potentially additional opportunities for conservation in SVM's mineral recovery process. A feasibility study and engineering report describing the potential for SVM to use recycled and/or brackish water in the mineral recovery process will be completed as soon as practical. If SVM use of recycled and/or brackish water is feasible, construction of new production facilities, conveyance infrastructure, and site retrofits for SVM will commence no later than January 2025.

5.3.3.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code 10725.2). Specifically, California Water Code Section 10726.4 grants the IWVGA authority to "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells". California Water Code Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement basin-wide conservation measures as a GSP management action.

5.3.4 Project No. 4: Shallow Well Mitigation Program

5.3.4.1 *Project Description*

As discussed in Section 3.3.4.4, the IWVGB has been overdrafted for many decades resulting in a significant lowering of the regional and local groundwater elevations, and a significant reduction in the amount of useable groundwater in storage. In addition, the IWVGB has areas with poor water quality (specifically high total dissolved solids) which has migrated to areas that previously had higher quality groundwater, resulting in water quality impacts to some wells. Most of the impacted wells are "shallow" wells, constructed to serve rural domestic/mutual water companies, small agricultural, and livestock water supply needs. Shallow well impacts are a direct result from both the chronic lowering of groundwater levels and degraded water quality, and therefore a Shallow Well Mitigation Program is necessary to reach IWVGB sustainability.

The IWVGA will prepare a mitigation plan (Shallow Well Mitigation Plan) to address the approximately 872 shallow wells in the IWVGB. The Shallow Well Mitigation Plan will include the development of criteria to characterize the level of impacts and the development of an evaluation process to access the viability of the wells. Shallow wells that experience impacts related to chronic lowering of groundwater levels and/or degraded water quality that have occurred after February 1, 2020 are eligible for mitigation, pending the evaluation of the impacts. The evaluation process will include, but not be limited to, analysis of:

1) loss of efficiency/performance reduction
2) the appropriateness of the original well design and construction
3) water level and water quality impacts, and
4) the percentage (if any) of well owner's mitigation responsibility.

The Shallow Well Mitigation Plan will also outline the process by which individual well owners can apply and submit wells for evaluation and consideration for mitigation by the IWVGA, including the evaluation and review process the IWVGA's Water Resources Manager will follow to process the applications and make recommendations to the IWVGA Board.

After the adoption of the Shallow Well Mitigation Plan, in appropriate intervals throughout the planning horizon, shallow wells will be evaluated based on the adopted criteria and organized into specific areas/zones for development of effective mitigation options. Some wells may be proposed to be abandoned (not mitigated) based on evaluation of impacts. Specific improvements will be identified for impacted shallow well which may include deepening the well, replacing the well, connecting to existing water systems, or other mitigation measures. The wells recommended for mitigation will be placed on an Impacted Shallow Well Priority List and will be scheduled for mitigation.

5.3.4.2 *Project Benefits and Mitigation of Overdraft*

The proposed Shallow Well Mitigation Project will directly mitigate impacts due to the following:

- Reduction of groundwater in storage;
- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Shallow Well Mitigation program will provide a direct benefit to beneficial users in the IWVGB who have unreasonably experienced water supply and financial hardships due to overdraft conditions in the IWVGB. Many of the beneficial users that will benefit from the implementation of this project are members of disadvantaged communities. The implementation of the other proposed projects and management actions will also improve groundwater conditions and are anticipated to reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E).

The metric for measuring project benefits will be the number of shallow wells that are impacted and mitigated under this program.

5.3.4.3 *Justification*

-The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Shallow Well Mitigation Program to mitigate undesirable results caused by chronic lowering of groundwater levels and degraded water quality that are directly impacting individual well owners and directly impacting their ability to meeting potable water demands, including demands for basic health and safety.

5.3.4.4 *Project Costs*

The estimated cost to develop the Shallow Well Mitigation Plan is $70,000. The estimated annual costs to administer the program is $20,000. The model results for the proposed projects and management actions indicate that potentially 22 shallow wells could be impacted. The estimated costs to mitigate these impacts is $1.65 million.

5.3.4.5 *Permitting and Regulatory Process*

The shallow well mitigation effort will require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. Furthermore, implementation of shallow well mitigation measures is anticipated to require a series of permits and approvals, including but limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will conduct a CEQA review to identify potential impacts for some mitigation projects. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.4.6 *Public Notice*

The public will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.4.7 *Implementation Process and Timetable*

The Shallow Well Mitigation Plan will be developed to describe the process and criteria used to evaluated impacted shallow wells and the process by which well owners can submit their wells for consideration for mitigation by the IWVGA. It is anticipated the Shallow Well Mitigation Plan will be developed by December

2020, with implementation of mitigation measures continuing throughout the planning horizon. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Shallow Well Mitigation Plan. In appropriate intervals throughout the planning horizon, shallow wells will be evaluated in accordance with the Shallow Well Mitigation Plan and the Impacted Shallow Well Priority List will be available for public review prior to implementing mitigation.

5.3.4.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Shallow Well Mitigation Program.

5.3.5 Project No. 5: Dust Control Mitigation Program

5.3.5.1 *Project Description*

Section 5.2.1 identifies the first planned management action as implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. Implementation of this management action will result in a potential increase in windblown dust and sand, due to the climate of the IWV, which must be mitigated concomitant with decreased agricultural water use.

The IWVGA will prepare a study (Dust Control Mitigation Plan) to investigate best management practices to address windblown dust and sand that can be used on fallowed agricultural land and to identify the location and magnitude of the potential need for dust control. In 1991, the "Dustbusters Research Group" was formed to develop "…best management practices for mitigating wind erosion, reducing blowing dust and improving air quality" in the Antelope Valley, which has comparable issues as the IWV regarding windblown dust. (Agricultural Guide to Controlling Windblown Sand and Dust, October 2010). Mitigation measures applicable to farmland that do not require addition water use include, but are not limited to, the following:

- Wind breaks/wind barriers: According to the Agricultural Guide to Controlling Windblown San and Dust, wind typically does not lift sand much more than three feet into the air. Consequently, the wind breaks/wind barriers create a "trap" which interrupts to transport of blowing sand and causes the sand to deposit at the site of the wind break. Wind breaks may include, but are not limited to, solid or porous fences, straw bales, tilling soils to create surface roughness, and berms.

- Mulch: According to the Agricultural Guide to Controlling Windblown Sand and Dust, surface coverings to address blowing dust may include, but are not limited to, mulch (wood chips, gravel, and /or plastic products) and chemical dust suppressants.

Based on the results of the Dust Control Mitigation Plan and what current IWVGB farms voluntarily fallow agricultural land, critical areas will be identified and prioritized for mitigation. The IWVGA initially will monitor dust issues as agricultural practices continue and are gradually phased out, to create a baseline by which to compare and evaluate future mitigation needs. IWVGA will continue to monitor the occurrence of windblown dust and sand and implement proactive mitigation measures as identified in the Dust Control Mitigation Plan.

5.3.5.2 *Project Benefits and Mitigation of Overdraft*

The proposed Dust Control Mitigation Program will directly mitigate secondary impacts caused by implementing necessary management actions to address impacts caused by the following sustainability indicators:

- Reduction of groundwater in storage; and
- Chronic lowering of groundwater levels;

The Dust Control Mitigation Program will provide a direct benefit to beneficial users in the IWVGB that may experience undesirable secondary impacts related to the reduction in vegetation and the reduction of use of applied water on agricultural lands. Implementation of mitigation efforts which do not involve use of water will result in an effective replacement of vegetation, and contribute to long-term decreased groundwater use.

The metric for measuring project benefits will be the number of acres of fallowed agricultural lands that have dust control mitigation measures implemented.

5.3.5.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement Management Action 1 (Annual Pumping Allocation Plan, Transient Pool and Fallowing Program) which may cause secondary impacts related to dust that must also be mitigated to achieve sustainability and prevent undesirable results in the IWVGB. If the Dust Control Mitigation Program is not implemented, IWV residents may over time experience impacts to finances, health, and quality of life as a result of unmitigated windblown dust and sand. The unmitigated windblown dust and sand can also affect mission capabilities at NAWS China Lake.

5.3.5.4 *Project Costs*

The estimated cost to develop the Dust Control Mitigation Plan is $70,000. The estimated annual costs to administer the program is $20,000. The estimated costs to mitigate these impacts may be up to $19 million.

5.3.5.5 *Permitting and Regulatory Process*

The study of the dust control mitigation effort will likely require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. However, implementation of dust control measure will like include a series of permits and approvals, including but not limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will likely be required to comply with CEQA requirements to identify potential impacts and to describe mitigation measures. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.5.6 *Public Notice*

The public will be given the opportunity and time to comment on the Dust Control Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.5.7 *Implementation Process and Timetable*

The Dust Control Mitigation Plan will be developed to investigate the magnitude and need for mitigation and best management practices to address windblown dust and sand that can be used on fallowed agricultural land. It is anticipated the Dust Control Mitigation Plan will be developed by June 2021, with implementation of mitigation measures continuing throughout the planning horizon as necessary based on the voluntary schedule of the fallowing of agricultural lands. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Dust Control Mitigation Plan. In appropriate intervals throughout the planning horizon, agricultural lands that may require dust mitigation measures will be evaluated with the recommended mitigation measures made available for public review prior to implementing mitigation. The IWVGA will implement certain proactive mitigation measures in areas of greatest rick and gradually ramp up dust control mitigation, as circumstances demonstrate.

5.3.5.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to “perform any act necessary or proper” to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Dust Control Mitigation Program.

5.3.1 Project No. 6: Pumping Optimization Project

5.3.1.1 *Project Description*

Evaluation of the modeling results for the proposed groundwater management and project scenarios showed that some current groundwater pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells.

It is anticipated that the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, will greatly reduce groundwater pumping for agricultural uses in the northwestern portion of the IWGWB over time. The modeling results indicate groundwater levels in this area will not only stabilize but will increase as a result of the proposed management actions and projects.

It is also anticipated that groundwater pumping by the Water District west and southwest of the City will continue and that, along with pumping by Searles Valley Minerals, Inc. and others, the groundwater levels in these areas will not completely stabilize by 2040.

The pumping optimization program will relocate some of the Water District, and potentially some of Searles Valley Minerals Inc., groundwater pumping to the northwest portion of the basin. The pumping optimization program will include the construction of two new wells in the northwest portion of the basin along Brown Road and approximately nine miles of pipeline to connect the wells to the Water District's water system.

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Pumping Optimization Project will directly mitigate impacts due to the following:

- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Pumping Optimization Project will stabilize groundwater levels west and southwest of the City and reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E), due to both lower groundwater levels and from potential water quality impacts.

The metric for measuring project benefits for this project will be will be to monitor groundwater levels and water quality.

5.3.1.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Pumping Optimization Project to mitigate undesirable results that would directly impact the ability of shallow well owners to meeting potable water demands, including demands for basic health and safety.

5.3.1.4 *Project Costs*

Infrastructure costs are for the design and construction of a new well and new distribution system. The estimated cost to construct the facilities for the Pumping Optimization Project is $23 million.

5.3.1.5 *Permitting and Regulatory Process*

Implementation of the Pumping Optimization Project will require encroachment or excavation permits for construction of the pipeline, well permits from Kern County, and agreements for use of the facilities or to take water from the facilities with the Water District and perhaps Searles Minerals, inc. The IWVGA will conduct a CEQA review to identify potential impacts from construction of the facilities. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.1.6 *Public Notice*

The public will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.1.7 *Implementation Process and Timetable*

The Pumping Optimization Project will require significant funding from outside the IWV to be feasible. If adequate funding is obtained it is anticipated the Pumping Optimization Project will be complete by December 2025.

5.3.1.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to “perform any act necessary or proper” to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC

10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Pumping Optimization Project.

5.4 CONCEPTUAL PROJECTS STILL UNDER CONSIDERATION

5.4.1 Brackish Groundwater Project

To further enhance the sustainable and adaptive management strategies for Indian Wells Valley (IWV), the Brackish Water Resources Partnership was formed, consisting of IWVWD, the Coso Operating Company, Mojave Pistachios, Searles Valley Minerals, and Meadowbrook Dairy, to evaluate the feasibility of extracting and treating brackish groundwater to produce fresh water for potential multiple beneficial uses including, among other things:

- Providing a source of water as a bridge or buffer to assist in achieving SGMA sustainability;
- Diversifying local water supplies;
- Improving reliability as part of a portfolio of multiple sources of water; and
- Providing a local, beneficial industrial use for the waste brine.

There are areas in the IWVGB that have TDS concentrations greater than 1,000 mg/L, particularly in the intermediate and deep aquifer layers and primarily underlying NAWS China Lake. These groundwater areas are considered to be brackish, and are the subject of the Brackish Groundwater Feasibility Study.

The Brackish Groundwater Feasibility Study will examine the feasibility of extracting brackish groundwater, options for treating the brackish groundwater, and options for delivery of all water types to the various connection points. On the basis of examining several criteria, the “ideal” brackish groundwater extraction well has several characteristics:

- Completed in a sand layer that will yield a desirable volume of water over the long term;
- Completed where the long-term TDS concentrations of the brackish groundwater are greater than 1,000 milligrams per liter (mg/L) (up to 4,000 mg/L);
- Located away from existing freshwater production wells;
- Located in an area where the potential for impacts to freshwater resources are minimized (lateral transport, vertical transport); and
- Located in an area where impacts from subsidence are minimized.

NAWS China Lake has engaged the Brackish Water Resources Partnership members and expressed concerns that brackish water extraction wells and infrastructure developed within the NAWS China Lake ranges posed a risk to the Navy mission. ~~An~~ Therefore, an additional constraint is that all brackish groundwater extraction wells and infrastructure has to occur outside the ~~boundary~~ boundaries of NAWS China Lake.

After examining several areas within the basin that have proved to be unsuitable for project implementation, the Brackish Groundwater FS has now narrowed its focus to the northwest part of the IWVGB just south of Pearsonville and north of Brown Road, outside of the boundaries of NAWS China Lake. The Brackish Groundwater Feasibility Study is evaluating if brackish groundwater could be extracted from the deep aquifer zone in this geographical area. After the Brackish Groundwater Feasibility Study is compete, and if brackish groundwater extraction, treatment, and conveyance is found to be feasible, the next steps in the project process would include:

- Conduct a pilot test of brackish groundwater extraction and treatment in the area of interest;
- Design a full-scale brackish groundwater extraction system with associated treatment plant and conveyance works; and
- Construct and commission the full-scale brackish groundwater extraction, treatment, and conveyance system.

5.4.2 Direct Potable Reuse Project

California Water Code section 13561(b) defines direct potable reuse (DPR) as “the planned introduction of recycled water either directly into a public water system or into a raw water supply immediately upstream of a water treatment plant.” Possible methods of DPR include:

- Raw water augmentation
  - The planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system.
- Reservoir water augmentation

  - The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, or into a constructed system conveying water to such a reservoir.
- Treated drinking water augmentation
  - The planned placement of recycled water into the water distribution system of a public water system.

The SWRCB currently has no regulatory criteria for DPR projects in California, though uniform water recycling criteria for DPR through raw water augmentation are required to be adopted by the SWRCB by December 31, 2023, in accordance with California Water Code Section 13561.2. At this time, uniform water recycled criteria for DPR through reservoir water augmentation or treated drinking water augmentation are not anticipated to be adopted.

Because no raw water treatment facilities currently exist in the Indian Wells Valley, a reservoir water augmentation project or treated drinking water augmentation project would currently be the only feasible alternatives for DPR of recycled water in the IWVGB. Significant coordination with the SWRCB, DDW, the Lahontan RWQCB, and potentially the USEPA would be required to implement such a project, including conceptual-level planning, treatment evaluations, permit issuance, pilot testing, regulation development, establishing monitoring requirements, etc. Should the IWVGA pursue imported water opportunities that would require construction of new surface water treatment and storage facilities, a raw water or reservoir water augmentation project may be a feasible alternative for a DPR project. Otherwise, the IWVGA will continue researching the feasibility of a potential DPR project through reservoir water augmentation or treated drinking water augmentation over the GSP planning and implementation horizon.

5.4.3 Additional Projects

The IWVGA is taking an adaptive management approach to IWVGB management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to reach sustainability in the IWVGB. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

5.5 REFERENCES

Antelope Valley Dustbusters 2010. *Agricultural Guide to Controlling Windblown Sand and Dust*. October 2010.

California Regional Water Quality Control Board, Lahontan Region (Lahontan RWQCB), 2016. *Water Quality Control Plan for the Lahontan Region, North and South Basins*. January 2016.

Carollo Engineers, 2008. *City of Ridgecrest Wastewater Treatment Plant Final Project Report*. Prepared for the City of Ridgecrest. September 2008.

DWR, 2017. *Management of the California State Water Project: Bulletin 132-16*. June 2017.

DWR, 2018. *Final State Water Project Delivery Capability Report 2017.* March 2018.

Environmental Science Associates (ESA), 2009. *City of Ridgecrest General Plan Update, Draft Environmental Impact Report*. Prepared for the City of Ridgecrest. May 2009.

Ecological Research Services (ERS), 1991. Elements of a Habitat Management Plan for the Mohave Tui Chub at the China Lake Naval Weapons Center Relative to the City of Ridgecrest's Wastewater Reclamation Project. Document provided by Stephan Bork of the Indian Wells Valley Technical Advisory Committee. October 1991.

GSP §## from California Code of Regulations (CCR), 2016. California Code of Regulations; Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans.

Plumlee, Megan H. et al. "Costs of Advanced Treatment in Water Reclamation." *Ozone: Science & Engineering: The Journal of the International Ozone Association* 36.5, 485-95. September 2014.

Provost & Pritchard, 2015. *Wastewater Treatment Plant Facility Plan*. Prepared for the City of Ridgecrest. October 2015.

RMC, 2018. *Draft Indian Wells Valley Groundwater Basin Salt and Nutrient Management Plan*. January 2018.

State Water Resources Control Board (SWRCB), 2016. *Investigation on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse*. December 2016.

Todd Engineers (Todd), 2014. *Indian Wells Valley Resource Opportunity Plan, Water Availability and Conservation Report*. Prepared for Kern County Planning and Community Development Department. January 2014.

Comments on Draft GSP

Judie Decker, EKCRCD Representative

November 15, 2019

General Text Comments Each section of this document has a table of contents. The Appendices and the Figures should also be listed in the Table of Contents for each section. All the Figures need to also be identified. For example: Section 1 Figure 1. A proof reader is needed to correct sentence structure, grammar, and other “mechanical” errors. There is much verbiage in the document that seems to be unnecessary or is repetitious. An example is the beginning of Section 3. The history of water is not really necessary unless it is an item that is required or recommended. All California water basins saw use by Native Americans and then by passing explorers, traders, and settlers. However, if the history of water in the IWV is going to be included then mention of early day farming and land settlement in Ridgecrest and the Inyokern/North Brown Rd area needs to be mentioned, This section should include statements regarding the change in climate in this area over the last 100+ years. Long ago the Shoshone/Piute tribes camped along the shores of a much larger China Lake. When DWP built their first aqueduct there were streams flowing into this valley on a year round basis, streams like Dixie Wash and others.

Further Comments In some sentences the draft document states that the Basin has been in overdraft for 50 years and in some sentences it says 60 years. The document needs to be consistent with this number; it is certainly more than 50 years which was 1969. Many technical reports are cited in the GSP that state this fact. These technical reports were made available to the public at the time they were published. The major pumpers have known about the overdraft for over a half century and **chose** to ignore it until the implementation of SGMA law. As a result, it is going to cost the water consumers of this Basin many millions of dollars more than it would have if the problem had been addressed in a timely fashion.

For example, The Water District started pumping from the Ridgecrest Field, moved to the Intermediate Field where they had 3 major producing wells on 40 acres, and then moved to the West and Southwest where they are repeating the process seen in the Intermediate Field. As each area was pumped over time the field became less productive as water levels dropped and water quality declined. They now have 4 wells along Bowman Road west of Highway 395. Each is about one half mile from the other. This practice of the Water District having a series of major wells close to one another has seriously impacted most of the shallow well owners, both those close to District wells and those farther away. This issue needs to be mentioned since there is discussion about the impact on shallow wells by agricultural pumping.

An explanation that some of the projects that are suggested will be the responsibility of individual governing agencies needs to be stated. At the present time the recycled water is under the purview of the City of Ridgecrest. Optimizing pumping and moving wells to the northern portion of the IWV is an item that is solely within the governance of the Indian Wells Valley Water District. These projects, when approved by their Boards, will have to undergo a full CEQA review which takes some time to process, including at least one public hearing as part of the CEQA process. The dates you have put on projects associated with independent governing agencies needs to be removed. The projects need to be deferred to those appropriate agencies. The dates listed in the draft are probably unrealistic.

The critical questions are:

How much longer will our aquifer support the present overdraft pumping?

Is there a hydrological "point of no return" for a water basin?

How long will it take to implement the proposed projects?

The longer all this takes the less water will be available for the future. Litigation will only delay the solution, perhaps for decades. Meanwhile, the status quo will continue, and the Basin will dip even further into overdraft.

Comments on Section 1

Page 3 This sentence is incorrect. "…water producers have been **FORCED** (emphasis mine) to mine the basin in order to meet water demand." Please state the facts of the situation. This sentence should read: "…water producers **have mined the basin** in order to meet water demand."

Page 4 The paragraph about DACs which starts on Page 3 needs an addition. Many of the DAC Community are either customers of the IWVWD or the Inyokern CSD. This paragraph should state this.

Page 10 Regarding the paragraph describing the addition of the Inyokern CSD. Remove Tim Carroll's name. He will not always be the CSD's Representative but they will always have a representative. This is what has been done for the names of other representatives from agencies listed.

Comments on Section 2

Page 9 First sentence reads "However, a <u>number</u> f Navy…". It should state: "However, the **majority** of Navy…"

<u>2.4.6 IWV Cooperative Groundwater Management Group</u> I am uncertain why there is so much written on a group that is no longer in existence and in reality did little. However, if you are going to have this inclusion, it needs to state: The Cooperative Groundwater Group was formed by the major public pumpers as a result of the findings and recommendations from the 1993 Bureau of Reclamation Report. In its later years the group included other entities (some of them are mentioned). Agriculture needs to be added.

<u>2.5 Land Use</u> "Implementation of the GSP <u>may</u> impact land use…" It should say: "Implementation of the GSP <u>**will**</u> impact land use…"

Page 27 Top paragraph Recheck the facts in this paragraph. I believe you will find that the 100 wells monitored were monitored by the IWVWD, the KCWA, and the U.S. Navy-not the co-operative group. The co-operative group did not monitor any wells. Many of the wells monitored are part of a mitigation effort by the IWVWD and have been monitored since the 1980s.

<u>Page 33 2.7.4.</u>1 Fifth Bullet "Prohibit landscape irrigation on the <u>surface</u>.." Check and see if this statement is copied correctly because it doesn't make sense.

Comments on Section 3

Pages 6-7 History of Water Use in the IWV These pages have reference given to various authors. All of the information that is given here is general knowledge and can be found in several publications. All author references should be removed here. It is also general knowledge that sheep used to be driven through this valley every spring. There is no relevance to the GSP in noting that sheep were driven through the valley.

Page 8 Regarding both the text and footnote 6, SKYTEM. SKYTEM findings have **never** been publicly presented or published. This needs to be noted and/or this segment removed.

Page 10 Blue Max Peak is **most definitely not** the highest peak that drains from the Sierras into this Basin –it is Owens Peak.

3.4.4 Overdraft Conditions

Again, there is a need for consistency on when Overdraft first began. There needs to be an emphasis on the time before the 1960s. The need is not for DWR but rather for those members of the public who refuse to believe we have a serious water problem.

Page 34 3.4.6 The last line. Change lodge to restaurant. A lodge implies a hotel/motel. While the facility is called The Indian Wells Lodge it is a restaurant. This may need to be changed elsewhere if the lodge is referred to.

Note to Stetson Staff: Section 3 is of Critical Importance. It must clearly and accurately define the water situation. As it is there are those who will argue to negate its findings and thus, try to weaken the need for action

Comments on Section 4

Pages 8-10 4.2.3 Sustainability Measures: Implement Annual Pumping Allocation Plan, Transient Pool and Voluntary Fallowing Program. There is very little detail in this paragraph. There is so little detail that a reader who had not been closely following the GA Board and committee meetings carefully would have no idea what this is about. Therefore, it is a good way to spread and enforce distrust instead of fostering co-operation. Suggest you separate these three measures and give a short description of each. Also it is important to pair any fallowing effort with dust mitigation because the two issues go together.

Page 10 4.2.4 <u>Explanation of How Goals will be Achieved</u> The title of this section does not match what is written. There are **no details** of how these goals will be achieved. Some possibilities under each category should be listed. They can be listed without going into a lot of detail.

The first bullet has the pumping allocation plant, transient pool and fallowing land as one section. These should be listed separately with an explanation of each.

Under the section on Conservation it should be noted that even extreme conservation will not solve the overdraft problem in this valley.

Several of the items in 4.2.4 list dates when they will be accomplished. These dates are not realistic. For instance, Pumping Optimization is listed as being accomplished by 2025. Yet when one reads further one discovers this project includes the buying out of large agricultural entities, the IWVWD installing new wells, pumping equipment and the necessary pipeline. It would take over 5 years to execute this project without the involvement of land purchase. This is true of the other projects that have dates associated with them

Page 12 It is stated that because of the IWV's location there is no seawater intrusion. However, there **is** saline water intrusion in some areas due to heavy pumping. As the higher quality water is depleted it is replaced with, in most cases, a much lower quality of water. Thus, some de minimis wells have had to be abandoned because they are no longer potable. This should be noted.

Page 14 Second paragraph-last sentence add the phrase at least: " It is estimated **that at least 97 wells…"** Does this number include the shallow wells belonging to co-ops and Mutuals? I don't think so.

Page 14 Check the grammar in the third paragraph, third line.

Page 14 Third paragraph. Will the reader really understand this paragraph? I think not.

Page 20 Number 3. Add a sentence to indicate that Coso Valley, Rose Valley and Salt Wells Valley have no or few residents, and water uses. Also include: Salt Wells Valley is federal land under the jurisdiction of the U.S. Navy as is Coso Valley. Most of Rose Valley is owned by DWP. It seems like Searles Valley needs to be included here also. In a sentence about Searles Valley it would be noted that their water comes from the IWVGB.

4.4.1.1 Fourth line down: change **stimulated to** simulated

Page 21 First paragraph Make sure that the reference to the 40-50 acre feet of outflow to Salt Wellls Valley remains the same in all of the tables and references in this document

4.4.1.5 Relationship with Federal, State and Local Standards

This short paragraph is an understatement in the extreme. It should say that that these entities **must** address the issues of SGMA in their updated General Plans. They should update their General Plans upon adoption of the GSP by the IWVGA Board. The downplaying of this section is a clear indicator of the conflict of interest that exists between individuals from land use entities sitting as groundwater authority board members.

This change needs to also be added to all other sections where General Plans are discussed as in 4.2.5

Page 27 Discussion of poor quality water. It needs to be noted here that degraded water quality occurs throughout the groundwater basin at depth. Thus, as the water levels decline so does the water quality While this problem is more severe in the Northwest part of the valley it is very evident elsewhere. I would note the issue with the cemetery which has removed all of its turf due to an extreme degradation in water quality in their well. Water quality degradation is the very reason that the IWVWD has moved its production wells ever westward. The above information needs to be noted in this section.

Comments on Section 5

Pages 6-7 Introduction. This section is unclear and somewhat confusing. Since Section 5 is a description of the actions that are planned to reach sustainability the introduction needs to contain more information. Perhaps a short outline is needed so the reader can see what will take place, when it will begin and which groups of users will be involved. Here are some questions that need to be answered in this section. Management Action 1 involved 3 parts. Who will be affected by each of these parts? What type of user will pay an Allocation fee? How long will this fee be in place? Which type of user is listed in the Transient Pool? How long will this pool be available? Fallowing land should be combined with dust mitigation because they go together. Where does it fit in? It will take many years to actually receive imported water. This time period needs to be shown. Do de minimis users pay allocation fees? What requirements will be applied to Searles Valley Minerals?

Recycled water. Again this is a city of Ridgecrest project and not a GA project. This should be noted in the discussion of recycled water. There are other projects that would result in a beneficial use of this water besides the ones mentioned. They should be included as possibilities.

<u>Conservation</u> This is Management Action 3. However, conservation by the Navy and by the IWVWD customers has been ongoing for many years. This needs to be noted in this document. Nothing has been mentioned about a conservation effort to replace the aged leaky pipes that carry water from the Indian Wells Valley to Searles Valley. While Searles Valley Minerals is a private company the savings in water loss would benefit all valley water users.

Page 8 Bullet 9 Is this verbiage a direct quotation from the existing law? As stated earlier the IWV lies in the Mojave Desert. A desert is always in a state of drought. If it had enough water it would no longer be a desert.

5.1.1.1 Management Actions Pumping Allocations and Augmentation Fees It is unclear to the reader exactly who will be required to pay these fees. It is clear what the fees will be used for, but it is unclear who will pay them. Do de minimis, co-ops and Mutuals pay? Will public utilities pay? industrial? This needs to be clarified on Page 9 which is the introduction to this section of text.

Page 11 Second paragraph "Groundwater production in excess of Annual Pumping Allocations…" How is this going to be tracked and enforced?

5.2.1.2 Costs Page 15 Administrative costs-do these include legal fees? The legal fees should be separated so the public can know how much they are. This should be done for all the projects listed in the GSP.

5.1.1 Recycled Water Projects This document needs to state that there are other potential use for the recycled water that may be more cost effective. They will be investigated. One possibility is to sell Trona the treated water for their use on brine ponds. A new pipe would have to be built for this project. This proposal would reduce the amount of water used by Searles Valley Minerals for industrial purposes by almost 100%. Sending the water to Trona would be far cheaper than building purple pipe to send the water to Cerro Coso College. Cerro Coso is the largest IWVWD customer. At one point it used 10% of all water pumped by the District. It also pays the most per gallon of water because it must be electrically boosted 4 times to reach the campus. Another factor in considering sending the water to Trona is that

Searles Valley Minerals maintains their water pipeline. Pipes that are installed in the city for recycled water use will have to maintained by a governmental agency like the city of Ridgecrest or the IWVWD. This would cost the public more money in an already very costly endeavor.

5.3.2 Basin Wide Conservation Efforts 2nd paragraph under Project Description "the IWGA will confer…the Water District…" Need to add the Inyokern CSD to this list

Last sentence same paragraph "The IWVGA will **implement** the Water Conservation Strategic Plan…" Here is another example where a description of the placement of authority is needed. The Navy, as listed above, is a Federal agency responsible for its federal lands. The IWVWD, the City of Ridgecrest and the Inyokern CSD regulate the citizens that lie within their boundaries. They are all Special Districts of the State of California. The IWVGA is **not** a Special District. Which governing entity has the top authority? The public needs to know.

5.3.2.8 Legal Authority

Page 39 This paragraph is the same for each management action. .Again, it is important to describe the hierarchy of legal authority between the governing entities in this valley.

Page 40 Second paragraph. Shallow Well Mitigation. Wells usually do not decline instantly. It is a process that happens over time. Your last two sentences indicate that no one with a shallow well in existence will be eligible for mitigation unless their new well is drilled after 2/1/2020. Perhaps you need to add a segment on Shallow Well Buy Out. Many well owners are not the original developers of the property. They will not be able to answer the questions that are listed on this page. Furthermore the questions posed are value judgments. Water levels and water quality has been declining in virtually every shallow well drilled in this valley. The same holds true for major production wells in this valley. Refer to my comments earlier about the practices of the IWVWD with regards to a history of their well placement.

The same holds true for the US Navy. They used to pump wells that were fairly evenly spaced along highway 178, but more recently have been using one well that is located in Section 17. Investigate what that has done to surrounding domestic well owners, who were using wells in the area before the Navy drilled theirs.

The Shallow Well Mitigation Plan as it currently stands is a hollow plan. The words written are true to the situation that has and is being experienced by shallow well owners throughout the valley. Then comes the timeline requirement of 2/1/2020. This is a clear message to those well owners that, in fact, the IWVGA will do nothing to alleviate their well problems.

5.3.4 Dust Mitigation This is listed as Project 5 However, it goes with land fallowing, and should be so noted both here and in the fallowing land portion of the document. Many people still live in this Valley who remember the travesty that occurred when the County of Kern allowed the Arciero Farms to cease operation (because of the over pumping of economical water) and simply walk away. To the east of the farms lies a small community, Cantil, that was literally buried under blowing sand. The problem, though reduced by the recent installation of solar fields, still exists. The County road department must scrape the paved road that passes through the area after every major wind storm so that traveling vehicles do not get stuck in the sand.

Fallowing farm land, especially in the Northwest part of the valley will severely negatively impact the mission of the Navy. Therefore, it needs to be stated in this GSP that land will not be fallowed without a comprehensive dust mitigation plan in place for that parcel of land.

The GSP needs careful examination of different methods that have been used for dust control. Note; that long ago the UP railroad used snow fencing to try to control blowing sand in the area of the Eastern Mojave called the Devil's Playground. Even many years ago one could only see small sections of this fencing because the sand had completely covered it.

5.1.1 Pumping Optimization Project. Again, this project would be one that would be executed by the IWVWD. The cost and efforts to do this would be borne by them. This fact needs to be noted up front. One possibility that is not mentioned is for the Inyokern CSD to join the IWVWD for this project.

5.3.4.13 Regulatory Process Page 48 If this is to be a Water District project why would the IWVGA do a CEQA on it? The IWVWD would have to do a CEQA on their project.

5.3.4.14 Public Notice First line, states Shallow Well Mitigation Plan. Shouldn't it say Pumping Optimization Plan?

5.4.1 Brackish Groundwater Project. Verbiage in this section needs to note that this project will still be pumping groundwater from our Basin. It should also note that this project will be pumping water at a much higher cost because of the methods for pumping that are being proposed. It should also note that there are several negative effects to the area surrounding the pumping project that can occur if this project is implemented These negative facts need to be included with the description of this project.This project is proposed for the farthest northwest part of the IWV.

Comments on Section 6

This section has the wrong title page.

Is a more detailed Implementation Plan going to be written? If so, then this needs to be stated in this section of the GSP. It needs to include some details as to timelines and schedules, the order and priority of projects and how they will be accomplished. One of the first projects is the allocation and augmentation plan. This needs to be detailed to assist those who will be affected by it.

Page 3 Third bullet point Incorrect English: "adaptively management the program"

Pages 3-4. The bullet points do not fit well with the last paragraph on page 3. It would be appropriate to list the proposed projects in order of their priority. It would be clear if the projects were related to one another. For instance, if land is fallowed then a dust mitigation plan must be activated immediately.. The two projects are closely related to one another. It also states that:"…the initial priority is **demand reduction**…" But page 4 has a bullet entitled Pumping Optimization Projects. One is contrary to the other..

The projects/plans need to state their associated costs and timing and value. For a given project what is the cost per acre foot of water saved. In this regard it needs to be noted that some of the projects are under the purview of different agencies and that these agencies will bear all or some of the costs for the project.

An example of this is water reuse. The city of Ridgecrest has been collecting tax dollars for years for the wastewater facility upgrade. They will (and should) bear the cost of this project. When listing it here in Section 6 the cost per acre foot needs to be added. The same hold true for the Well Optimization Plan. This is for the IWVWD

The projects that will be implemented by the GA Board need to be listed with a cost to benefit received comparison. This should be a part of Table 6.1.

They also need to be listed in the order of priority. Which project will save the most water. This exercise should exclude Imported Water with an explanation of its great importance and the complication and cost involved. It is a separate issue and the cost for this water must be borne by every pumper in the valley from the Federal government down to the local level.

In the costs section there is no separation of costs and payments for work already accomplished. What did the Prop 1 grant funding cover? How much money has been spent annually on Administrative Costs? How much money annually has the City, the IWVWD, the three counties contributed? How much has been spent by the agencies involved on legal costs? What are the estimated legal costs yet to be spent-especially in the light of the very strong probability of litigation? It would seem that these potential costs should be added to the GSP.

While a timeline is given for implementation of some of the projects a closer examination of the timeline in relation to GSP approval by the state needs to be given. What projects can be legally and realistically be .undertaken in the interim months while awaiting GSP approval?

Heather,

I have identified a few editorial changes that need to be made in Sections 4, 5, 6:

Page 4-21 Para 4.3; first line top of page word, ”historical”, should be “historically”

page 5-18 Para 5.3.1.1: “California Highway 14” is not “Interstate” (In some areas, it is a “limited access Freeway”)

page 5-21 Para 5.3.1.5: same as above

page 5-45 Para 5.3.5.7 last sentence word should be “risk”, not “rick”

Page 6-1 Cover page for Section 6 says “Section 5”

Throughout entire text document, the spacing after the period of a sentence before the following sentence should be uniform. Sometimes one space, sometimes two spaces and sometimes three spaces. In the past, two spaces were proper.

Thanks for all of the Great work!

Lyle Fisher

November 15, 2019

From: Mallory Boyd Technical Advisory Committee (TAC) representative for business interests
To: Adam Bingham, TAC committee chair
Copy: Heather Steele

Subject review of draft GSP

General comments - format may be in requisite form asked by SGMA, but it occurred to me as I read through the draft that many of our citizens will have less interest (and/or ability) to interpret a complex document such as the draft GSP. Perhaps it would be wise of us (the collective GA/TAC/PAC) to designate someone to pull together an 'executive' summary, or rather an 'IWV community summary' that gets to the salient points of this document in a manner (common language) that we can better help the community to come to a collective opinion that the GSP is leading us in the right direction, as painful as it might be to some in our community.
We have lacked effective and proactive public outreach in the past, in fact we've left large components of our community feeling unheard, disenfranchised, and perhaps worse - being forced to change behaviors that they believe to be guaranteed by law.
We need to get to the point where the community understands why it is important for ALL IWV citizens to share in the solution to this problem - to recognize we are ALL facing a future of sacrifice, but to ignore or hope this just go away will only make things harder. That the time to take action to remedy the course we're on, and that we all need to get on board . It is also a time for compassion for our fellow citizens as it will be harder for some of us to adopt the changes we need to make for the future of our valley.
We cannot wait for the papers to editorialize this in a manner that adds unnecessary angst across our community, especially absent a counter voice aimed to balance the emotional response that many of us expect.

Section 1 - Introduction
no substantive comments

Section 2 - Plan area
General comments. Probably outside GSP, but the ordinances established by the City of Ridgecrest associated with the future use of water (the listed 20 goals pages 21-22)) have been in place for nearly 10 years and have been ignored by many citizens, business's, including the City government itself, sending a unintended message to the public that these goals were (are) not important. One only need look at the lavish use of water intensive landscaping around the Kerr-McGee Center/City of Ridgecrest Headquarters complex), where - oh by the way - we have been conducting our public TAC/PAC and GA meetings, to see a fine example how we send insincere messages the need to embrace the water challenges we face. Irrigation water runoff in gutters, and streaming down adjacent to college heights blvd are other examples of our casual treatment of water resources. It also brings to mind, if we've been unable to deal with these issues in the past, do we lack the will to act in the future? Do we lack the authority of enforcement? If City leaders lack the resolve (or capacity) to confront these issues in the past, why do i need to worry about them now? - might be overhear a confused citizen muttering.
My final comment for this section deals with water re-cycling. While the benefits of re-cycling are mentioned as necessary, the emphasis is on secondary reuse for landscaping which only puts our water to re-use once - we need to seriously embrace tertiary treatment of effluent for the purpose of ground water replenishment. Only then will we see long term positive effects, and a reduction of our unnecessary public water fed landscaping. The cost/benefit analysis of every

water dependent landscaping project the City embraces should be made public and open to scrutiny. While the GSP does mention tertiary treatment of effluent it does so light heartedly, and doesn't provide insights into the costs for tertiary treatment. It does however, go into significant detail of plans for secondary treatment, and detailed discussions of purple line installations, further providing evidence that GW replenishment is of low (or worse, no) priority. I feel this to be a significant misstep and missed opportunity address our declining water table. Past history of how secondary reuse has done little to change our attitudes stand out - CL golf course, City of Ridgecrest alfalfa farm etc. While better than just letting it evaporate away, it promotes future dependencies by building an expectation that these secondary uses will be always there. We need to put it in the ground, and future uses of the water be made knowing the full cost of potable supplies. Other projects worth mentioning are improving rain-water runoff and capture. Seasonal runoff in the past has been known to fill Mirror lake to a few feet in depth, only to be gradually evaporated. The upcoming new WWTF should include designs that would make taking advantage of this periodic water source, or at least study to potential, and advise the public of its findings.

Section 3 - Basin Setting

checking ET figure in table 3.7.

USBR (1993) estimate a range from 1,020,000 AF to 3,020,000 AF in storage. On page 26, why was 2,370,000 AF used to estimate ground water in storage? A more conservative number of 2,010,000 AF (the average of their 1993 estimate range) could be argued as being more representative. Please explain how this higher number was derived.
Also, given that the USBR was conducted in 1993, what would be involved in securing a more accurate estimate? It occurs to me that this should receive high priority given the implications of further reducing our groundwater in storage.

Section 4 - Sustainable Management Criteria

It has been suggested that the word 'Fallowing' be replaced since the action being proposed is not temporary. The GSP is suggesting a permanent change in the use of the land, bringing agricultural uses of GW under plans for sustainment, this is not fallowing.

pg 22 - section 4416 - 'according no' should be 'accordingly, no'

Section 5 - Projects and Management actions

we should caution that both projects and management actions require further effort before commencement. for example, Capital Core efforts indicate further negotiations to secure water contracts, and absent costing information the GA may be hesitant (should be) to commit to a plan where total costs are undefined. other costs and uncertainties included securing easements, cooperation from INYO county for option 2, and there was no information in the report regarding the brackish water project which promises to address certain aspects of the IWV GW challenge - which if the demo is successful, brackish sources might be found outside the IWVGW basin to address water needs of SVM and/or Coso Geothermal operations - further reducing demands on IWV water stores.

other potential source not mentioned by Capital Core is periodic diversion of South Fork Kern River during wet years. elevation differences would negate need for pumping and of course there are other parties that have controlling interests. These may be more (or less) difficult than proposed options (1) and (2), but the absence of discussing this option is interesting given initial work exploring this resource late last century.

Nearly 10% of our estimated annual recharge (7650AF/yr) is lost after irrigating the golf course and City alfalfa fields. another 800AF/yr is estimated to percolate from evaporation ponds at current WWTF which maintain a habitat for an imported endangered species, the Mojave Tui Chub, and ultimately lost largely through evaporation. These losses must be addressed more seriously in the future.

Recycled water subproject 1 - no steps should be taken until a serious cost/bene analysis of providing water to the Citys' 53 acres of landscaping is reviewed by a technical board and submitted for public opinion. Future costs of water used to maintain public spaces should be estimated, including special infrastructure required.

Sun shelters in parks could replace trees and provide safe installation of solar arrays. Carefully designed wind breaks could be installed to further enhance the outdoor experience in inclement weather further reducing the need for trees. Current grassed areas could be reviewed ti further identify more water conservation.

emphasis on tertiary treatment of effluent for direct injection into area aquifers as well as dramatic reductions in decorative-water-intensive landscaping would yield further relief on limited ground sources.

section 5324 - tertiary treatment facilities costs should be summarized here.

Cerro Coso irrigation - serious reductions (possibly only to health and safety needs) should be considered for this area. because of extra costs of moving water to these higher elevations. the costs of providing unnecessary water here makes no sense. The college should be focused on educating our next generations on how to live in the desert with minimal needs beyond health and safety. Perhaps they could ultimately help lead us through these challenges.

page 34, section 5331, second paragraph fifth line reads 'that potentially waste water' should say ' that waste water'. no potential about it

pg 41 section 5344 $1.65M seems high to mitigate 22 shallow wells (75K each) seems high. mitigation costs should only be used to deepen wells, all other costs should be borne by the owner

Section 6 - Implementation

no comment

MEADOWBROOK DAIRY

P.O. Box 1627, Inyokern, CA 93527

November 15, 2019

Mr. Steve Johnson
Indian Wells Valley Groundwater Authority Water Resources Manager
Mr. David Janiec, PAC Chair
PAC Members, c/o WRM

Re: Meadowbrook PAC Member Comments on November 4, 2019 Draft GSP

Dear Water Resources Manager, PAC Chair and Fellow PAC Members:

As a member of the IWVGA Policy Advisory Committee ("PAC") representing Large Agriculture including Meadowbrook Dairy ("Meadowbrook"), please accept these preliminary comments on the November 4, 2019 Draft GSP ("Draft GSP") prepared by the Water Resources Manager team ("WRM"). While we appreciate the opportunity to review the Draft GSP, we do wish to note that two weeks' time is not sufficient for meaningful PAC and TAC review on a document that the WRM has taken many months to prepare. It is also not in keeping with the IWVGA's commitment to provide PAC and TAC members meaningful participation in the development of the GSP.

<u>General Comments</u>

Several themes emerge in the Draft GSP: protect the Navy, eliminate agriculture, move pumping to force-fallowed areas, and impose incredible fees along the way. In many ways, the Draft GSP appears written to achieve pre-determined outcomes without sufficient regard to the technical, legal and practical considerations required by SGMA, the GSP Regulations and DWR's Best Management Practices ("BMPs") and Guidelines.

The PAC and TAC are supposed to work together as Advisory Committees to the Board. Policy and technical aspects of the GSP must be aligned. Many "policy" problems in the Draft GSP arise from severe technical issues, gaps and questions. For the benefit of PAC and TAC coordination in reviewing this letter, please also refer to the TAC Member comment letter on the Draft GSP that has been submitted by Eddy Teasdale of LSCE on behalf of Meadowbrook, and ensure that a copy of that letter is provided to the PAC Members.

Many of the Draft GSP Sections cross-reference or repeat information contained in other sections. Meadowbrook's comments on individual sections apply to the Draft GSP as a whole. Meadowbrook reserves the right to comment further on the Draft GSP and subsequent drafts, and in response to comments offered by other PAC and TAC Members, the public, the IWVGA and its staff.

<u>Section 1 – Introduction</u>

- The Draft GSP does not indicate whether it intends to follow DWR's Best Management Practices. If it deviates from those BMPs, it should justify and explain the deviations.
- The opening paragraphs should be re-worded to avoid using conclusive language on issues that are based on currently incomplete data and information.
- The opening paragraphs emphasize Navy and domestic water users, and make no mention of agricultural interests.
- This section does not explain the IWVGA's decision to exclude mutual water companies from the Joint Powers Authority.
- This section does not detail how the IWVGA sought to comply with its Community and Engagement Plan.

<u>Section 2 – Plan Area</u>

- Meadowbrook Dairy became a member of the Cooperative Group, which is not reflected in this text.
- The GSP identifies the Salt and Nutrient Management Plan but fails to detail of the findings, data and analysis of the SNMP.
- Discussion regarding "federal reserved water rights" is not necessary or relevant in this section. Why include it?
- The section on IWVGA fees should note that the $30/acre fee is among the highest, if not the highest, GSP-development fee in California, notwithstanding the receipt of over $1 million in grant funding. It should also note that the fee was imposed over the strenuous objection of many parties who submitted extensive comment letters into the record.
- Please see the LSCE Comment Letter for additional comments.

<u>Section 3 – Basin Setting</u>

- This section refers to the "GSP Guide" and many old studies, but provides very few if any citations to SGMA law or the GSP Regulations. The Section does not support compliance with those regulatory requirements.
- This section provides an interesting history of the Valley and cites several sources, but fails to state why those sources are deemed the best available science and information.
- SGMA does not require the basin to return to pre-development conditions. What is the intended purpose of describing history and water conditions dating back to the 1800s? What is the justification for describing "water budgets" dating back to the 1920s and how does that fit within the GSP regulatory requirements?
- What is the source of data for the text regarding SVM and the Navy? No citation is provided.
- What are the USGS and USBR records that have documented "water use in the IWV over the past 70 years"? When and to whom was that data provided?
- The Cooperative Group data for groundwater production beginning in 1970s is mostly estimates. Meadowbrook has submitted multiple comment letters seeking clarification on much of that data, which has not been adequately addressed. The use of such estimates for water budgets and other aspects of the GSP must be appropriately qualified.

- The emphasis on the Todd Report must be explained, since the Todd Report was generated for Kern County land use purposes, not SGMA planning purposes.
- The information on geology and hydrogeology is based primarily on reports dating back to 1960. As the GSP must be based upon the best available science and information, the Draft GSP should be revised utilizing the most sophisticated data, such as the SkyTEM project.
- The summary of only selected prior recharge studies does not explain the basis for that selection. All prior recharge studies should be listed and explained, including the USGS.
- Data for domestic groundwater well production is very limited as the text acknowledges, and WRM recently reports that only a handful of domestic well owners have registered their wells. The GSP must emphasize this important data gap, especially if the GSP uses "impacts on shallow wells" as a primary basis for establishing sustainable management criteria.
- No mention is made of Meadowbrook's conservation efforts and reduced groundwater production in recent years as compared to its historical production. Rather, the GSP paints "Agricultural" groundwater use collectively as having recently expanded and that it is expected to expand further "unless restricted".
- Groundwater production by the IWVWD for Navy staff that live off of the base is not any more relevant than IWVWD production for all of its customers. The only apparent purpose for including this language seems to be an attempt to support the IWVGA's theory of an "extended" off-reservation federal reserved water right for the Navy. Meadowbrook and others have submitted multiple letters outlining the legal flaws in that theory.
- The "current water budget" inappropriately singles out trends in "agricultural water demands" and then, without explanation, describes a "current water budget" based on years 2011 to 2015. Those include some of the driest years on record in California. The Draft GSP does not explain why it deems that time period to be an appropriate "current water budget" or how it complies with GSP regulatory requirements.
- The Draft GSP frequently refers broadly to "pumping centers", areas of "depression", and areas of "declining water levels". Using broad references fails to recognize unique subarea conditions, which can mislead the reader.
- The Draft GSP fails to consider and incorporate information and comments provided by Meadowbrook that indicate water levels and water quality at its production wells have shown stabilizing trends over recent years.
- The Draft GSP places extreme emphasis on avoiding "loss of storage" as a primary objective, but offers no current analysis of the amount of water in storage. Rather, it refers only to old studies and admittedly limited data. This is major flaw in the Draft GSP, especially where it intends to force agriculture into a "pool" of "temporary storage loss". The GSP must use best available science and information.
- The Draft GSP's use of the terms: "sustainable yield," "Current Sustainable Yield," and "Future Sustainable Yield" are confusing and are inconsistent with SGMA, the GSP Regulations and the GSP Best Management Practices. The Draft GSP conflates an "estimated long-term average natural recharge to the IWVGB" with "sustainable yield" and frequently refers to an objective of making "pumping equal to sustainable yield". It estimates a "Future Sustainable Yield" which is not a defined term under SGMA or the GSP Regulations. The primary problem is that using a basin-wide average recharge estimate fails to meet the definitional requirement of "operating within the sustainable yield" which inherently requires avoiding specifically and locally defined, quantified, technically- and legally-supportable *undesirable results*. Meadowbrook has submitted

multiple letters to the IWVGA citing GSP regulatory requirements and DWR BMPs highlighting these and related issues, which have not been addressed.

- Where does the "Artificial Recharge" figure of 3,500AF come from? Who determined that would be an appropriate amount for the Basin?
- Why doesn't the Draft GSP address PFOS/PFOA groundwater contamination on NAWS China Lake, which was recently reported as one of the highest contamination areas among all DOD facilities globally by orders of magnitude?
- As reflected in the Draft GSP Appendix, Model Scenario 6.2 was developed by the IWVGA Attorneys, the WRM and DRI in multiple iterations, all without any meaningful prior input from the PAC, TAC or the public. Model Scenario 6 results comprise the *foundation* for the Draft GSP's sustainability goal, sustainable management criteria and projects and management actions. Detailed Model Scenario 6.2 assumptions have never been revealed to the PAC, TAC or the public. Meadowbrook has submitted multiple comments letters detailing the legal, technical, procedural and practical flaws in Model Scenario 6.2, which remain unresolved.
- Please see the LSCE Comment Letter for additional comments.

Section 4 – Sustainable Management Criteria

- Meadowbrook previously submitted written comments on the draft "Sustainability Goal" language, which comments have apparently been ignored. In short, California Water Code Section 10723.2 requires Groundwater Sustainability Agencies to consider the interests of all beneficial uses and users of groundwater, specifically including "holders of overlying groundwater rights including agricultural users, including farmers, ranchers and dairy professionals." The federal government, including the military and managers of federal lands, is also included in that list. The Sustainability Goal, however, centers almost exclusively on the Navy's interests, and fails to consider the interests of other beneficial users and uses of groundwater. Not a single reference is made to agricultural users. Instead, the Draft Sustainability Goal and related Groundwater Authority staff materials suggest an intention to eliminate agricultural users entirely from the basin.
- As detailed in prior Meadowbrook comment letters, the development process and substance of the draft Sustainable Management Criteria are fundamentally flawed. The Draft GSP compared a "baseline scenario" (that appears to not comply with DWR Regulations) against Model Scenario 6.2 results (based on admittedly incomplete data and pre-determined, baked-in projects and management actions designed to benefit selected groundwater users) and then identified "minimum thresholds," "interim milestones" and "measurable objectives" as mere plotted points on the Modeling Scenario 6.2 results. Notably, Section 4 outlines the projects and management actions (in Model Scenario 6.2) that the IWVGA intends to pursue before establishing or describing the specific undesirable results are that those projects and managements are intended to avoid. DWR's BMP and the GSP Regulations and SGMA require extensive public engagement and technical and policy considerations in developing sustainable management criteria. The Draft GSP falls short of those requirements.
- The Draft GSP fails to explain or justify, for example, how the proposed minimum threshold and measurable objective for loss of groundwater storage satisfies GSP regulatory requirements, where for example: (1) the Draft GSP admittedly relies on old and limited information on total storage; (2) current information and data indicates much more groundwater in storage than the figures listed in the Draft GSP; (3) the "potential shallow well impacts" are modeled estimates only and admittedly provide no information on specifically where in the Basin those impacts are, were or may occur; (4)

the Draft GSP and Model Scenario 6.2 do not include other potentially significant projects and storage supplies (e.g. El Paso); and (5) the sustainable management criteria are not justified according to specific monitoring sites.

- Assuming some shallow wells will be impacted and require mitigation, has the IWVGA considered that the cost of mitigating qualifying shallow well impacts might well be far less than the costs associated with the proposed projects and management actions that would attempt to eradicate tens if not hundreds of millions of dollars of agricultural property interests from the valley?
- The Draft GSP states that impacts to groundwater pumpers, land uses, and other interests within the IWVGB were considered when developing Minimum Thresholds. How so? By whom? How were Meadowbrook's interests considered, and other agricultural interests?
- How will the sustainable management criteria factor in the reports and analysis of other regulating agencies, such the Regional Water Quality Control Board's recently adopted Salt and Nutrient Management Plan?
- Model Scenario 6.2. results project that some sustainability indicators would not just stabilize but would increasing over time *beyond* the measurable objectives. This is an indication of unnecessarily aggressive restrictions under SGMA, considering the punitive impact on many private groundwater producers.
- One theme of the Draft GSP appears to be a desire to eradicate agriculture in order to accommodate potential, future expansion of Navy interests. What potential Navy expansion does the IWVGA contemplate? Under what timeline? Will the Navy agree to pay for the groundwater and water- and property-rights impacts of such an expansion?
- Please see the LSCE Comment Letter for additional comments.

<u>Section 5 – Projects and Management Actions</u>

- The projects and management actions described in this section follow Model Scenario 6.2, with minor changes. See the comments above regarding Meadowbrook's prior comment letters addressing Model Scenario 6.2 issues.
- The Draft GSP does not explain how imposition of an allocation framework will satisfy SGMA's requirements to avoid undesirable results.
- The "Sustainable Yield Allocation Chart" that the WRM presented to the PAC and TAC in October rendered Meadowbrook a "0" allocation to produce groundwater from the native yield and would force Meadowbrook into a temporary pool and eventually force Meadowbrook from the Basin entirely—without due process or just compensation. The allocation ordinance process described in this section indicates that the IWVGA will assign allocations based upon its evaluation of water rights, priorities and other factors. IWVGA attorneys have already indicated in the October "Sustainable Yield Allocation Chart" their position that the Navy has a federal reserved water right that could exceed the entire average basin recharge, citing the June 2019 letter from the Navy as a basis for that assertion. IWVGA counsel recently acknowledged that the claimed "extended" federal reserved water right concept is not based on established case law. How then, can any producer, especially Meadowbrook, expect to receive a fair, factual and legally-supported process and determination of an allocation for Meadowbrook when that determination will be based on recommendations made by the WRM and those attorneys who produced the October allocation chart?

- The discussion in this section regarding a Navy federal reserved water right and other water right priorities and interests is clearly a legal argument, and highlights the concern identified in the prior comment above.
- How would IWVGA member agencies that produce groundwater participate in the allocation ordinance process? Would it not be a conflict of interest for those agencies to make a determination of their own allocations?
- Does the IWVGA intend to recognize an allocation for the Navy in the amount of 2,041 AF? What is the justification for doing so when the June 2019 letter indicates a much lower current Navy demand on the base? Has the IWVGA ever questioned or objectively evaluated the merit of using that particular figure, or does the IWVGA intend to accept that figure without reservation?
- In any allocation process, Meadowbrook is entitled to and must receive a permanent allocation. Meadowbrook has already indicated many times a willingness to "ramp down"—even significantly—in order to achieve sustainability. Sustainability must be in accordance with SGMA, however, and not based upon politically or emotionally-driven decision making devoid of best available science and information.
- Where does the 51,000 AF figure for the "Transient Pool" come from? Who determined that figure? How does that figure fit within SGMA's requirements to avoid undesirable results? Why was the figure reduced from prior "Transient Pool" numbers? What is the technical and legal basis for Kern County Counsel's recent public comment that, if adjusted from Model Scenario 6.2., the Transient Pool figure would "only go lower"? If the Transient Pool is based upon an IWVGA evaluation of water rights principles, how can the IWVGA justify pre-determining a total amount of any party or group of party's production allocation?
- The anticipation that imposing this management action will result in "rising groundwater levels" in certain areas, particularly North Brown Road, is evidence that the management action overreaches, especially where the cost of that action is the unlawful taking of extensive agricultural property and water rights.
- The Draft GSP should address CEQA implications.
- The Draft GSP should address how applications for new groundwater production will be addressed.
- Where does the figure $9 million come from for the "Fallowing Program"? Is that figure in any way based upon the IWVGA's prior appraisal of Meadowbrook property which was performed without prior notice to Meadowbrook (as stated in our prior letters)?
- Is $9 million based on stripping Agriculture of production rights before "taking" the properties? Who has determined that $9 million is adequate?
- Where does the figure $19 million come from for "Dust Mitigation"? Why is dust mitigation more important and funded than fallowing?
- This Section cites repeatedly a SGMA provision authorizing a GSA to "perform any act necessary or proper" to implement SGMA and the GSP Regulations. That provision does not authorize a GSA to perform acts in violation of SGMA or the GSP Regulations. The Draft GSP cites very little legal support for many of the actions it intends to take, including imposing the allocation action.
- The Draft GSP identifies potential project capital costs in excess of $320 million, and potential annual costs in excess of $14 million. The Draft GSP provides very little detail on how those costs will be funded, including how they might impact the various beneficial users of groundwater.
- The Draft GSP indicates the IWVGA would pay for feasibility studies and infrastructure to fund SVM retrofitting to use recycled or brackish water. Where would those funds come from? Would the IWVGA use fees generated by private pumpers it seeks to eradicate from the Basin to fund

studies and projects specifically to benefit other private pumpers that it determines should not be eradicated? Would that not be a gift of public funds?

- Why doesn't the Draft GSP indicate a similar willingness on the part of the IWVGA to reach out to other private pumpers, like Meadowbrook, to discuss potential conservation measures, feasibility studies, and the use of potential alternative supplies?
- As Meadowbrook has previously indicated, the IWVGA should develop a shallow well mitigation plan based upon best available science and information, before considering imposing any significant pumping limitations. How, specifically, has or will Meadowbrook's groundwater production impair specific shallow wells, and when? The IWVGA has not and cannot answer this question. Yet, the IWVGA still proposes forcing Meadowbrook into a temporary pool and ultimately forcing it out of business, while requiring no conservation from the very well owners it intends to "protect" only to then move other large producers to the very place that Meadowbrook has operated for decades!
- The reference to "financial hardships" fails to acknowledge the economic impacts to agricultural users who stand to face tens if not hundreds of millions of dollars in impact that would result from the projects and management actions.
- Where does the figure $23 million come from for "Pumping Optimization"?
- What is the estimated range of "Augmentation Fees"?
- Please see the LSCE Comment Letter for additional comments.

<u>Section 6 – Implementation Plan</u>

- The aggressive, prescriptive nature of the Draft GSP leaves little room for adaptive management as required by SGMA. How, for example, would the "allocation" action be adjusted when the IWVGA recognizes new and more accurate data that indicates long-term groundwater production by Meadowbrook does not cause undesirable results? How will the IWVGA adapt its projects and management actions if DWR does not approve the GSP on the basis that, for example, the sustainable management criteria are not technically supportable?
- Considering that the IWVGA has not responded in writing to any of Meadowbrook's prior comment letters, how will the IWVGA respond to this comment letter and subsequent letters on the Draft GSP?
- Please see the LSCE Comment Letter for additional comments.

<u>Appendix</u>

- The Appendix includes two comment letters previously submitted by the Navy. The Appendix contains none of the many detailed comment letters submitted by Meadowbrook and other parties.
- Please see the LSCE Comment Letter for additional comments.

Thank you for the opportunity to provide comments on the Draft GSP. We look forward to receiving, reviewing and providing comments on further drafts of the GSP.

Sincerely,

Ed Imsand
PAC Member – Large Agriculture

To: Steele, Stetson Engineers
Cc: Janiec, PAC Chair
From: Panzer, PAC Member
Subject: Comments on November 4, 2019 Draft GSP
Date: 5 November 2019

1. Subject draft lacks a reasonable path to the SGMA-defined sustainability goal, namely operating within sustainable yield (CA 10721 (u)). This is so because the draft relies upon import water that is currently only conceptual and potential, without offering an explicit alternative path that does not rely upon import water. This alternative path should branch from the proposed path if, by January, 2023 (page 5-23), neither import option proves feasible in all respects (e.g., funding, environmental, political, legal, regulatory, technical, etc.). See Reg.354.44.(b)(1)(A) regarding “termination of projects.” In such case, and at such time, pumping should immediately cut back to current safe yield. Moreover, the general public should be forewarned now, in terms and quantities understandable by regular citizens, about the so-called “extreme lifestyle changes” referred to throughout the draft (e.g., Page 5-19). The C&E Plan specifically requires this (see Executive Summary therein).

2. The statement at page 5-15 concerning the “imposition of applicable fees” to pay for the Allocation Plan, Transient Pool, and Fallowing is vague. For example, who exactly will pay the $9,000,000 estimate for fallowing?

3. Regarding De Minimis pumpers: How would the plan verify de minimis status, individually and in aggregate? What legal authority holds that the plan cannot reduce individual pumping below 2 afy as stated at page 5-14? Are de minimis pumpers subject to general administration fees?

4. How will the plan set augmentation fees given that the “conservation effect” (page 5-34) will drive unit demand down and thereby drive unit prices up in order to cover fixed costs?

5. Is off-station use, if any, of FRWR water subject to administration or augmentation fees? See page 5-14.

6. Article X, Section 2 of the California Constitution declares, among other things, that unreasonable uses of water must be prevented. SGMA Section 10720.1.(b) specifically calls for the application of that “Reasonable Use Doctrine.” Given our long-running 4X overdraft, it seems possible that we could have some unreasonable uses of water in our dry, groundwater-dependent basin. We should address this Constitutional provision in the plan since SGMA calls for such.

From: Renee Westa-Lusk PAC Member **November 15, 2019**

Subject: Comments on Section 1 Introduction Chapter and Section 2 Plan Area

SECTION 1 INTRODUCTION CHAPTER

I accept Section 1 Introduction Chapter and at this time see no changes that need to be made.

SECTION 2 PLAN AREA

Pages 26-28 Section 2.6 Existing Water Resources Monitoring Programs Figure 2-13

The reader is led to believe there are only 2 entities monitoring wells in the IWV, CASGEM and KCWA.
There is no mention in the paragraphs from pages 26-28 of the Navy monitoring wells. Yet in Figure 2-13 there are 3 entities of well monitors shown: CASGEM, KCWA, and the Navy .
The Section 2.6 written form need to be consistent with what is shown in Figure 2-13.

I recommend that a new section 2.6.4 be put in about the Navy monitoring wells.

Pages 38-39 Section 2.7.6 Groundwater Contamination Cleanup and Map key Figure 2-14

Pages 38-39 is not consistent with what the map key designates on Figure 2-14.

Pages 38-39	Figure 2-14
Sites that require cleanup	
Cleanup Program Sites	Cleanup Program Site
Leaking Underground Storage Tank(LUST) sites	LUST Cleanup Site
Department of Defense sites	Military Cleanup Site
Permitted facilities	
Operating Permitted Undergrnd Storage Tanks(USTs)	Permitted Underground Storage Tank
Land Disposal Site	Land Disposal Site
	Military UST Site

The inconsistencies I see here: 1) the lists on pages 38-39 contain 5 categories but the Map key in Figure 2-14 contains 6 categories, 2) the words used to describe categories for example: “military cleanup site” is that the same as “Department of Defense(DOD) sites”?, are they terms to be used interchangeably? DOD refers to both private sector and military 3) when looking for red circles on Figure 2-14 that represent “Cleanup Program Sites” I could not find any on the map in Figure 2-14.
The sentence on page 38states “Figure 2-14 shows the sites of possible and confirmed groundwater contamination located in the IWVGB, including:”(lists are included above). This sentence leaves the reader to believe that what is on pages 38-39 should be consistent with what is shown in Figure 2-14.
I recommend making page 34 consistent with what is shown in Figure 2-14.

Searles Valley Mineral Comments on Figures and Sections 1, 2, 3, 4
Nov. 15, 2019

General Comments on Figures: In those circumstances where there are multiple shades of the same color that mean something different, please consider using a hatched or patterned fill of some kind so as to distinguish the categories. Otherwise the reader cannot tell the difference between the various shades of red, etc. and therefore the categories are not differentiated and may as well be lumped together.

Figure 3.4a: The boundaries of the base do not show very well on this map. The green line is confusing.

Figure 3.13: The key does not explain what the purple dots are. Also, there are very few trends because the amount of data over time is lacking.

Figure 3.17: The map itself is blurry.

General Comments on Maps: The original base map that all of the maps are based on contains an area off Hwy 395, south or Ridgecrest, north of Johannesburg called Searles. This word refers to the Searles Station railroad crossover to the UP railroad. Please remove this word if possible. It causes confusion because it is not located in Searles Valley proper.

Section 2

Page 2.5: Second paragraph, Searles Valley Minerals, Inc. does not have a comma after Searles Valley Minerals Inc.

Page 2.8: What does SWP stand for?

Page 2.8: Please insert a section titled 2.3.7 Searles Valley Domestic Water Company that states "Searles Domestic Water Company (SDWC) serves the communities of Trona, Westend, Pioneer Point and Argus in the Searles Valley. The service area encompasses a population of more than 850 households."

Page 2.19: Should the sentence in the first paragraph read "Areas with a Resource/Land Management **designation** span over several miles to the east of China Lake and **south** of the Inyo County line.

Page 2.22: Second paragraph, Searles Valley Minerals Inc.

Page 2.30: Section 2.7.4.2, Do the two water efficient landscape requirement bullet points refer to new housing, or does this apply to current housing as well? If it is new housing only, this should be stated in the bullet points. The same question applies to the other bullet points.

Page 2.44: Section 2.8.4.1, There is a spurious error message in the first paragraph of this section as well as a reference to a screenshot that does not appear.

Section 3

Page 3.14: Section 3.3.3.1 Climate and Precipitation, The normal range of rainfall in any given year in the Indian Wells Valley is 2-5 inches. To try to force an average when the climate in southern California is cyclical does not give an accurate picture of the rainfall totals (see Fig 3.9). A range is a more useful tool to convey information.

Page 3.20: At top of page. In the bullet point at the top of the page it should read Industrial (Searles Valley Minerals Inc.).

Page 3.28: 3.3.5 Sustainable Yield Section, The problems of overdraft in the basin can be solved by either decreasing the amount of water pumped out of the basin, increasing the amount of water in the basin, or a combination of the two. This section focuses on increasing the amount of water that is in the basin. That seems to rely only on two of the management projects-- direct injection of recycled water and imported water from LADWP. The other imported water plan would send imported water directly to the IWVWD to send to its customers. This water would not be basin water, but supplant water that would be pumped out of the basin. This section is unclear and most of the confusion is reflected in how the phrase “future sustainable yield” is used in this section.

Page 3.34: Second paragraph last page. Given the frequent tectonic activity in the area near the SNORT track, the conclusion that the subsidence affecting SNORT is both tectonic and also due to groundwater pumping does not seem determinative. This should be considered a data gap. The Navy has considered and approved SNORT alignment criteria for observation of subsidence. Will subsidence data be made available from the Navy at least every 5 yrs for the regular update to DWR to indicate the type and level of impact and whether or not it is overdraft related and clearly linked to groundwater use?

Comments on Section 4 are stated on the PDF of Section 4.

Searles Valley Minerals
Overall Comments and Questions for Sections 5 and 6
Nov. 15, 2019

Comments on Sections 5 and 6 of the GSP

1. Projects should probably be listed in order of when they will be implemented. Management Action 1 should be first, then conservation, recycled water, pumping optimization and imported water. Dust mitigation and shallow well mitigation should occur after Management Action 1 since they are needed regardless of any other plan in order to mitigate undesirable results, but may be intermittent depending on the occurrence of undesirable results.
2. The time horizon for some projects is too short. SVM does not think that in the first year the GA has enough resources, both from a fiscal and manpower standpoint, to develop Management Action 1, a shallow well mitigation plan and a dust mitigation plan in the first year.
3. Any cost numbers associated with management actions and projects are preliminary and should be stated as estimates. The uncertainty in the costs should be stated.
4. The pumping fees are not stated. If the IWVGA are planning to use the fees to cover project costs that will not be covered by state or federal funding, a general estimate should be used. As it is, future planning for expected costs will be difficult.
5. There is no plan for the scenario in which imported water supplies are not available, or not available at a reasonable cost.
6. Searles Valley Minerals welcomes discussion with the IWVGA on the topic of conservation of water and is willing to partner with the IWVGA and other entities in the IWV in conservation of potable water. SVM is eager to explore, with the assistance of the IWVGA, grants and other funding opportunities to aid in potable water conservation.

Questions on Section 5 and 6 of the GSP

1. Is there a reason that the allocations in the transition pool are not transferrable? SVM suggests that these allocations be transferrable to other pumpers in the IWV, not just the IWVGA.
2. Will the pumping allocation amount decided by the Water Resources Manager to be given to the individual pumpers be the same over the 2020-2040 time horizon (assuming imported water in 2035)?
3. What is the anticipated augmentation fee amount? When will it be applied? Who will be paying it?
4. In the first 5 years of the plan (2020 to 2025), the implementation schedule shows $9M payout for fallowing land, $43M minimum (up to $75M) for recycled water project, $23M for pumping optimization. This totals $75M. There is also a possibility of $19M for dust mitigation. This does not include any funds for imported water. $75M to $94M in only 5 years is a large amount of costs. Does this assume grants and other government funding for such a large expenditure over a short 5-year period of time? This timeline seems aggressive. Will the time horizon for projects be extended?
5. How often will the GSP groundwater model(s) be updated with new data to increase the accuracy and predictive value of their use after the GSP is completed?

Other comments and questions are specifically stated on the comment and review mark-up of the draft documents of Sections 5 and 6.

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 4 – SUSTAINABLE MANAGEMENT CRITERIA

DRAFT

November 4, 2019

SECTION 4: SUSTAINABLE MANAGEMENT CRITERIA

4.1 INTRODUCTION

Sustainable Groundwater Management is defined as the "…management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results…" (California Water Code 10721 (v)). The GSP regulations collectively include four GSP requirements for Sustainable Management Criteria which include: 1) **Sustainability Goal** (see Section 4.2); 2) **Undesirable Results** (see Section 4.3); 3) **Minimum Thresholds** (see Section 4.4); and 4) **Measurable Objectives** (see Section 4.5).

The development of these criteria relies upon information about the IWVGB developed in the hydrogeologic conceptual model, the description of current and historical groundwater conditions, and the water budget. The impacts and estimated changes to future IWVGB conditions from the projects and management actions proposed in Section 5 were considered when developing the sustainable management criteria for the IWVGB. As discussed in Section 3, the IWVGB has been in overdraft for decades and the resulting reduction of useable groundwater in storage, chronic lowering of groundwater levels resulting in wells going dry, and water quality degradation in some wells continue to threaten the long-term viability of the IWVGB. In addition, although the amount of land subsidence due to declining groundwater levels in the IWVGB is relatively small, the SNORT facility at NAWS China Lake, which is a significant asset, has been impact by subsidence due to both reduction of groundwater levels and tectonic activity. The sustainable management criteria are used to establish thresholds and objectives to ensure the IWVGB does not experiencing undesirable results in the future.

Comment [CA1]: Not definitively proven.

4.1.1 Sustainability Indicators

SGMA has identified six sustainability indicators which refer to effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results (Water Code Section 10721(x)). Basin sustainability~~,~~ and the effectiveness of the proposed plans and programs will be judged by the ability to eliminate the undesirable results and conditions represented by the six sustainability indicators, as applicable to the IWVGB:

- Reduction of Groundwater in Storage
- Chronic Lowering of Groundwater Levels
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

4.1.2 Representative Monitoring Sites

The IWVGA has selected representative monitoring sites to be used to ~~measure~~ monitor groundwater conditions caused by the sustainability indicators applicable to the IWVGB. These sites were selected based on evaluation of the best available data. As more data becomes available through monitoring and data collection, the representative sites will be reevaluated for effectiveness at representing basin-wide conditions. Data from these sites, along with measured and verified groundwater production, will be used as the basis for confirming that the proposed project and management actions are having the desired effect on IWVGB management.

4.2 SUSTAINABILITY GOAL

4.2.1 Background

DWR states that "SGMA requires local agencies to develop and implement GSPs that achieve sustainable groundwater management by implementing projects and management actions intended to ensure that the basin is operated within its sustainable yield by avoiding undesirable results" (DWR, 2016). As discussed in Section 3.3.5, the sustainable yield is a crucial and fundamental element of GSP development, including establishing sustainable management criteria. The importance of the IWVGB sustainable yield is magnified by the fact that groundwater is the sole source of potable water in the

IWV. The results of the water balance analysis indicate the natural long-term average recharge of 7,650 AFY ~~as~~ is the sustainable yield.

As discussed in Section 3.3.4.4, it is well documented that IWV has been in overdraft since ~~the~~ at least the 1960s ~~and before~~ (Dutcher and Moyle, 1973). Current IWVGB outflows are approximately four times the inflows (see Section 3.3.4). The IWV community is currently experiencing the consequences of prolonged overdraft and will continue to experience increasing environmental, social, and economic impacts if sustainability is not achieved (see Section 4.3).

Water reliability is critical to sustain the community and the diverse interests that operate in the IWV. It is also critical to military sustainability and resiliency at NAWS China Lake. The current overdraft conditions indicate groundwater resources in the IWVGB are not currently sustainably managed and water supply and demand management projects must be implemented in order to preserve the water resource and maintain the community.

4.2.2 Description of Sustainability Goal

The sustainability goal is to preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of IWV residents, and sustain the mission at NAWS China Lake. The absence of significant and unreasonable undesirable results throughout the planning horizon will ~~be indicative~~indicate the sustainability goal has been achieved. The sustainability goal will be accomplished by achieving the following objectives:

- Operate the IWVGB groundwater resource within the sustainable yield.
- Implement projects and management actions to reduce IWVGB groundwater demands, increase reuse of current supplies, obtain supplemental water supplies, and mitigate undesirable results.
- Monitor the IWVGB actively and thoroughly and adaptively manage the projects and management actions to ensure the Groundwater Sustainability P~~p~~lan is effective and undesirable results are avoided.

4.2.3 Sustainability Measures

The IWVGA is developing a series of projects and management actions that will reduce demands and increase supplies, helping achieve the sustainability goal. These projects are briefly summarized below and described in greater detail in Section 5. If one or more of the planned measures to achieve the sustainability goal are not able to be realized, the proposed projects and management actions may need to be modified, including potential~~ly~~ additional measures to reduce groundwater production to reach sustainability.

- Implement Annual Pumping Allocation Plan, Transient Pool and Voluntary Fallowing Program. A Pumping Allocation Plan, Transient Pool Allocation, and Voluntary Fallowing Program will be implemented in 2020. Pumping allocations will be implemented consistent with existing groundwater rights and priorities including health and safety, municipal and industrial, and the federal reserve of water necessary for military purposes.
- Optimize recycled water use. The City's current recycled water supplies will be optimized for direct and indirect reuse to reduce groundwater demands. The expanded recycled water project is anticipated to be online in 2025.
- Continue emphasis on water conservation. Conservation pilot projects in severely disadvantaged communities will be implemented in 2020. In addition, the IWVGA and beneficial users of groundwater in the IWV will continue to evaluate and implement additional measures to reduce groundwater demands.
- Obtain an imported water supply. After all projects and management actions that use IWVGB water supplies are fully implemented (Pumping Limitations, Recycled Water Project, Pumping Optimization and Conservation), it is anticipated groundwater demands will continue to be greater than the current sustainable yield. Accordingly, the IWVGA will continue to develop a firm imported water supply no later than 2040 to ensure groundwater pumping equals sustainable yield (including imported water replenishment.) The goal is to have the imported water project online by 2035.
- Pumping Optimization. Pumping will be optimized throughout the IWVGB by moving pumping from areas with high volumes of pumping to areas with lesser pumping in order to mitigate

undesirable results caused by pumping depressions and chronic lowering of groundwater levels by 2025.

- Shallow Well Mitigation. Shallow wells impacted by degraded water quality and/or lowering of groundwater levels will be mitigated on an ongoing basis.
- Dust Control Mitigation. Potential undesirable results caused by potential increased windblown dust and sand resulting from agriculture fallowing will be mitigated on an ongoing basis.

4.2.4 Explanation of How Goal will be Achieved

The sustainability goal is described in Section 4.2.2 with the specific measures to achieve the goal listed in Section 4.2.3 above. The following is a description of how those measures will achieve the sustainability goal by 2040. (See Section 5.2 and Section 6.3 for additional information including discussion on project costs, funding, and schedule.)

- Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. This management action will have a direct impact in achieving sustainability and will be directly quantified through reported groundwater production and verified through groundwater elevation measurements. There is a direct relationship between reduced extractions and a decrease in the rate of decline of groundwater levels in the IWVGB. Furthermore, reduced groundwater pumping will reduce or eliminate localized pumping depressions, minimize impacts to shallow wells, reduce annual overdraft, minimize or eliminate adverse impacts to groundwater water quality (which will be quantified through groundwater quality sampling), and minimize possible land subsidence caused by excessive groundwater extraction.
- Optimize recycled water use. A recycled water project to optimize reuse of the City's recycled water supply will be implemented by 2025. This project will have a direct impact in achieving sustainability through reduced groundwater demands which will be directly quantified through reported groundwater production and metered use of recycled water use and verified through groundwater elevation measurements.
- Continue emphasis on water conservation. As discussed previously, the U.S. Navy, IWVWD, and others have already implemented successful conservation measures. Additional conservation will have a direct impact toward achieving sustainability through reduced groundwater demands

Formatted: No underline

which will be quantified directly through reported groundwater pumping and indirectly through groundwater elevation measurements. Individual groundwater savings resulting from the conservation programs will be measured and documented.

- Obtain an imported water supply. It is anticipated that the IWVGA will have an imported water supply by 2035. The addition of imported water for either direct use and/or groundwater replenishment will have a quantifiable benefit which will be identified through reported groundwater pumping, groundwater level measurement, and metered use or delivery of imported water. Furthermore, increased use of imported water to offset pumping of water from the IWVGB will help to reduce or eliminate localized pumping depressions, reduce impacts to shallow wells, reduce annual overdraft, reduce or eliminate adverse impacts to groundwater water quality (which will be quantified through groundwater quality sampling), and minimize possible land subsidence caused by excessive groundwater extraction.
- Pumping Optimization. The pumping optimization project will be implemented by 2025. It will directly contribute to mitigation of undesirable results caused by chronic lowering of groundwater levels and results will be verified by groundwater level measurements.
- Shallow Well Mitigation. The Shallow Well Mitigation Program will directly contribute to mitigating undesirable results caused by reduction of groundwater in storage, chronic lowering of groundwater levels, and degraded water quality.
- Dust Control Mitigation. The Dust Control Mitigation Program will directly contribute to mitigating secondary undesirable results caused by the fallowing of agriculture lands.

4.3 UNDESIRABLE RESULTS

Undesirable results occur when any of groundwater conditions related to the six sustainability indicators become significant and unreasonable. SGMA requires that groundwater sustainability agencies determine what constitutes significant and unreasonable undesirable results for each groundwater basin.

As applicable and related to the IWVGB, the six sustainability indicators can be organized into three categories: 1) Indicators with documented current and/or historical undesirable results that will continue in the future if not addressed, 2) Indicators with no known undesirable results and no current data to determine likelihood of future undesirable results, and 3) Indicators not applicable to the IWVGB.

There are four sustainability indicators with documented current and/or historical significant and unreasonable undesirable results: reduction in groundwater in storage, chronic lowering of groundwater levels, degraded water quality, and possible land subsidence. The reduction of groundwater in storage is directly related to the chronic lowering of groundwater levels. Hydrographs of wells taken throughout the IWV demonstrate significant and unreasonable prolonged drawdown causing undesirable results (see Appendix 3-D and Section 3.4.2). As discussed in Section 3.4.4.1, TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred and are indicative of groundwater water quality degradation undesirable results. As discussed in Section 3.4.5, land subsidence has historically caused undesirable results to facilities at NAWS China Lake, particularly the SNORT alignment.

Comment [CA2]: The subsidence at the SNORT alignment is mainly, if not all, due to tectonic forces. It has yet to be determined that the subsidence is due to groundwater pumping. This is a data gap and needs to be monitored.

As discussed in Section 3.5.4, the numerical model was used to simulate future IWVGB conditions (Baseline conditions) under a no action scenario assuming the GSP was not implemented. Baseline condition model results shown in Appendix 3-H indicate continuing and worsening conditions are anticipated for reduction in groundwater in storage, chronic lowering of groundwater levels, and degraded water quality. The numerical model was also used to simulate future conditions if the GSP proposed projects and management actions described in Section 5 are implemented to use as a tool for establishing sustainable management criteria (Scenario 6.2). Section 3.5.5 and Appendix 3-H provide the description and results of that numerical model simulation.

Depletion of interconnected surface water is the one sustainability indicator with no known undesirable results and no current data to determine likelihood of future undesirable results. There are no major or significant surface water bodies within the IWVGB. Streams in the valley are typically ephemeral and contribute to mountain front recharge, but typically do not flow past the mouths of the canyon except for in very wet years. When the streams do flow into the IWVGB during very wet years the surface waters are not interconnected with groundwater in the basin.

Due to the location of the IWVGB, seawater intrusion is not currently applicable to the IWVGB and is not of concern in the future. Consequently, Minimum Thresholds, Measurable Objectives, and Interim Milestones are not established for this sustainability indicator.

SGMA requires three components to be addressed for each potential undesirable result (California Water Code § 354.26). Those components and a brief description are included below:

1. The cause of groundwater conditions occurring within the IWVGB which may lead to, or has led to, undesirable results based on information described in the basin setting. It is recognized that the IWVGB may not have any undesirable ~~any~~ results for some sustainability indicators.
2. The criteria used to define undesirable results for each sustainability indicator which is relevant and applicable to the IWVGB.
3. The potential effects on the IWVGB of the undesirable result of continued groundwater use including potential impacts on beneficial uses and users.

4.3.1 Reduction of Groundwater in Storage Undesirable Results

4.3.1.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable reduction of groundwater in storage. Modeling results simulating baseline conditions (no action) indicate a continued drastic reduction of groundwater in storage. (See Appendix 3-H.)

4.3.1.2 *Criteria to Define Undesirable Results*

Baseline conditions model results indicate that useable groundwater in storage could be depleted to the point that potential future demands could not be met if the IWVGB is not managed, which would jeopardize all beneficial uses and users in the IWVGB. Scenario 6.2 model results, simulating the proposed projects and management actions, indicate approximately 215,000 acre-feet of groundwater would be removed from storage over the planning horizon, compared to approximately 1.6 million acre-feet estimated to be removed from storage under Baseline conditions.

The available groundwater in storage is a significant groundwater management consideration for the IWVGA also because IWVGB groundwater resources must be preserved as a sustainable water supply for NAWS China Lake. In a letter to the IWVGB, the U.S. Navy deemed groundwater resources as the primary encroachment concern for NAWS China Lake (see Appendix 4-A). Furthermore, any future major conflict could require expansion of the NAWS China Lake mission and could require additional water use from the IWVGB. In addition, preserving groundwater in storage is a high priority due to uncertainties including general basin knowledge uncertainties, model uncertainties, and uncertainties related to availability and implementation schedule of supplemental water supplies.

In areas in the IWV where the groundwater levels have been steadily declining, the water levels have dropped enough to impact shallow wells, requiring wells to be deepened, re-drilled, or abandoned as a water source. As discussed in Section 3.4.2, an analysis was conducted on the IWVGB well inventory to estimate the number of shallow wells impacted due to the chronic lowering of groundwater levels, which is related to the unreasonable and significant reduction of groundwater in storage (Appendix 3-E). It is estimated 97 shallow wells were impacted ~~by~~ from 1980 to 2018 based on preliminary analysis. An additional approximately 800 wells are estimated to be impacted by 2070 under the baseline, "no action", conditions.

The number of wells estimated to be impacted is the criterium to define significant and unreasonable reduction of groundwater in storage because it is significantly beyond what could reasonably and feasibly be mitigated. The number of shallow wells that would to be impacted if the proposed projects and management actions are implemented is estimated to be 22, which is a feasible number of wells that can be mitigated.

The amount of groundwater estimated to be removed from storage with the proposed projects and management actions is the maximum amount of useable groundwater reserves than can be extracted to prevent undesirable results while still providing a margin of safety for future use, uncertainties, and potential changes to the NAWS China Lake mission.

4.3.1.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the significant reduction of groundwater in storage if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Reduction of buffer from loss of production for deeper wells, both for municipal/domestic use, industrial use, and agriculture use
- Impacts to shallow wells due to lowering of groundwater levels which would require deepening or replacement
- Encroachment on mission of NAWS China Lake
- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Land subsidence causing impacts to infrastructure
- Jeopardy to beneficial uses due to lowering of groundwater levels and degraded water quality including domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs and supplemental supplies (including de minimis groundwater users and members of disadvantaged communities)

4.3.2 Chronic Lowering of Groundwater Levels Undesirable Results

4.3.2.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable chronic lowering of groundwater levels. Modeling results simulating Baseline conditions (no action) indicate a continued drastic lowering of groundwater levels if appropriate projects and management actions are not implemented (see Appendix 3-H.)

4.3.2.2 *Criteria to Define Undesirable Results*

The results of the shallow well impact analysis (see Appendix 3-E) is the criteria to define significant and unreasonable chronic lowering of groundwater levels.

Comment [CA3]: This is not detailed enough. The criteria to define undesirable results of lowering of groundwater levels will be the measuring of groundwater levels decreasing and the effects of this on the shallow wells. It should be similar to 4.3.1.2.

4.3.2.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the chronic lowing of groundwater levels if not addressed through projects and management actions. The potential basin impacts include:

- Impacts to shallow wells directly caused by lowering of groundwater levels which would require deepening or replacement
- Impacts to shallow wells due to degraded water quality indirectly caused by lowering of groundwater levels which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Land subsidence causing impacts to infrastructure
- Jeopardy to beneficial uses including domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)

4.3.3 Degraded Water Quality Undesirable Results

4.3.3.1 *Cause of Undesirable Results*

As discussed in Section 3.4.4.1, the groundwater movement in the IWVGB causes dissolution of evaporites, resulting in increased TDS concentrations. Groundwater production can exacerbate the process, and TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred. TDS concentrations in areas of the IWVGB are indicative of groundwater degradation.

Comment [CA4]: TDS concentrations in and of themselves are not indicative of groundwater degradation. An increase in TDS concentrations in areas that were not previously high is indicative of groundwater degradation.

After considering several factors including the past, present, and probable future beneficial use of the groundwater, economic considerations, and environmental considerations, the LRWQCB has removed the designation for Municipal and Domestic Supply for a large portion of the IWVGB underlying NAWS China Lake due to existing poor water quality. The water quality in this area is considered a pre-SGMA undesirable result and will not be addressed by projects and management actions and will not have sustainable management criteria established for it. Figure 4-1 provides a map showing the de-designated area on NAWS China Lake.

4.3.3.2 *Criteria to Define Undesirable Results*

Degradation ~~to~~ of groundwater quality is considered significant and unreasonable if the quality is degraded such that it is unsuitable for the current beneficial uses in the IWVGB.

4.3.3.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the degraded water quality if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Jeopardy to beneficial uses including domestic supplies, industrial supplies, and agriculture supplies which could results in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)

4.3.4 Land Subsidence Undesirable Results

4.3.4.1 *Cause of Undesirable Results*

As discussed in Section 3.4.5 and Appendix 3-G, the IWVGB is partially underlain by extensive fine-grained materials which have a high to very high susceptibility to land subsidence. These fine-grained materials are prone to inelastic compaction when the groundwater table is lowered below historical levels. Consequently, the current overdraft conditions, resulting in lowering of groundwater levels, contribute to land subsidence conditions in the IWVGB. Additionally, due to the high tectonic activity in the IWV, the IWVGB is also subject to direct tectonic changes in ground elevation, as well as soft sediment deformation and compaction of fine-grained units due to seismic activity.

4.3.4.2 *Criteria to Define Undesirable Results*

Land subsidence is considered significant and unreasonable if the rate and amount impacts current facilities and infrastructure.

4.3.4.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the land subsidence if not addressed through projects and management actions. The potential basin impacts to beneficial uses and users include:

- Encroachment on mission of NAWS China Lake
- Damage to infrastructure including high value sensitive facilities at NAWS China Lake (For example, the SNORT alignment)

4.3.5 Depletions of Interconnected Surface Water Undesirable Results

Ephemeral streams exist in the mountain canyons, but typically do not flow past the mouths of the canyon except for in very wet years. There are multiple natural springs in the IWV (see Figure 3-11). There is currently no data documenting any undesirable results or basin impacts related to depletions of interconnected surface water. Groundwater is critical to sustaining springs, wetlands, and perennial flow (baseflow) in streams as well as to sustaining vegetation such as phreatophytes that directly tap groundwater. As discussed in Section 3.4.7, GDEs on the valley floor are vulnerable and susceptible to impacts related to the chronic lowering of groundwater levels. Model results simulating Baseline conditions (no action) indicate continued drastic lowering of groundwater levels in the vicinity of the GDEs near the China Lake Playa if appropriate projects and management actions are not implemented (see Appendix 3-H). Critical information on the relationship between groundwater levels and the health of GDEs is currently not known; therefore, GDE monitoring, currently a data gap, is proposed as part of the GSP monitoring program. Due to limited data on the relationship of interconnected surface water (springs) to GDEs and GDE's direct use of groundwater, no additional sustainable management criteria are proposed at this time.

4.4 MINIMUM THRESHOLDS

A Minimum Threshold is defined as "a numeric value for each sustainability indicator used to define undesirable results" (§ 351 (t)). DWR's Sustainable Management Criteria BMP further clarifies that the Minimum Threshold is "…the quantitative value that represents the groundwater conditions at a representative monitoring site that, when exceeded individually or in combination with Minimum Thresholds at other monitoring sites, may cause an undesirable result(s) in the basin…" SGMA requires that each Groundwater Sustainability Agency determine the value for each sustainability indicator at which undesirable results occur. Impacts to groundwater pumpers, land uses, and other interests within the IWVGB were considered when developing the Minimum Thresholds.

Minimum Thresholds for the applicable sustainability indicators are established at monitoring sites that are representative of overall IWVGB conditions. It is recognized that exceeding a Minimum Threshold at a single monitoring site may not be indicative of an undesirable result. Any Minimum Threshold exceedance will be evaluated to determine the cause and if corrective action is necessary. There is inherent uncertainly when predicting water levels and the IWVGB anticipated response to planned projects and management actions intended to eliminate undesirable results, but groundwater levels that exceed the established Minimum Thresholds will be used as an indication that additional or more aggressive actions may need to be implemented. If planned project and management actions are unable to be realized or the intended IWVGB benefits are not achieved, sustainable management criteria, including Minimum Thresholds and Measurable Objectives, will need to be revaluated and additional or more aggressive management actions may need to be implemented.

GSP Regulations § 354.28 require six components of information to be documented for each Minimum Threshold. The six components are as follows:

1. The criteria used to establish Minimum Thresholds including elements of the basin setting and/or modeling results used to establish the thresholds.
2. The relationship to other sustainability indicators and a comparison to thresholds in adjacent representative monitoring sites, and the relationship between the selected Minimum Threshold and Minimum Thresholds for other sustainability indicators.
3. The relationship to adjacent basins and how Minimum Thresholds have been selected to avoid unintended undesirable results in an adjacent basin or impacting the ability of an adjacent basin to achieve its sustainability goals. The groundwater basins surrounding the IWVGB are Rose Valley, Coso Valley, Salt Valley, and Fremont Valley. These basins are not required to submit a GSP in accordance with SGMA.
4. The potential effects and how an identified Minimum Threshold may impact groundwater conditions, beneficial uses, and consequently groundwater users.
5. The relationship with Federal, State and Local Standards and the justification for any differences between the selected Minimum Threshold and other regulatory standards.
6. The method of quantitative measurement and the data collection schedule.

4.4.1 Reduction of Groundwater in Storage Minimum Threshold

4.4.1.1 *Criteria used to Establish Minimum Thresholds*

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Minimum Threshold for the reduction of groundwater in storage is set at the stimulated estimated value of the total loss of groundwater in storage at year 2070 after the projects and management actions are implemented (Scenario 6.2) plus an additional 10 percent buffer for the purposes of operational flexibility. The purpose of the operational flexibility is to account for uncertainties related to availability and implementation schedule of supplemental water supplies.

4.4.1.2 *Relationship to Other Sustainability Indicators*

Reduction of groundwater in storage is related to sustainability indicators for chronic lowering of groundwater levels, degraded water quality, and land subsidence for the IWVGB. By preserving groundwater in storage, the Minimum Threshold for reduction of groundwater in storage will additionally minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land subsidence.

4.4.1.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley for the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY on average between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to reduce the reduction of storage are not expected to impact adjacent basins.

4.4.1.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the total volume of groundwater allowed to be removed from storage through the establishment of the Minimum Threshold which will subsequently protect beneficial users and uses from undesirable results. The Minimum Threshold for reduction of groundwater in storage will minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land subsidence which will benefit beneficial users and uses in the IWVGB. Reserve groundwater resources will be preserved for potential increased groundwater use to support the mission of NAWS China Lake. Impacts to deeper wells from impacts due to chronic lowering of groundwater levels and degraded water quality will be reduced. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold impacts and limits the volume of groundwater that can be produced by beneficial users and used for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to reduce the reduction of groundwater in storage have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.1.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the reduction of groundwater in storage. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.1.6 *Representative Monitoring Sites*

The Minimum Threshold~~,~~ and other sustainable management criteria~~,~~ for the reduction of groundwater in storage is not set at representative monitoring sites but is set for the entire IWVGB. Accordingly, no representative monitoring sites have been selected. The procedure for determining the reduction of groundwater in storage in discussed in Section 4.4.1.7 below.

4.4.1.7 *Method of Quantitative Measurement*

The change of groundwater in storage will be estimated using the Thiessen polygon method. The IWVGB will be subdivided into discrete polygons drawn to represent the area closest to each measurement point. The measurement points will be the wells monitored semi-annually by the KCWA for groundwater levels. Discretization of the polygons will be performed using the Thiessen weighted average polygon method to proportion data that is not uniformly spaced. The polygons will be drawn to represent the area closest to a measuring point that provides physical data of the basin. The change in groundwater in storage will be calculated annually based on bulk hydrogeologic parameters and measured fall groundwater levels for each polygon. The change in groundwater in storage will be monitored as 5-year rolling averages to determine if Minimum Thresholds are exceeded.

The following equation is used to estimate the change in storage for each polygon:

Change of Groundwater in Storage (feet^3) =
[area (feet^2)] x [specific yield (unitless)] x [change in depth to water (feet)]

4.4.2 Chronic Lowering of Groundwater Levels Minimum Threshold

4.4.2.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for chronic lowering of groundwater levels are historical groundwater elevation levels/trends and simulated predicted water levels. The numerical model was used to estimate and predict water levels throughout the IWVGB under the conditions of the proposed projects and management actions. The simulated data was compared to extrapolated trends of historical data. Operational flexibility is an important consideration when setting the Minimum Thresholds for chronic lowering of groundwater levels because groundwater levels respond to groundwater production and also changes in hydrologic cycles.

The approach for setting Minimum Thresholds is dependent on groundwater level historical groundwater elevations and trends in specific representative monitoring sites and the simulated predicted water levels at those monitoring sites. The simulated predicted water levels were adjusted within the numerical model margin of error in order for the common point between the historical data and the simulated data to have the same value. At wells with highly variable water levels, the simulated predicted water levels were adjusted to the most recent 3-year average of historical data. Groundwater levels for some representative monitoring sites near pumping centers experience high seasonal variability. For these wells, the amplitude of the seasonal troughs extends significantly below the historical trendline. The lower value between the following data was used to determine the Minimum Threshold:

1. 5 feet below the minimum of the simulated groundwater level before groundwater level recovery is anticipated due to the implementation of projects and management actions; or
2. 5 feet below recent minimum historical value.

By using the lower value of the above-mentioned data, a more appropriate Minimum Threshold is established with greater operational flexibility.

4.4.2.2 *Relationship to Other Sustainability Indicators*

The chronic lowering of groundwater levels is related to other sustainability indicators for reduction of groundwater in storage, degraded water quality, and land subsidence for the IWVGB. By limiting the decline of groundwater levels in the IWVGB, the Minimum Threshold for chronic lowering of groundwater levels will additionally minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence.

4.4.2.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley for the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY on average between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to address chronic lowering of groundwater levels are not expected to impact adjacent basins.

4.4.2.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the decline of groundwater levels. The Minimum Threshold for the chronic lowering of groundwater levels will minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence which will subsequently protect beneficial users and uses from undesirable results. The risk to wells going dry, along with the associated financial impacts, will be mitigated by limiting the chronic decline of groundwater levels. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold for the chronic lowering of groundwater levels impacts and limits amount of groundwater production that can occur for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to mitigate the chronic lowering of groundwater levels have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.2.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the chronic lowering of groundwater levels. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA to coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.2.6 *Representative Monitoring Sites*

Ten monitoring wells have been selected to be representative key wells to monitor chronic lowering of groundwater levels. The locations of these wells are provided in Figure 4-2. To determine the selection of representative monitoring sites, groundwater levels throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted water levels over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the decline of groundwater levels. Monitoring wells with good period of record of historical data were prioritized over wells with little recorded historical data.

Table 4-1 provides the list of representative monitoring sites to monitor chronic lowering of groundwater levels.

Table 4-1. Representative Monitoring Sites for Chronic Lowering of Groundwater Levels.

Well Name	T/R-S	Depth	Screen Intervals	Latitude (NAD83)	Longitude (NAD83)
USBR-01	27S/38E-23F01 27S/38E-23F02 27S/38E-23F04	635 1060 1770	615-635 1040-1060 1750-1770	35.569683	-117.863691
USBR-03	27S/39E-11D01 27S/39E-11D02 27S/39E-11D03	670 1340 1870	650-670 1320-1340 1850-1870	35.607183	-117.755633
USBR-04	26S/39E-26A03	1200	1190-1200	35.649682	-117.743133
USBR-05	25S/38E-34G01 25S/38E-34G02 25S/38E-34G03	870 1610 1980	850-870 1590-1610 1960-1980	35.718013	-117.871749
USBR-06	25S/38E-12L01 25S/38E-12L02 25S/38E-12L03	350 1210 1660	330-350 1190-1210 1640-1660	35.776068	-117.842027
MW 32	26S/39E-27D02 26S/39E-27D03 26S/39E-27D04	900 1260 1920	880-900 1240-1260 1900-1920	35.648571	-117.775912
NR-2	25S/38E-36G01 25S/38E-36G02 25S/38E-36G03	350 1560 1930	330-350 1540-1560 1910-1930	35.718739	-117.834723
Kerr McGee	26S/39E-17G02			35.676348	-117.804524
Sandquist Spa	26S/39E-11E02	191	135-191	35.688570	-117.756468
Steele 31L01	26S/39E-32L01			35.629935	-117.811488

4.4.2.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring chronic lowering of groundwater levels is direct measurement of groundwater levels. Groundwater levels will be monitored at the representative monitoring sites semiannually. Groundwater levels will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.3 Degraded Water Quality Minimum Threshold

4.4.3.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for degraded water quality are historical TDS concentrations and historical trends. The numerical model was also used to estimate TDS concentrations throughout the IWVGB under the conditions of the proposed projects and management actions (Numerical Model Scenario 6.2). The simulated data was compared to extrapolated trends of historical data when available; however, there are many areas of the IWVGB that have limited TDS data or do not have long periods of record. Operational flexibility is an important consideration when setting the Minimum Thresholds due to current uncertainties. Likewise, there are areas where there is not enough reliable data to establish Minimum Thresholds at this time until baseline TDS conditions are established.

The approach for setting Minimum Thresholds is dependent on historical TDS concentrations and trends in specific representative monitoring sites. In areas of the IWVGB with generally good water quality, the Minimum Threshold is set at the Secondary TDS MCL (500 mg/l) in order protect current beneficial uses for domestic supply. After looking at historical data and trends, Minimum Thresholds were established in some areas with poorer water quality at 600 mg/l and at 1,000 mg/l. The northwest area of the IWVGB has documented poor quality that is still designed for domestic use and is also used for agricultural uses. This area of the IWVGB is of particular concern for water quality degradation; however, limited water quality data indicate that this area has already documented high TDS concentrations that are pre-SGMA undesirable results. Due to the limited data, Minimum Thresholds (and other sustainable management criteria) will need to be established after baseline TDS concentrations are established.

4.4.3.2 *Relationship to Other Sustainability Indicators*

Degradation of water quality is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and chronic lowering of groundwater levels. The Minimum Thresholds established for the reduction of groundwater in storage and the chronic lowering of groundwater levels minimize undesirable results caused by degraded water quality. The Minimum

Threshold established for degraded water quality does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.3.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins, with 50 AFY estimated to flow to the Salt Wells Valley from the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY (see Appendix 3-H). Consequently, the Minimum Thresholds selected to address degraded water quality are not expected to impact adjacent basins.

4.4.3.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by establishing Minimum Thresholds to limit and mitigate the degradation of groundwater quality which will subsequently protect beneficial users and uses from undesirable results. By maintaining TDS concentrations below Minimum Threshold, the number of wells that would require well abandonment or treatment due to water quality degradation will be reduced and beneficial uses will be protected. As discussed in Section 5, projects and management actions implemented to mitigate the degraded water quality have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.3.5 *Relationship with Federal, State and Local Standards*

The LRWQCB issues water quality objectives that apply to all groundwater in the Lahontan region. In general, the groundwater quality objectives are set to be protective of beneficial uses. Groundwaters designed for municipal and domestic use should not contain concentrations above MCLs or SMCLs based on drinking water standards. The water quality objectives for the Lahontan region are provided in Appendix 4-B. As discussed in Section 3.4.4, groundwater concentrations already exceed MCLs and SMCLs for TDS and arsenic in certain areas of the IWVGB are pre-SGMA undesirable results. Consequently, the proposed projects and management actions are intended to improve water quality, but will not necessarily reduce concentrations in every area of the IWVGB to below MCLs and SMCLs. As discussed in Section 2.5.2, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA ~~to~~ will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.3.6 *Representative Monitoring Sites*

Eleven monitoring wells and production wells have been selected to be representative key wells to monitor water quality degradation. The locations of these wells are provided in Figure 4-3. To determine the selection of representative monitoring sites, historical TDS concentration data in wells throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted TDS concentrations over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the degradation of water quality, with a higher density of representative wells in sensitive and/or vulnerable areas of the IWVGB that is put to greater beneficial uses. Wells with historical increasing TDS tends are intended to be used as "sentinel" wells in the monitoring network, with the intention that by monitoring these wells for water quality degradation, additional IWVGB wells will likewise be protected. Monitoring wells with good period of record of historical data were prioritized over wells with little recorded historical data. Other factors, including accessibility and reliability of data, were also considered in the section of representative monitoring well sites.

One representative monitoring well has been selected in an area of poor water quality on NAWS China Lake that is no longer designed for municipal or domestic use. Additional data will be collected to establish Baseline TDS conditions before setting sustainable management criteria at that well.

One representative monitoring well has been selected in the El Paso subbasin ~~due to there only being~~because there are only minimal beneficial uses in that area and stable groundwater levels and water quality.

Table 4-2 provides the list of representative monitoring sites to monitor water quality degradation.

Table 4-2. Representative Monitoring Sites for Degraded Water Quality.

Well	T/R-S	Depth	Screen Intervals	Latitude (NAD83)	Longitude (NAD83)
USBR-01	27S/38E-23F01 27S/38E-23F02 27S/38E-23F04	635 1060 1770	615-635 1040-1060 1750-1770	35.56968	-117.86369
IWVWD Well 33	27S/39E-08L01	1020	560 - 1000	35.60051	-117.80419
Owens Peak South Well 01	26S/39E-32N	n/a	366 - 376	35.62377	-117.80867
IWVWD Well 30	26S/39E-27D	1200	600-1200	35.65024	-117.77578
Hometown Water Association Well 01	26S/39E-26B1	n/a	263-323	35.64835	-117.74803
IWVWD Well 11	26S/40E32-K01	620	260-310, 340-380, 470-500, 520-600	35.62833	-117.69602
Sandquist Spa	26S/39E-11E02	191	135-191	35.68857	-117.75647
22B	26S/40E-22B	651.5	531-631	35.661433	-117.666783
West Valley Mutual 01	26S/39E-07M1	n/a	200-400	35.68696	-117.83003
USBR 6	25S/38E-12L01 25S/38E-12L02 25S/38E-12L03	350 1210 1660	330-350 1190-1210 1640-1660	35.77607	-117.84203
NR-2	25S/38E-36G01 25S/38E-36G02 25S/38E-36G03	350 1560 1930	330-350 1540-1560 1910-1930	35.71874	-117.83472

4.4.3.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring degraded water quality is TDS sampling. Groundwater samples will be collected at the representative monitoring sites annually and analyzed for TDS at qualified laboratories. TDS concentrations will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.4 Land Subsidence Minimum Threshold

4.4.4.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish the Minimum Threshold for land subsidence are historical data on land subsidence rates in the area of most concern and susceptibility to land subsidence: the southern subsidence area, specifically near the SNORT alignment on NAWS China Lake (see Appendix 3-G). The Minimum Threshold for land subsidence is set at the rate from the most recent data period that has been analyzed (2005-2010) which is a value of 2.2 mm/year or 0.09 inches/year, due to declines in water levels and not tectonic processes, based on a 5-year running average in order to avoid additional undesirable results occurring at SNORT due to increased rates of land subsidence as compared to the current rates.

4.4.4.2 *Relationship to Other Sustainability Indicators*

Land subsidence is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and the chronic lowering of groundwater levels. By establishing Minimum Threshold to preserve groundwater in storage and limit the decline of groundwater levels in the IWVGB, the aquifer materials that may be subject to compaction will not be dewatered and therefore undesirable results caused by land subsidence will be minimized. The Minimum Threshold established for land subsidence does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.4.3 *Relationship to Adjacent Basins*

The Minimum Thresholds selected to address land subsidence are not expected to impact adjacent basins.

4.4.4.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved and impacts caused by land subsidence will be reduced by establishing Minimum Thresholds to limit land subsidence.

4.4.4.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any federal, state or local standards specific to addressing the reduction of land subsidence.

4.4.4.6 *Representative Monitoring Sites*

Data from future level line surveys for existing monuments along the SNORT alignment conducted by the U.S. Navy will be reviewed if available. The IWVGA will evaluate new surveying, InSAR data and Light Detection and Ranging (LiDAR) data for the IWVGB, as available, to analyze basin-wide land subsidence rates and to determine if additional monitoring locations are necessary and if additional Minimum Thresholds are required for additional IWVGB locations.

4.4.4.7 *Method of Quantitative Measurement*

Common land subsidence measurement techniques include level-line surveys, InSAR and LiDAR measurements, and extensometers. The U.S. Navy periodically performs level-line surveys at the SNORT alignment to monitor land subsidence. The U.S. Navy has proposed establishing additional geodetic control points on NAWS China Lake. In additional, InSAR and airborne LiDAR, a pulsed laser sensing method, data has been collected for NAWS China Lake following the significant earthquakes that occurred in the IWVGB in July 2019. The IWVGA will coordinate with the U.S. Navy to obtain data related to land subsidence in order to evaluate potential Minimum Threshold exceedances. As discussed in 4.4.4.6, surveying, InSAR, and LiDAR data will be analyzed, as available.

4.5 MEASURABLE OBJECTIVES AND INTERIM MILESTONES

Measurable Objectives are defined as the "…quantitative goals that reflect the basin's desired groundwater conditions and allow the GSA to achieve the sustainability goal within 20 years…" This GSP Measurable Objectives are established at the same representative monitoring sites selected for monitoring conditions for potential Minimum Threshold exceedance. The planned Projects and Management Actions have been selected to achieve the Measurable Objectives. In addition to the Measurable Objective, Interim Milestones are identified in five-year increments at each monitoring site.

4.5.1 Reduction of Groundwater in Storage Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objective for the reduction of groundwater in storage is set at the simulated estimated total loss of storage at the end of the planning horizon in 2070. The value for the Measurable Objective is 213,474 acre-feet of groundwater removed from storage.

As discussed in Section 3.3.5, although the IWVGB will be operating within the current estimated sustainable yield of 7,650 AFY by 2040, additional losses will continue due to ET losses occurring in the China Lake Playa region causing additional reductions of groundwater in storage. Modeling has indicated that additional recharge of imported water in the recharge zone by the Sierra Nevada Mountains does not substantially reduce the ET losses occurring in the China Lake Playa within the time frame of the 50-year planning horizon. Accordingly, the Measurable Objective will be met by 2040, despite some additional losses occurring from 2040 through the planning horizon.

The Interim Milestones for 2025, 2030, and 2035 are the simulated estimated values of total cumulative volume of groundwater removed from storage at January 1 of those years: 81,952 acre-feet, 119,661 acre-feet, and 131,896 acre-feet of groundwater removed from storage, respectively.

4.5.2 Chronic Lowering of Groundwater Levels Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the groundwater levels over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objectives for each representative well for the chronic lowering of groundwater levels is set at the simulated estimated value at that well at year 2040, after the projects and management actions are implemented and sustainability is reached. The Interim Milestones for 2025, 2030, and 2035 are the simulated groundwater levels at January 1 of those years.

Groundwater levels will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.3 Degraded Water Quality Measurable Objective and Interim Milestones

At representative monitoring sites that have historical TDS data, the Measurable Objective for degraded water quality is set at the highest most recent TDS concentration. At wells where the TDS concentrations at the representative monitoring sites are anticipated to generally be stable or stabilize after projects and management actions are implemented based on simulated TDS concentrations, the Interim Milestones are established at the same value as the Measurable Objective. For wells with increasing historical trends, Interim Milestones are established at the extrapolation of the historical trend to the year 2030, at which time some stabilization of TDS trends is anticipated. At representative monitoring sites in areas of the IWVGB were there is not enough historical data to set criteria, Measurable Objectives and Interim Milestones will be established after baseline TDS conditions are established through monitoring.

TDS concentrations will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.4 Land Subsidence Measurable Objective and Interim Milestones

Due to implementation of projects and management actions that will result in stabilization of groundwater levels, the current rate of land subsidence is not anticipated to increase from the ~~most~~ data period (2005-2010). Accordingly, the Measurable Objective is set at the historical rate of subsidence of approximately 1.1 mm/year (0.04 inches/year) over an 18-year period from 1992 to 2010. The Interim Milestones for 2025, 2030, and 2035 are set at the same rate as the Measurable Objective at 1.1 mm/year (0.04 inches/year).

4.6 SUMMARY OF SUSTAINABLE MANAGEMENT CRITERIA

4.6.1 Reduction of Groundwater in Storage

Table 4-3 below shows the numerical sustainable management criteria established for the reduction of groundwater in storage. Figure 4-4 provides a graph of predicted simulated reduction of storage along with the sustainable management criteria.

Table 4-3. Sustainable Management Criteria Summary: Reduction of Groundwater in Storage.

Sustainable Management Criteria	Value (acre-feet of groundwater removed from storage)
Minimum Threshold	234,821
2025 Interim Milestone	81,952
2030 Interim Milestone	119,661
2035 Interim Milestone	131,896
Measurable Objective	213,474

4.6.2 Chronic Lowering of Groundwater Levels

Table 4-4 below shows the numerical sustainable management criteria established for representative monitoring sites for chronic lowering of groundwater levels. Figure 4-5a through Figure 4-5j provide graphs of historical and simulated groundwater levels along with the sustainable management criteria.

Table 4-4. Sustainable Management Criteria Summary: Chronic Lowering of Groundwater Levels.

Representative Monitoring Site	Minimum Threshold (ft msl)	2025 Interim Milestone (ft msl)	2030 Interim Milestone (ft msl)	2035 Interim Milestone (ft msl)	Measurable Objective (ft msl)
USBR-01	2,659	2,667	2,667	2,666	2,664
USBR-03	2,139	2,145	2,148	2,151	2,153
USBR-04	2,110	2,118	2,123	2,125	2,126
USBR-05	2,151	2,157	2,156	2,156	2,156
USBR-06	2,166	2,179	2,175	2,173	2,171
MW 32	2,119	2,125	2,131	2,132	2,134
NR-2	2,150	2,157	2,155	2,155	2,155
Kerr McGee	2,138	2,145	2,144	2,144	2,145
Sandquist Spa	2,162	2,168	2,167	2,167	2,167
Steele 31L01	2,140	2,146	2,148	2,150	2,152

4.6.3 Degraded Water Quality

Table 4-5 below shows the numerical sustainable management criteria established for representative monitoring sites for degraded water quality. Figure 4-6a through Figure 4-6f provide graphs of historical TDS concentrations along with the sustainable management criteria.

Table 4-5. Sustainable Management Criteria Summary: Degraded Water Quality.

Representative	Minimum	2025 Interim	2030 Interim	2035 Interim	Measurable

Monitoring Site	Threshold (mg/l)	Milestone (mg/l)	Milestone (mg/l)	Milestone (mg/l)	Objective (mg/l)
USBR-01	ND	ND	ND	ND	ND
IWVWD Well 33	500	310	310	310	310
Owens Peak South Well 01	500	300	300	300	300
IWVWD Well 30	500	341	341	341	240
Hometown Water Association Well 01	500	448	448	448	370
IWVWD Well 11	600	546	546	546	530
Sandquist Spa	ND	ND	ND	ND	ND
22B	ND	ND	ND	ND	ND
West Valley Mutual 01	600	511	511	511	500
USBR-06	ND	ND	ND	ND	ND
NR-2	ND	ND	ND	ND	ND

ND = not determined at this time. As baseline TDS sampling data is gathered, these criteria will be established.

4.6.4 Land Subsidence

Table 4-6 below shows the numerical sustainable management criteria established for land subsidence.

Table 4-6. Sustainable Management Criteria Summary: Land Subsidence.

Sustainable Management Criteria	Value at SNORT Alignment (inches/year)
Minimum Threshold	0.09 inches/year
2025 Interim Milestone	0.04
2030 Interim Milestone	0.04
2035 Interim Milestone	0.04
Measurable Objective	0.04

4.7 GSP PROPOSED MONITORING NETWORK

4.7.1 Proposed Monitoring Network and Schedule

The existing groundwater level monitoring network is very robust for establishing changes in groundwater levels over time throughout the Indian Wells Valley basin and will continue throughout the planning horizon. The ten monitoring wells that have been selected to be representative key wells to monitor sustainable management criteria for chronic lowering of groundwater levels will be monitored semi-annually and reported specifically to track progress toward sustainability. Groundwater level monitoring in the vicinity of GDEs will be added to the existing monitoring network. As data gaps in the groundwater level monitoring program outside of the pumping areas are filled, additional monitoring points will be added to the groundwater level monitoring network.

As discussed in Section 3.6.1.3, the existing TDS database has water quality data from 1920 to present; however, the dataset includes only a limited number of wells, or a one-time sample when the well was drilled. Baseline sampling will be conducted to fill water quality data gaps. Wells reporting under the GAMA program will continue to be monitored. The 11 monitoring wells that have been selected to be representative key wells to monitor sustainable management criteria for degraded groundwater quality will be monitored annually and reported specifically to track progress toward sustainability.

Land subsidence is not currently monitored in the IWVGB, with the exception of infrequent monitoring conducted by the U.S. Navy at established monuments on NAWS China Lake. The IWVGA will coordinate with the U.S. Navy to obtain data related to land subsidence as monitored.

See Section 3.6.1 for discussion of the data gap evaluation of the existing monitoring network for additional information on the proposed changes to the existing monitoring network.

4.7.2 Monitoring Protocols

An integral part of each GSP is to collect, process, and store data necessary to assess the physical condition of the groundwater basin. The data collection and reporting standards shall also be consistent with the Data Management System (DMS) used to support the implementation of the GSP for the IWV.

The goal of the IWV monitoring protocol and reporting standards is to establish a set of monitoring protocols and reporting standards with respect to groundwater levels, groundwater production, groundwater quality, precipitation, streamflow, and evapotranspiration within the IWV watershed. The standards allow IWVGA to assess the sustainable yield for IWVGB to effectively manage groundwater use and production. These standards were developed and maintained in accordance with the BMPs established by DWR. The standards will be re-evaluated by the IWVGA at least every five years to provide for continued efficacy and relevance.

A copy of the full Technical Memorandum entitled "Monitoring Protocols and Reporting Standards", dated October 26, 2018 is included in Appendix 4-C.

4.8 REFERENCES

California Regional Water Quality Control Board Lahontan Region, 2016. *Water Quality Control Plan for the Lahontan Region*. January 2016.

California Regional Water Quality Control Board Lahontan Region, 2016. *Proposed Basin Plan Amendment to Remove the Municipal and Domestic Supply (MUN) Beneficial Use Designation from Certain Ground Water Beneath Naval Air Weapons Station China Lake, Kern, Inyo, and San Bernardino Counties.* Resolution R6V-2015-0005. February 2015.

Dutcher L.C. and W.R. Moyle, 1973. *Geologic and Hydrologic Features of Indian Wells Valley, California.* USGS Water Supply Paper 2007. Prepared in cooperation with the California Department of Water Resources.

California Department of Water Resources (DWR), 2016. *Water Budget Best Management Practice.* Sustainable Groundwater Management Program BMP, 53pp. December, 2016.

J:\2652 IWVGA\08 GSP\Draft_Chapters\Section_4_\Draft text\Section 4\IWVGA_GSP_Section4_SMC_TAC_PAC_review_draft_redline_rev.docx

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 5– PROJECTS AND MANAGEMENT ACTIONS

DRAFT

November 4, 2019

SECTION 5: PROJECTS AND MANAGEMENT ACTIONS

5.1 INTRODUCTION

As established in Section 3, the IWVGB is in critical overdraft. Projects and management actions are required to be implemented in order to respond to changing conditions in the groundwater basin such that undesirable results are avoided and/or mitigated. Groundwater pumping estimates for 2016 indicate that groundwater production in the IWVGB is approximately four times the estimated Current Sustainable Yield of the basin. This level of overdraft, and the current depletion rates of groundwater reserves (see Sections 3.3.4 and 4.3), has already resulted in undesirable results in the basin and it will continue to do so until the IWVGB is brought within the Future Sustainable Yield of the basin. As stated by DWR, "SGMA requires local agencies to develop and implement GSPs that achieve sustainable groundwater management by implementing projects and management actions..." Implementation of the management actions and projects presented below will bring operation of the IWVGB within its Future Sustainable Yield.

While it would be beneficial to immediately reduce all pumping to the Current Sustainable Yield of 7,650 AFY, it is not feasible for the community to make such immediate and drastic reductions without extreme lifestyle changes, alteration of the community character, loss of livelihoods, great financial costs, and other significant negative impacts. Water demands in 2015 for municipal and domestic use alone were greater than the Current Sustainable yield of the IWVGB. A high percentage of the municipal and domestic water demands support the domestic needs of the staff needed to support the mission of NAWS China Lake.

Comment [CA1]: This last sentence does not seem to belong here. It hangs without any context.

It is anticipated that with the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production will reduce to approximately 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation, anticipated to be 2021. This program will greatly reduce the amount of annual overdraft that will continue until supplemental water supplies, Project No. 1 – Imported Water Supply Project, and Project No. 2 – Optimization of Recycled Water Use are implemented.

Comment [CA2]: Does this sentence mean that total pumping, not including agriculture, will be 12,000 AFY in year 1?

Demand management measures, Project No. 3 – Conservation, will be implemented to reduce demands on groundwater.

There will potentially be continuing shallow domestic well impacts, either lost well production capacity due to lower groundwater levels or increasing TDS concentrations, until the IWVGB is operated within the Future Sustainable Yield. Project No. 4 – Shallow Well Mitigation Program, will be implemented to mitigate impacted wells.

The implementation of Augmentation Fees and the Fallowing Program, discussed in Management Action No. 1 below, will lead to a reduction of agricultural operations in the IWVGB. Project No. 5 – Dust Mitigation Plan, discussed below, will be implemented if needed, to mitigate secondary impacts caused by windblown dust due to fallowed agricultural land.

Evaluation of groundwater management and project modeling scenarios showed that some current pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells. Project No. 6 – Optimization of Basin Pumping will be implemented to mitigate these localized conditions.

According to CWC § 354.44, the GSP shall include a description of the projects and management actions that include the following:

1. **A list of projects and management actions** proposed in the GSP with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The GSP shall include the following:
    a. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which an agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.
    b. The process by which an agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

2. If overdraft conditions are identified through the analysis required by Section 354.18, the GSP shall describe projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
3. A summary of the **permitting and regulatory process** required for each project and management action.
4. The status of each project and management action, including a **time-table** for expected initiation and completion, and the accrual of expected benefits.
5. An **explanation of the benefits** that are expected to be realized from the project or management action, and how those benefits will be evaluated.
6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of an agency, an explanation of the source and reliability of that water shall be included.
7. A description of the **legal authority** required for each project and management action, and the basis for that authority within an agency.
8. A description of the **estimated cost** for each project and management action and a description of how the Agency plans to meet those costs.
9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or deletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The proposed projects and management actions are supported by the best available information and best available science and have considered the level of uncertainty associated with the IWVGB basin setting during development.

The IWVGA planned projects and management actions and the potential projects and management actions are discussed in the subsections below. Given the magnitude of overdraft and the current basin conditions, the planned projects and management actions shall be implemented with the earliest feasible timetable.

5.2 PLANNED MANAGEMENT ACTIONS

5.2.1 Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program

5.2.1.1 *Management Action Description*

The primary initial management action is the establishment of annual groundwater pumping allocations ("Annual Pumping Allocations"). These Annual Pumping Allocations will be used for the purpose of assigning pumping fees ("Augmentation Fees") that will in turn provide the funding for the development of supplemental water supplies and other projects and management actions to achieve sustainability. Accordingly, these Annual Pumping Allocations are not a determination of water rights in that they do not prohibit the pumping of groundwater. Rather, all groundwater pumpers continue to possess the right to produce groundwater provided they pay the Augmentation Fee. While this action will not directly limit groundwater extraction by any individual entity, it is anticipated that the costs associated with the Augmentation Fee will result in voluntary pumping reductions and the implementation of additional conservation measures to lower demands.

Comment [CA3]: What will the augmentation fee be? Will the GA determine the fee? Will it be solely based on funding projects, or will it be punitive?

In accordance with California law, water produced within the safe yield [1] of the basin, generally considered to be equal to the long-term average natural recharge of the basin, may be charged a General Administration fee but it shall be free of any Augmentation Fees. Water produced in excess of the safe yield shall be subject to an Augmentation Fee as set forth below. The Federal entities (NAWS China Lake and BLM) are exempt from these fees through the legal principles of sovereign immunity.

The Annual Pumping Allocation program will assign each qualified groundwater pumper an Annual Pumping Allocation of the safe yield, if any, after consideration of:

1) Federal Reserve Water Rights (FRWR) of NAWS China Lake;
2) California water rights;
3) Beneficial use priorities under California Law;
4) Historical groundwater production; and,
5) Municipal requirements for health and safety.

SGMA recognizes FRWR as distinct from water rights that are based in state law and directs that FRWR be respected in full, and in case of any conflict between federal and state law, federal law shall prevail (Water Code Section 10720.3(d)). SGMA also directs that IWVGB consider the interests of all beneficial

[1] The safe yield is equal to the long-term average natural recharge of the basin, currently estimated to be 7,650 AFY. The current estimate of the sustainable yield, defined by SGMA as the maximum quantity of water that can withdrawn annually without causing undesirable results, is also currently estimated to be 7,650 AFY. The sustainable yield may ~~will~~ well change as projects and management actions are implemented that artificially recharge the basin and increase the volume of water that can be withdrawn annually without causing undesirable results.

uses and users of groundwater, listing the federal government, including, but not limited to, the military and managers of federal lands among those interests (Water Code Section 10723.2).

While NAWS China Lake may voluntarily agree to an allocation under the GSP less than its full FRWR, the IWVGA has no legal authority to enforce such an allocation and NAWS China Lake has not provided a final accounting of its FRWR. In recognition of these facts and the acknowledgment of the limits on the IWVGA to regulate the federal government, any such allocation shall be directly assigned to the federal agency and shall not be subject to the requirements of any allocation ordinance, including but not limited to allocation carryovers, borrowing, transfers, reductions and/or variances and fees.

In accordance with SGMA and California Water law, a five-year base period defined as January 1, 2010 through December 31, 2014 ("Base Period") will be used to evaluate groundwater production for all groundwater pumpers, with the exception of NAWS China Lake and de minimis users. An Annual Pumping Allocation, based on California water rights law and historical pumping during the Base Period, will be assigned to groundwater pumpers. The Annual Pumping Allocations will be regularly reevaluated to ensure sustainability.

Comment [CA4]: Exactly how will the pumping allocations be assigned? Will the GA be deciding the priority of California water rights law? Will each pumper be given a priority number based on a matrix of water laws and historical pumping that will be measured against other pumpers? This process is vague. It makes it difficult for individual pumpers to plan for the future.

The IWVGA recognizes that the safe yield is significantly lower than current pumping and some groundwater pumpers with inferior rights will not be granted any Annual Pumping Allocations. As this groundwater may have been put to significant and important economic use and to ease the transition from current pumping levels to sustainable pumping levels, the IWVGA has determined that some additional loss of storage is acceptable and necessary to ease the transition from current pumping to the Future Sustainable Yield. See Section 4 for the sustainable management criteria for the reduction of groundwater in storage.

All groundwater pumpers who were producing groundwater during the Base Period and who are not given an Annual Pumping Allocation will be eligible to receive a Transient Pool Allocation. The Transient Pool, which consists of a limited non-transferable one-time allocation of water to be used prior to 2040, will be created to facilitate coordinated production reductions and to allow groundwater users to plan and coordinate their individual groundwater pumping termination. The Transient Pool Allocation water is a single use, non-transferable, one-time allocation of water, and once all water in the Transient Pool

Comment [CA5]: Who are the groundwater pumpers who are not given an annual Pumping Allocation?

Comment [CA6]: We suggest that this allocation pool be transferrable.

Comment [CA7]: See comment CA6 above.

has been consumed (or sold through the Fallowing Program as set forth below), the Transient Pool will cease. Each party's share of the Transient Pool will be determined pursuant to the same principals of water law used to establish the Annual Pumping Allocations. The total allocations from Transient Pool will be limited to no more than 51,000 acre-feet.

Comment [CA8]: Who is determining the water law? How is that being used to establish each party's share?

Groundwater production in excess of Annual Pumping Allocations and Transient Pool Allocations will be subject to an Augmentation Fee in an amount that is determined to be sufficient for the acquisition of supplemental water supplies pursuant to this plan.

Comment [CA9]: What will this fee be? Exactly how will it be calculated? If there is no groundwater pumping in excess of the annual pumping allocations and transient pool allocations, where will the money for supplemental water supplies come from? This sentence seems to contradict the first paragraph in this section above that describes augmentation fees.

All groundwater pumpers who are assigned a Transient Pool Allocation may be enrolled, at their sole election, in a Fallowing Program. Pursuant to the Fallowing Program, the groundwater pumper may elect to sell their Transient Pool Allocation back to the IWVGA in exchange for a price equal to the fair market value of the overlying lands associated with their shares of the Transient Pool. This payment shall be made in three equal payments to be paid annually. In exchange for this payment, Transient Pool shareholders shall agree to transfer all property interests in their overlying land along with all water rights, if any.

Comment [CA10]: Who is determining "fair market value"?

Comment [CA11]: Isn't this essentially buying the pumpers out?

Given the amount of overdraft and the cost and scarcity of supplemental water supplies (see Section 5.3.2), the IWVGA will allow some reasonable overdraft of the IWVGB due to groundwater production to continue until supplemental water supplies are acquired. It is anticipated that with the implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production is anticipated to reduce to around 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation. Some overdraft will continue until the augmentation program is able to increase supplies with estimated importation supplies becoming operational by 2035, but not later than 2040 to reach sustainability. Under baseline conditions, which assumes no GSP projects and management actions are implemented, annual average pumping from 2020 to 2070 is anticipated to be approximately 37,000 AFY. The Annual Pumping Allocation Plan is anticipated to significantly reduce pumping to an annual average of approximately 14,000 AFY from 2020 to 2070. The difference between pumping and the long-term natural recharge to the IWVGB will be augmented with supplemental water to bring operation of the basin within the Future Sustainable Yield.

Comment [CA12]: There is no plan for the scenario that supplemental water supplies are not acquired.

5.2.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in significantly less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or i~~I~~mprovement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Comment [CA13]: This situation has not definitively been shown to be an undesirable result of groundwater use in the IWVGB.

The corresponding cumulative loss of groundwater in storage under Baseline conditions is estimated to be approximately 1.6 million acre-feet, while the cumulative loss of groundwater storage with the Annual Pumping Allocation Plan, and the proposed projects and management actions, is estimated to be approximately 215,000 acre-feet. These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the ~~IWWGB~~IWVGB, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program will assist with the preservation of ~~NAWS China Lake and~~ the communities in the Indian Wells Valley and surrounding areas.~~y~~.

The metric for measuring management actions benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.2.1.3 *Justification*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program are ~~a necessity~~necessary to reach sustainability due to the current state of overdraft, the current unavailability of a supplemental water supply, and the costs of building the infrastructure and obtaining the supplemental supplies once they become available. The estimated Current Sustainable Yield of 7,650 AFY does not support current groundwater production. As discussed previously, it is infeasible for the community to make such immediate reductions to the Current Sustainable Yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. The distribution and volume of groundwater production in the IWVGB is such that proportional reductions to reach the Current Sustainable Yield are infeasible because the majority of individual groundwater users would not have a large enough allocation to maintain an acceptable quality of life and the drastic community changes would impact the support of NAWS China Lake. Economically viable agricultural operations cannot be sustained with a greatly reduced water supply (pumping allocation) as would be required with a proportional reduction to the Current Sustainable Yield. Similarly, domestic and municipal users would not be able to meet basic health and safety requirements under a proportional reduction allocation. Accordingly, the IWVGA is currently working with groundwater users in the IWV to determine an equitable process for assigning allocations. In order to implement the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, the IWVGA must consider and evaluate the following: 1) FRWR of NAWS China Lake, 2) California water rights, 3) beneficial use priorities, 4) historical groundwater production, and 5) municipal requirements for health and safety.

Under U.S. Supreme Court case law defining the FRWR, federal agencies have an implied right to water to support the primary mission for which Congress and the Federal government have designated that land, including a provision of water for growth to support that mission[2]. It is well established in the Supremacy Clause of the U.S Constitution, Article VI, Clause 2, that the Federal Government is not subject to state regulation, unless Congress clearly and unambiguously waives this sovereign immunity. There is no such waiver for state regulation of groundwater, except in the case of a comprehensive state court adjudication of all rights to water, as expressed in the McCarran Amendment (43 U.S.C § 666). SGMA does not meet the requirements set forth in the McCarran Amendment and the IWVGA is therefore unable to regulate NAWS China Lake.

Due to the NAWS China Lake FRWR being currently unquantified and not established, the IWVGA is faced with planning and management hurdles related to allocations. In June 2019, the U.S. Navy provided the IWVGA documentation regarding historical water use, workforce trends, and current water requirements. This letter, provided in Appendix 5-A, estimates the NAWS China Lake water requirement to be 6,530 AFY. While this U.S. Navy estimate is not NAWS China Lake's FRWR, it demonstrates that the

[2] The FRWR was first recognized by the U.S. Supreme Court in the context of tribal interests (See Winters v. United States, 207 U.S. 564 (1908)) and subsequently expanded to federal agencies (See Cappaert v. United States, 426 U.S. 128 (1976)), Federal Power Commission v. Oregon, 349 U.S. 435 (1955)).

majority, if not all, of the estimated safe yield of 7,650 could be held as a federal right and must be respected by the IWVGA and the GSP. For planning purposes, the U.S. Navy recommended the IWVGA use 2,041 AFY as a reasonable estimate of current and future annual groundwater production on the installation. The Navy's response also expressly provides that, because of the movement of Navy staff and dependents off-Station, "the water requirements of the Navy cannot be determined solely by the Navy's recent direct production amounts". The response further provides that "[s]ince the Navy mission at China Lake requires its workforce, the full Navy water requirements are the combination of the on-Station requirements and those of the Navy workforce and their dependents off-Station." The IWVGA does not have legal authority to restrict, assess, or regulate production for NAWS China Lake; therefore, NAWS China Lake groundwater production is considered of highest beneficial use.

Comment [CA14]: This is a position taken by NAWS China Lake, but is not recognized in any existing water rights laws, regulations or precedents. Does the GA really want to cite this in their GSP as a justification?

According to CWC 10723.2, the IWVGA must "consider the interest of all beneficial uses and users of groundwater…" The groundwater user categories in the IWV currently are:

- Municipal
- Domestic (De Minimis private well owners and mutuals/co-ops)
- City/County
- NAWS China Lake
- Industrial
- Large Agriculture
- Small Agriculture

CWC Section 106 expressly declares that it is "the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." Accordingly, aside from NAWS China Lake production, which cannot be regulated, and use by SGMA defined de minimis pumper, which also cannot be reduced, the highest beneficial use of water in the IWVGB is for domestic purposes including human consumption, cooking, and sanitary uses. In the IWVGB, groundwater pumpers in the domestic category which would provide the highest beneficial use include production by the IWVWD, Inyokern CSD, individual domestic well owners (de minimis pumpers), and mutual water companies serving domestic users. These groundwater pumpers can and should implement additional conservation measures (see Section 5.2.4); however, the allocations for these pumpers would be continual and annual. In addition, the City and Kern County overlying groundwater production rights are superior to all other overlying rights because public entity rights may not be prescribed against.

The beneficial uses of other groundwater users, including agricultural and industrial users, will subsequently be evaluated based on water rights priorities. The IWVGA will allow all IWVGB groundwater pumpers the opportunity to provide documentation on historical groundwater production and other pertinent information. Current groundwater production that has existed and has been continuous prior to the establishment of NAWS China Lake will be given a priority over more recent pumping that has occurred since the IWVGB has been documented to be in overdraft conditions. Accordingly, all groundwater users and uses will be equitably considered and prioritized, as required by SGMA.

Comment [CA15]: For reference, what year was that determined?

5.2.1.4 *Costs*

The IWVGA will incur costs to develop the annual Pumping Allocations and Transient Pool Allocations. There will be administrative costs and engineering costs for conducting hearings, verifying pumping documentation, and preparing the final report to the IWVGA Board with the recommendations, among other implementation tasks, estimating to be $200,000.

The IWVGA will incur administrative costs to implement and manage the Fallowing Program. Additionally, the IWVGA may incur costs to purchase Transient Pool Allocations from groundwater pumpers electing to enroll in the Fallow Program estimated to be $9 million. These costs will be equal to the fair market value of the overlying lands.

Comment [CA16]: Where did this number come from?

Administrative costs to run all program components are estimated to be $40,000 annually.

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program costs will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof. See Section 6.3 for details of funding options.

Comment [CA17]: How will these fees be determined? Will the fees be spread over all the pumpers? Will the Ag pumpers be assessed a fee also? When would the fees be paid? If the Navy and Counties do not pay, will the fees only be covered by the IWVWD, Ridgecrest and Inyokern, Ag and SVM? What is the timetable for covering this amount?

5.2.1.5 *Permitting and Regulatory Process*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program does not require the IWVGA to obtain or issue any permits and the preparation and adoption of a GSP is exempt from Division 13 of the Public Resources Code.

5.2.1.6 *Public Notice*

The public will be given the opportunity and time to present historical pumping documentation provided to the IWVGA. The IWVGA will provide sufficient public notice of a public hearing to adopt the Annual Pumping Allocation and the Transient Pool Allocation. See Section 5.2.1.7 below for additional details.

Comment [CA18]: What is sufficient?

5.2.1.7 *Implementation Process and Timetable*

The IWVGA~~IWVGB~~ shall determine each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation following the adoption of this plan. All groundwater pumpers shall be instructed to submit records of their historical pumping and any other relevant material to the IWVGA prior to March 1, 2020. On or before April 15, 2020, the IWVGA Water Resources Manager shall review these materials and provide a draft recommendation of each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation to each groundwater pumper who submitted materials and to the IWVGA TAC members. By April 30th, 2020, all groundwater pumpers shall submit comments on the draft recommendation to the Water Resources Manager. The Water Resources Manager shall consider these comments and present a final report and recommendation to the IWVGA Board for consideration at its June 2020 meeting. Those receiving a Transient Pool Allocation may elect to join the Fallowing Program by no later than August 1, 2020.

Comment [CA19]: Will these documents be available to the public? Will they be kept confidential by the Water Resources Manager, GA and lawyers?

5.2.1.8 *Legal Authority*

SGMA broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, CWC Section 10726.2 provides the IWVGA with the authority to develop and implement an Annual Pumping Allocation Plan, Transient Pool and Fallowing Program to meet the needs of the basin and CWC Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement the GSP management action set forth above.

Although not subject to formal regulation under SGMA, NAWS China Lake is committed to being a good steward of water resources and to exploring partnerships that help to achieve groundwater sustainability, including projects and management actions that benefit both the Navy and the community.

5.3 PLANNED PROJECTS

5.3.1 Project No. 1: Develop Imported Water Supply

5.3.1.1 *Project Description*

The IWVGA does not currently have access to any water supply from outside of the IWVGB. Procuring an imported water supply will require purchasing water supplies (with all required contractual and/or appurtenant water rights) as well as obtaining access to existing water conveyance facilities and constructing additional infrastructure to bring imported water to the IWVGB. The majority of the IWVGB is within the boundaries of the KCWA, a SWP Contractor. KCWA does not have unused SWP water that can be made available to the IWVGB. A small portion of the southern portion of the IWVGB is within the boundaries of Antelope Valley – East Kern Water Agency (AVEK). The nearest existing imported water conveyance facilities are the Los Angeles Department of Water and Power's (LADWP) Los Angeles Aqueduct (LA Aqueduct) and AVEK's water transmission pipeline that terminates near California City (California City Pipeline). The LA Aqueduct conveys to LADWP's service area surface water runoff from the Eastern Sierra Nevada Mountains in Inyo County as well as groundwater from the Mono Basin in Inyo County (collectively referred to in this section as Owens Valley water). The LA Aqueduct extends through the western portion of the IWVGB, including through the Freeman-Dixie Wash and El Paso areas. The California City pipeline is located at California City, approximately 15 miles south of the IWVGB boundaries and 50 miles south of the City of Ridgecrest.

Comment [CA20]: Explain acronyms

The IWVGA has identified the following two imported water project options as conceptually feasible for potential implementation. Each of the options is briefly described below, and a technical memorandum that more fully describes the projects is included in Appendix 5-B. It is anticipated that either one of the two imported water project options will be fully implemented by 2035.

Option 1: Direct Use Project with AVEK

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be wheeled through existing AVEK facilities, specifically through existing AVEK surface water treatment facilities and the California City Pipeline. AVEK staff has indicated that there is currently unused capacity in the California City pipeline. The California City Pipeline would require an extension of approximately 50 miles along Interstate Highway 14 into the populated centers of the IWVGB. Due to the elevation profiles of the proposed pipeline alignment, at least two (2) pump stations will be required to lift the IWVGA's imported water supplies over the El Paso Mountains and through the El Paso area. A potable water storage tank would also be required. The treated water would be used directly to meet water demands that exceed the long-term natural recharge to the IWVGB. A map of the facilities required for Imported Water Option 1 is shown on Figure 5-1, including approximate locations of pump stations.

Option 2: Groundwater Recharge Project with LADWP

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be delivered to MWD and subsequently provided to LADWP for use in LADWP's service area. In exchange, LADWP would provide Owens Valley water from the LA Aqueduct to the IWVGB for use in a groundwater recharge project. A new turnout from the LA Aqueduct would be required, along with a raw water pipeline conveying Owens Valley water to a potential new spreading grounds located northwest of the Inyokern Airport. The Owens Valley water would be recharged into the IWVGB at the spreading grounds and serve as a supplemental source of recharge to replace any groundwater pumping that exceeds the long-term natural recharge to the IWVGB. A map of the facilities required for the Option 2 project is shown on Figure 5-2, including a preliminary location of the surface spreading grounds.

Comment [CA21]: What is the velocity of recharge movement in the IWVGB at this location? If the recharge movement of water is slow, this spreading ground as a source of groundwater recharge will not do much to offset pumping. In that case, treating the water and using it directly might be a better option.

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Option 1 project will directly meet groundwater demands above the current sustainable yield of the IWVGB. The proposed Option 2 project will replace any groundwater produced above the natural recharge to the IWVGB and allow the IWVGB to be operated within the Future Sustainable Yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Comment [CA22]: See comment CA13 above.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. By reducing groundwater production in the IWWGB, development of imported water supplies will assist with the preservation of China Lake NAWS and the community.

The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.1.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Economically viable agricultural operations and industrial operations cannot be sustained without an augmented water supply. Similarly, current domestic and municipal users would not be able to demands without an augmented water supply. Accordingly, the IWVGA is currently working with potential water supply sellers and transfers partners to secure opportunities to purchase and convey imported water supplies to the IWVGB.

See Section 5.2.1.3 for additional justification.

5.3.1.4 *Costs*

A summary of the conceptual capital costs, water rights acquisition costs, annual operations and maintenance (O&M costs), and annual service costs for the necessary infrastructure for Imported Water Project Option 1 is shown in Table 5-1. Annual O&M for Imported Water Project Option 1 would primarily consist of maintenance on the two pump stations and power to lift water across the El Paso Mountains into the IWVGB. Annual service costs for Imported Water Project Option 1 would consist of transportation, wheeling, and treatment fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5-1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-1. Conceptual Costs for Direct Use Project with AVEK (Imported Water Project Option 1).

Item	Total
Capital Costs[1]	$177,975,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$2,280,000
Annual Service Costs[4]	$5,860,000

Notes:

1) Includes two 8,800 gpm pump stations; a 28" steel pipeline extension approximately 50 miles in length; and a one million gallon steel reservoir

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes pump station maintenance and pump station power supply.

4) Includes estimated State Water Project transportation charges, wheeling charges, and treatment charges.

A summary of the conceptual costs, water rights acquisition costs, annual O&M costs, and annual service costs associated with Imported Water Project Option 2 is shown in Table 5-2. Annual O&M for Imported Water Project Option 2 would primarily consist of maintenance on the IWVGA's new surface spreading grounds. Annual service costs for Imported Water Project Option 2 would consist of transportation and wheeling fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5.1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-2. Conceptual Costs for Option 2: Groundwater Recharge Project with LADWP.

Item	Total
Capital Costs[1]	$55,046,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$180,000
Annual Service Costs[4]	$4,260,000

Notes:

1) Includes a new turnout from the Los Angeles aqueduct; a new 28" steel pipeline approximately 10 miles in length; and an approximately 800-acre surface spreading grounds.

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes spreading grounds maintenance.

4) Includes estimated State Water Project transportation charges and wheeling charges.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.1.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. Imported Water Project Options 1 and 2 will require encroachment permits from Kern County Public Works to secure right-of-way for the IWVGA's new imported water pipelines. The Option 1 project will require an encroachment permit from the California Department of Transportation to secure right-of-way for the new California City pipeline extension along Interstate Highway 14.

An application may need to be submitted to the Bureau of Land Management to secure a Land Use Permit for construction of the new imported water pipelines (Options 1 and 2) and surface spreading grounds (Option 2 only) on lands within the jurisdiction of the Bureau of Land Management.

Implementation of either Imported Water Option is subject to CEQA regulations and would require the preparation of a CEQA Initial Study to determine what, if any, further CEQA review will be required. Due to the presence of lands managed by the China Lake NAWS and by the Bureau of Land Management, implementation of either Imported Water Option may also be subject to National Environmental Policy Act (NEPA) regulations and would require the preparation of a NEPA Environmental Impact Statement. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

If treated water is delivered to the IWVWD for direct use through Imported Water Project Option 1, an amendment to the IWVWD's current Domestic Water Supply Permit from the State Water Resources Control Board – Division of Drinking Water will be required.

Transportation and wheeling of imported water supplies will need either approvals from or agreements with the Department of Water Resources; KCWA; AVEK (for Imported Water Project Option 1 only); and MWD and LADWP (for Imported Water Project Option 2 only).

Per the IWVGA's Joint Powers Authority Agreement, this GSP shall not authorize any water supply augmentation to the IWVGB with groundwater from a basin within the jurisdiction of a general member of the IWVGA without the approval of the Primary Director representing that general member. Any proposal to transfer groundwater from Inyo County to the IWVGB (i.e. under Imported Water Project Option 2) would require the approval of the Inyo County Board of Supervisors, who will consider the existing environmental, agricultural, business, and civic interests in Inyo County in their decision to approve such a proposal. Inyo County Code Section 18.77 requires that any transferor of water pursuant to California Water Code Section 1810 obtain a conditional use permit (CUP) from the Inyo County Planning Commission (ICPC). The CUP would only be approved should the ICPC—as well as the Inyo County Water Commission and the Inyo County Water Department—find that the transfer of water does not unreasonably affect the environmental interests of Inyo County.

5.3.1.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the procurement of imported water supplies through the project's CEQA and NEPA processes.

5.3.1.7 *Implementation Process and Timetable*

The IWVGA has retained the services of Capitol Core Group, a water marketing and lobbying firm, to identify potential water supplies available for purchase as well as potential funding opportunities for the Imported Water Project Options. Capitol Core Group has provided the IWVGA with written deliverables outlining the potential future water supply opportunities available for the IWVGA to purchase and the potential strategic funding plans to pay for the infrastructure associated with the Imported Water Project Options. These written deliverables are confidential and are neither provided nor discussed in this GSP.

The IWVGA will continue to develop an imported water project as a post-GSP action. The IWVGA will meet with AVEK to discuss use of the existing California City pipeline capacity and the transfer agreements with DWR, KCWA, and AVEK. The IWVGA will also meet with LADWP to discuss Inyo County public approval, the nature of the exchanges with MWD and LADWP, and the transfer agreements with DWR, KCWA, LADWP, and MWD. The IWVGA will also conduct additional engineering studies of both Imported Water Project Options. It is anticipated that final selection of the most feasible Imported Water Project Option will occur in January 2023 after preparation of an engineering report and negotiation with the relevant transfer agencies. It is anticipated that the permitting and regulatory process will commence in January 2023 and will be completed in January 2026. Design, permitting, and construction of the infrastructure for the final Imported Water Project Option will begin in January 2026 and will be completed in January 2035.

Comment [CA23]: Is the cost of these studies included in the capital costs listed above? This is a non-trivial amount.

Comment [CA24]: See comment CA23.

5.3.1.8 *Legal Authority*

SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation

(California Water Code Section 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface or groundwater into the agency, and conserve and store within or outside the agency that water for any purpose necessary or proper to carry out the provisions of this part, including, but not limited to, the spreading, storing, retaining, or percolating into the soil of the waters for subsequent use or in a manner consistent with the provisions of Section 10727.2." Accordingly, SGMA grants the IWVGA the legal authority to implement the development of imported water supplies as a GSP management action.

5.3.1.9 *Source and Reliability*

Imported Water Project Options 1 and 2 will require the IWVGA to secure temporary transfer(s) or a single permanent transfer of external water supplies from a water district or water rights holder. The water rights acquisition costs shown in Tables 5-1 and 5-2 assume that the IWVGA will be able to secure a permanent transfer of SWP Table A Entitlement. The annual availability of SWP water supplies is highly variable due to hydrologic conditions. From 2007-2016, total historical annual deliveries of Table A allocation ranged from 475 TAF in 2014 (approximately 11% of the total Table A entitlement) to 2,901 TAF in 2011 (approximately 70% of the total Table A entitlement). The ten-year average of Table A deliveries from 2007-2016 was 1,778 TAF, but the running long-term average of Table A deliveries is currently **2,571 TAF**, or approximately **62%** of the total Table A entitlement (DWR 2018).

The hydrologic variability of SWP and other external water supplies may be addressed through water banking. The IWVGA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the IWVGB. Participation in a groundwater banking program would improve the reliability of the IWVGA's purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries. Participation in a groundwater banking program may also allow the IWVGA to purchase additional water supplies during wet periods. The potential groundwater banks in relative proximity to the IWVGB include:

- Willow Springs Water Bank

- Semitropic Water Storage District
- Rosedale Rio Bravo Water Storage District
- AVEK Water Banks
    - Westside Water Bank, Eastside Water Bank, and High Desert Water Bank
- Kern Water Bank

The IWVGA will continue to evaluate the availability and reliability of external water supplies, including SWP water supplies, in its effort to define the most feasible Imported Water Project Option. The IWVGA will also continue to evaluate potential groundwater banking opportunities to enhance the reliability of its purchased water supplies.

5.3.2 Project No. 2: Optimize Use of Recycled Water

5.3.2.1 *Project Description*

The IWVGA, working with the City of Ridgecrest (City), will optimize the use of recycled water supplies in the IWVGB. The City currently operates an existing 3.6 million gallon per day (MGD) WWTF[3] located on the NAWS base, approximately 3.5 miles northeast of the City center. Annual average day flows at the WWTF were approximately 2.44 MGD in 2017, or approximately 2,739 AFY. The City WWTF produces recycled water that is currently applied at a City site for irrigation of alfalfa fields with a recycled water demand of approximately 220 AFY, and at the China Lake NAWS for irrigation of a golf course with a recycled water demand of approximately 500 AFY. The remaining treated wastewater generated at the City WWTF—approximately 2,010 AFY—is discharged to evaporation/percolation ponds at the City WWTF site. A portion of the treated wastewater discharged to the evaporation/percolation ponds serves as seepage flow to the Mojave Tui Chub habitat, located north of the City WWTF. It has been estimated that the annual water demands to maintain the habitat is approximately 805 AFY (ERS 1991). The existing uses of recycled water in the IWVGB are discussed further in Section 2.7.5 of this GSP.

[3] A Memorandum of Agreement dated April 1, 1993, between the Navy and the City states that the City owns and operates the WWTF, though there is a general lack of consensus among the IWVGB stakeholders regarding the ownership and operations of the WWTF. The term "City WWTF" is used in this GSP for the sole purpose of distinguishing between the two existing WWTFs in the IWVGB.

The City of Ridgecrest's existing WWTF is currently the only facility which generates a recycled water supply for direct beneficial or controlled use within the IWVGB. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The new recycled water facilities would provide up to 1.8 MGD (2,016 AFY) of recycled water for City use in landscape irrigation and/or groundwater recharge (Provost & Pritchard, 2015).

Comment [CA25]: At what point is the city in its planning process. Is it likely that the city will go forward with its upgrade?

The IWVGA will coordinate with the City to further optimize the use of recycled water in the IWVGB. The IWVGA has identified the following three (3) recycled water subprojects as conceptually feasible for potential implementation in accordance with this GSP.

- Recycled Water Subproject 1 – Landscape Irrigation in the City and the China Lake NAWS
- Recycled Water Subproject 1a – Landscape Irrigation at Cerro Coso Community College
- Recycled Water Subproject 2 - Groundwater Recharge

Each of the IWVGA's recycled water subprojects is briefly described below. A technical memorandum that more fully describes the recycled water subprojects is included in Appendix 5-C. Further evaluation of the other potential opportunities for recycled water subprojects in the IWVGB (including industrial use of recycled water) will be conducted as a post-GSP action.

Recycled Water Subproject 1: Landscape Irrigation in the City and the China Lake NAWS

The City currently operates five (5) groundwater wells that provide irrigation for approximately 53 acres of landscaping located at City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Indian Wells Valley Water District (Water District) serves a large portion of the City, and it is assumed that the Water District provides groundwater for landscape irrigation within City boundaries with the exception of City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Navy operates wells that provide groundwater for landscape irrigation within the China Lake NAWS.

Under Recycled Water Subproject 1, the IWVGA will replace the groundwater currently used for landscape irrigation within the City and the China Lake NAWS with recycled water. Approximately 119 acres of existing landscaping have been identified within the City (95 acres) and the China Lake NAWS (24 acres) for potential landscape irrigation with recycled water (see Appendix 5-C). The estimated annual recycled water demand for landscape irrigation within the City and China Lake NAWS for Recycled Water Subproject 1 is estimated to be 930 AFY. The new facilities for Recycled Water Subproject 1 include a new 5,100 gpm recycled water booster pump station; approximately 15 miles of new purple pipe distribution system; and site retrofits for existing landscape areas including connections to existing irrigation mains, recycled water meters, pressure-reducing valves, and backflow prevention devices. A map of facilities required for Recycled Water Subproject 1 is shown on Figure 5-3.

Recycled Water Subproject 1a: Landscape Irrigation at Cerro Coso Community College

Under Recycled Water Subproject 1a, the IWVGA will extend the recycled water distribution system from Recycled Water Subproject 1 to replace existing groundwater use for landscape irrigation at Cerro Coso Community College (Cerro Coso) with recycled water. Approximately 25 acres of landscaping at Cerro Coso have been identified for potential irrigation with recycled water, and the estimated annual recycled water demand at Cerro Coso is approximately 194 AFY. The facilities to be constructed under Recycled Water Subproject 1 as well as additional new facilities will be required to deliver 194 AFY of recycled water to Cerro Coso. The additional new facilities include an additional 900 gpm recycled water booster pump station; approximately 4 miles of additional purple distribution pipe; and appropriate site retrofits at Cerro Coso. A map of facilities required for Recycled Water Subproject 1a is shown on Figure 5-4.

Comment [CA26]: The cost to deliver 194 AFY is $10M plus annual costs of $129K. That is $665 per AF not including capital costs of $250,000 per year over 20 years. Is Cerro Coso going to pay these costs? Maybe they should reduce their landscaping.

Recycled Water Subproject 2: Groundwater Recharge

Under Recycled Water Subproject 2, the IWVGA will further treat the produced recycled water supplies at the City WWTF for groundwater recharge through subsurface applications (deep injection). A recycled water groundwater recharge project through surface applications (surface spreading grounds) would not be feasible due to the limiting geologic and hydrogeologic conditions in the vicinity of the City WWTF. The presence of thick lacustrine clay layers and the minimal groundwater flow between water-bearing zones would prevent surface application of recycled water in the vicinity of the City WWTF from recharging the active production zones in the IWVGB. For effective recharge of the IWVGB, deep injection facilities will be required for Recycled Water Subproject 2.

The IWVGA estimates that approximately 352 AFY of recycled water will be available for groundwater recharge under Recycled Water Subproject 2. Additional quantities of recycled water for groundwater recharge may become available should any of the existing recycled water practices, such as maintaining seepage flow to the Tui Chub habitat (see Section 2.7.5.3), be discontinued.

The new facilities for Recycled Water Subproject 2 include new advanced wastewater treatment facilities; a new 300 gpm recycled water booster pump station; approximately 3 miles of new transmission pipeline; and deep injection wells. The City has developed efforts independent of this GSP to construct a new WWTF including tertiary treatment facilities with the capacity to treat 1.8 MGD (2,016 AFY) of wastewater. In accordance with the provisions for subsurface applications of recycled water as published in Title 22 Section 60320.201 of the California Code of Regulations, the recycled water supplies produced for deep injection must undergo advanced treatment through reverse osmosis and advanced oxidation. The IWVGA will construct the appropriate advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation) solely for the recycled water produced for groundwater recharge through deep injection. A map of facilities required for Recycled Water Subproject 2 is shown on Figure 5-5.

5.3.2.2 *Project Benefits and Mitigation of Overdraft*

The proposed Recycled Water Subprojects 1 and 1a will directly reduce groundwater produced above the current sustainable yield of the IWVGB for landscape irrigation. The proposed Recycled Water Subproject 2 will replace some groundwater produced above the natural recharge to the IWVGB and contribute to allowing the IWVGB to be operated within the future sustainable yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;

- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Comment [CA27]: See comment CA13 above.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. In addition, the proposed project will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, optimization of recycled water supplies will assist with the preservation of China Lake NAWS and the community.

The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.2.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions to in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Accordingly, the IWVGA plans to work with the City to generate new recycled water supplies for replacement of existing groundwater uses in landscape irrigation and for augmentation of the current natural recharge to the IWVGB. Existing groundwater uses for landscape irrigation should be replaced with non-potable water supplies (i.e. recycled water) to the greatest extent feasible so that groundwater may be produced primarily for domestic purposes.

See Section 5.2.1.3 for additional justification.

5.3.2.4 *Project Costs*

The City's independent efforts to construct a new WWTF include construction of tertiary treatment facilities to treat up to 1.8 MGD (2,016 AFY) of wastewater. The tertiary treatment capacity developed as part of the City's independent efforts is sufficient to treat 930 AFY of recycled water for Recycled Water Subproject 1 as well as the quantities of recycled water for Recycled Water Subprojects 1a and 2 discussed below. Therefore, the conceptual costs for the recycled water subprojects described below do not include estimates to construct new tertiary treatment facilities.

Comment [CA28]: If the costs do not include the City's costs for development of a new and/or expanded WWTF, what are the city's costs? How does the city plant to pay for the expansion? Is part of the cost going to be borne by the ratepayer? If the city cannot pay, will the IWVGA pick up those costs?

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1 is shown in Table 5-3. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1 include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-3. Conceptual Costs for Recycled Water Subproject 1: Landscape Irrigation with Recycled Water at City/China Lake NAWS.

Item	Total
Capital Costs [1]	$42,757,200
Annual Operations & Maintenance Costs [2]	$395,500

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1a is shown in Table 5-4. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1a include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-4. Conceptual Costs for Recycled Water Subproject 1a: Landscape Irrigation with Recycled Water at Cerro Coso Community College

Item	Total
Capital Costs[1]	$10,183,200
Annual Operations & Maintenance Costs[2]	$129,300

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

It should be noted that the required facilities for Recycled Water Subproject 1a are considered an extension of the facilities required for Recycled Water Subproject 1. The costs presented above and in Table 5-4 are considered incremental extensions of the costs listed in Table 5-3.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 2 is shown in Table 5-5. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 2 include annual maintenance and power supplies for the new recycled water pump station, annual maintenance of the purple pipe distribution system, and annual maintenance of the advanced wastewater treatment facilities.

Table 5-5. Conceptual Costs for Recycled Water Subproject 2: Deep Injection with Recycled Water for Groundwater Recharge

Item	Total
Capital Costs[1]	$22,798,000
Annual Operations & Maintenance Costs[2]	$480,300

Notes:

1) Includes new purple pipe distribution pipelines; a 300 gpm recycled water pump station; advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation with UV/H_2O_2); and a 500 gpm deep injection well.

2) Includes pump station maintenance, pump station power supply, distribution system maintenance, and advanced treatment facilities maintenance.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.2.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. The City will need to obtain a new National Pollutant Discharge Elimination System (NPDES) permit from the Lahontan Regional Water Quality Control Board (LRWQCB) for the new wastewater treatment facility. The IWVGA will need to prepare a Report of Waste Discharge for the new advanced wastewater treatment facilities and submit an application to the LRWQCB for a Waste Discharge Requirements/Water Reclamation Requirements (WDR/WRR) permit for a new groundwater replenishment project using recycled water. In accordance with the regulations for Groundwater Replenishment Reuse Projects (GRRPs) through subsurface application (per California Code of Regulations, Title 22, Division 4, Chapter 3, Article 5.2), the IWVGA will also need to submit and have approved by the State Water Resources Control Board – Division of Drinking Water a Title 22 Engineering Report to obtain the WDR/WRR permit.

The City's existing wastewater treatment facility is located within the boundaries of the China Lake NAWS. An easement permit from the U.S. Navy may be required to modify the existing wastewater treatment facility and/or to construct the recycled water pipelines for Recycled Water Subprojects 1, 1a, and 2.

Construction of the recycled water distribution system and transmission pipelines may require encroachment or excavation permits from the City.

Implementation of this project is subject to California Environmental Quality Act (CEQA) regulations and would require the preparation of a CEQA Initial Study. Due to of the need for easements on land managed by the China Lake NAWS, implementation of this project may also be subject to National Environmental Policy Act (NEPA) regulations and may require the preparation of a NEPA Environmental

Impact Statement. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

5.3.2.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the optimization of recycled water supplies through the project's CEQA and NEPA processes.

5.3.2.7 *Implementation Process and Timetable*

Prior to implementing the optimization of recycled water supplies, the IWVGA will coordinate with and assist the City in its independent efforts to relocate, expand, and enhance the existing City WWTF. It is anticipated that the recycled water permitting and regulatory process will commence in January 2022 and will be completed in January 2023. Construction of the infrastructure for the Recycled Water Subprojects will begin in January 2023 and will be completed in January 2025.

Comment [CA29]: Due to the variety of entities that will probably need to be involved in the permitting and review processes, this timetable seems optimistic, especially given the constraints mentioned in 5.3.2.9. In addition, the funding needed for these projects may not be available on such a short timeline.

5.3.2.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "transport, reclaim, purify, desalinate, treat, or otherwise manage and control polluted water, wastewater, or other waters for subsequent use in a manner that is necessary or proper to carry out the purposes of this part." Accordingly, SGMA grants the IWVGA the legal authority to implement the optimization of recycled water supplies as a GSP management action.

5.3.2.9 *Source and Reliability*

The IWVGA's recycled water subprojects will rely on the availability of treated effluent generated at the City WWTF. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The City has taken steps to initiate the City WWTF modifications/relocation, but progress on the City WWTF modifications/relocation is currently at a halt pending land use negotiations with the NAWS China Lake. The IWVGA's recycled water subprojects will build upon the tertiary treatment facilities that the City plans to construct at its new WWTF. Before implementation of the IWVGA's recycled water subprojects can commence, the City must complete negotiations with the NAWS China Lake and construct the modified/relocated City WWTF.

5.3.3 Project No. 3: Basin-wide Conservation Efforts

5.3.3.1 *Project Description*

An additional project is to develop additional voluntary and rebate-based conservation efforts for domestic beneficial uses in the IWVGB, and to also promote additional conservation efforts for the other beneficial uses (primarily industrial) that rely on groundwater from the IWVGB.

The IWVGA will confer with domestic and municipal groundwater producers (namely the Water District, City, Navy, SDWC, Inyokern Water District and private/domestic well owners) to discuss historical and current conservation measures, which will be used as a guide to establish the new voluntary conservation measures on a basin-wide level. Specifically, the IWVGA will review the current conservation measures governing landscape irrigation, wash-downs, and other practices that potentially waste water that could be directed toward for higher beneficial uses. The IWVGA may also determine the health and safety water use requirements for domestic water use in the IWVGB and use these requirements as another guide to establish the new voluntary conservation measures. The IWVGA will retain the services of a professional water conservation consultant to prepare a Water Conservation Strategic Plan that will incorporate the IWVGA's discussions with domestic and municipal groundwater producers as well as the IWVGA's evaluation of health and safety water use requirements ~~in the IWVGB~~for all communities served by the IWVGB. The IWVGA will implement the Water Conservation Strategic Plan in all domestic and municipal uses of groundwater in the IWVGB.

Comment [CA30]: The Searles Domestic Water Company (SDWC) should also be mentioned here because it is a PUC regulated domestic water district.

Historically, the Water District, the City, and the Navy have implemented mandatory water use restrictions within their service areas/jurisdictions in an effort to reduce groundwater production in the IWVGB (see Section 2.7.3). The IWVGA will build upon the historical and current mandatory water use restrictions to potentially establish new basin-wide mandatory conservation measures that will reduce per-capita water demands for domestic and recreational (irrigation) uses of groundwater to the greatest extent feasible. The new basin-wide mandatory conservation measures would also be enforced in the communities outside of the IWVGB that rely on groundwater from the IWVGB—namely the communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley.

Comment [CA31]: This management action will require participation of the Searles Domestic Water Company (SDWC) which is a PUC regulated entity. According to *10730.1. NOTICE TO CPUC*
A groundwater sustainability agency, before imposing or increasing a fee pursuant to Section 10730 or 10730.2 relating to a groundwater basin that includes a water corporation regulated by the Public Utilities Commission, shall notify the Public Utilities Commission.

The results of the IWVGA's Water Conservation Pilot Project (Rebate Program and Water Audit, Leak Detection, and Leak Repair Program) for Severely Disadvantaged Communities will be evaluated for potential implementation on a basin-wide level, including those severely disadvantaged communities located in Searles Valley that are dependent on the groundwater transported from the IWVGB. Pending evaluation of the Rebate Program, the IWVGA may implement a basin-wide rebate program to promote the installation of water-conserving fixtures and appliances. Pending evaluation of the Water Audit, Leak Detection, and Leak Repair Program, the IWVGA may oversee a basin-wide leak detection and repair effort to reduce system water losses in the IWVGB.

The IWVGA will also coordinate with Searles Valley Minerals~~,~~ Inc. (SVM) to investigate the potential for and feasibility of conservation in the industrial water uses of SVM. The IWVGA will reach out to SVM staff to discuss the historical conservation measures that have been implemented in SVM's mineral recovery process. In ~~coordination~~ conjunction with SVM staff, the IWVGA will also ~~determine~~ explore if SVM's mineral recovery process may be supplied with non-potable water resources such as recycled water and/or brackish water. If so, the IWVGA will conduct a feasibility study on the infrastructure and cost required to convey non-potable water resources to SVM for use in the mineral recovery process, including all necessary retrofits to SVM's existing mineral recovery facilities. If SVM's use of recycled and/or brackish water is determined to be feasible, the IWVGA will construct new facilities for production and conveyance of recycled and/or brackish water to SVM.~~, as well as all necessary retrofits to SVM's existing mineral recovery facilities~~.

5.3.3.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Comment [CA32]: See comment CA13.

These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the preservation of NAWS China Lake and the surrounding supporting communities will be upheld.

The metric for measuring management actions benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.

5.3.3.3 *Justification*

Due to the current state of overdraft and the current unavailability of supplemental water supplies, further developing and expanding current conservation efforts are a necessity to reach sustainability. The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. In addition, the high cost to acquire and convey supplemental water supplies will impact the financial status of the IWVGB's residents and local entities. Accordingly, the IWVGA must work with groundwater users in the IWVGB to implement basin-wide conservation measures that will minimize groundwater production and therefore minimize the quantity (and cost) of supplemental water required to reach future basin sustainability.

5.3.3.4 *Project Costs*

At this time, there are no capital costs anticipated with implementing basin-wide conservation efforts. The IWVGA will dedicate approximately $20,000 annually to find opportunities for additional conservation and implement the new basin-wide conservation measures. The associated costs will consist of evaluating current conservation measures, determining opportunities for additional conservation, conducting public outreach, meeting with groundwater producers, and drafting and adopting conservation ordinances.

Comment [CA33]: Does this cost include the cost to "retain the services of a professional water conservation consultant to prepare a Water Conservation Strategic Plan" mentioned in 5.3.3.1?

The costs for implementing basin-wide conservation efforts may increase should the IWVGA determine that the Water Conservation Pilot Project for Severely Disadvantaged Communities be implemented at a basin-wide level. The costs associated with a basin-wide Rebate Program would consist of advertising, marketing, customer service, processing rebate applications, purchasing water-conserving fixtures and appliances, vendor coordination, and issuing rebates. The costs associated with a basin-wide Water Audit, Leak Detection, and Repair Program would consist of conducting water audits, conducting leak detection surveys, reporting distribution system and storage leak occurrences, and repairing identified leaks.

The costs for implementing basin-wide conservation efforts may also increase should the IWVGA pursue conservation efforts in SVM's mineral recovery process. The associated costs would consist of coordination, meetings, and site tours with SVM staff; review of SVM's historical conservation measures; and analysis of opportunities for additional conservation in the mineral recovery process. Should the IWVGA and SVM conclude that SVM's mineral recovery process may use non-potable water supplies (recycled and/or brackish water), other associated costs would consist of preparing a feasibility study and engineering report, permitting, construction of recycled/brackish water production facilities, construction of recycled/brackish water conveyance facilities, ~~and installation of all necessary retrofits to SVM's existing mineral recovery facilities.~~

Comment [CA34]: The costs for this are on the order of tens of millions as a low estimate.

Costs may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.3.5 *Permitting and Regulatory Process*

This management action currently does not require the IWVGA to obtain approved permits. However, should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, construction of infrastructure to convey recycled and/or brackish water to SVM may be subject to the CEQA and NEPA regulatory processes, as well as the appropriate state and local permits.

Comment [CA35]: This management action will require participation of the Searles Domestic Water Company (SDWC) which is a PUC regulated entity. It is possible that the PUC will need to be involved in this action.

5.3.3.6 *Public Notice*

The public will be given notice of the IWVGA's adoption of ordinances that would enforce any additional conservation measures. As part of marketing the new voluntary conservation measures, the public will be provided with materials documenting the opportunities for voluntary conservation as well as the associated rebates issued by the IWVGA.

Should the IWVGA implement a Rebate Program on a basin-wide level, including those communities located in Searles Valley, the public will be provided with materials documenting the methods by which domestic and municipal groundwater producers may apply for rebates for water-conserving fixtures and appliances. Should the IWVGA implement a Water Audit, Leak Detection, and Leak Repair Program, members of the public that own or operate a groundwater production and distribution system will be provided with opportunities for a consultant to conduct system water audits with leak detection surveys and repairs to minimize system water losses.

Should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, the public will be provided with the opportunity to participate in the required CEQA and NEPA regulatory processes.

5.3.3.7 *Implementation Process and Timetable*

Prior to implementing basin-wide conservation measures, the IWVGA will determine acceptable conservation measures based on an analysis of historical current conservation measures enforced by the Water District, the City, and the Navy, as well as health and safety requirements for water use in the IWVGB. The IWVGA will confer with domestic and municipal groundwater producers to discuss opportunities for additional water conservation. The IWVGA will also retain its professional water conservation consultant to develop a Water Conservation Strategic Plan. It is anticipated that the Water Conservation Strategic Plan will be completed by no later than January 2023 and will be implemented over the GSP planning and implementation horizon.

The IWVGA's Water Conservation Pilot Program for Severely Disadvantaged Communities is expected to be completed by December 2020. The results of the Pilot Program will be evaluated by IWVGA staff for potential basin-wide implementation, which is tentatively planned for no later than January 2023.

IWVGA will coordinate with SVM staff starting as soon as practical regarding ~~potentially~~possible additional opportunities for conservation in SVM's mineral recovery process. A feasibility study and engineering report describing the potential for SVM to use recycled and/or brackish water ~~in the mineral recovery process~~ will be completed as soon as practical. If SVM use of recycled and/or brackish water is technologically and financially feasible, construction of new production facilities and~~,~~ conveyance infrastructure~~, and site retrofits for SVM~~ will commence no later than January 2025.

5.3.3.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code 10725.2). Specifically, California Water Code Section 10726.4 grants the IWVGA authority to "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells". California Water Code Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement basin-wide conservation measures as a GSP management action.

5.3.4 Project No. 4: Shallow Well Mitigation Program

5.3.4.1 *Project Description*

As discussed in Section 3.3.4.4, the IWVGB has been in overdraft ~~overdrafted~~ for many decades resulting in a significant lowering of the regional and local groundwater elevations, and a significant reduction in the amount of useable groundwater in storage. In addition, the IWVGB has areas with ~~poor water quality~~ water of poor quality (specifically high total dissolved solids) which has migrated to areas that previously had higher quality groundwater, resulting in water quality impacts to some wells. Most of the impacted wells are "shallow" wells, constructed to serve rural domestic/mutual water companies, small agricultural, and livestock water supply needs. Shallow well impacts are a direct result ~~from~~ of both the chronic lowering of groundwater levels and degraded water quality, and therefore a Shallow Well Mitigation Program is necessary to offset undesirable results that may occur before reaching sustainability in the IWVGB. ~~reach IWVGB sustainability~~.

The IWVGA will prepare a mitigation plan (Shallow Well Mitigation Plan) to address the approximately 872 shallow wells in the IWVGB. The Shallow Well Mitigation Plan will include the development of criteria to characterize the level of impacts and the development of an evaluation process to access the viability of the wells. Shallow wells that experience impacts related to chronic lowering of groundwater levels and/or degraded water quality that have occurred after February 1, 2020 are eligible for mitigation, pending the evaluation of the impacts. The evaluation process will include, but not be limited to, analysis of:

1) loss of efficiency/performance reduction
2) the appropriateness of the original well design and construction
3) water level and water quality impacts, and
4) the percentage (if any) of well owner's mitigation responsibility.

The Shallow Well Mitigation Plan will also outline the process by which individual well owners can apply and submit wells for evaluation and consideration for mitigation by the IWVGA, including the evaluation and review process the IWVGA's Water Resources Manager will follow to process the applications and make recommendations to the IWVGA Board.

After the adoption of the Shallow Well Mitigation Plan, in appropriate intervals throughout the planning horizon, shallow wells will be evaluated based on the adopted criteria and organized into specific areas/zones for development of effective mitigation options. Some wells may be proposed to be abandoned (not mitigated) based on evaluation of impacts. Specific improvements will be identified for impacted shallow well which may include deepening the well, replacing the well, connecting to existing water systems, or other mitigation measures. The wells recommended for mitigation will be placed on an Impacted Shallow Well Priority List and will be scheduled for mitigation.

5.3.4.2 *Project Benefits and Mitigation of Overdraft*

The proposed Shallow Well Mitigation Project will directly mitigate impacts due to the following:

- Reduction of groundwater in storage;
- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Shallow Well Mitigation program will provide a direct benefit to beneficial users in the IWVGB who have unreasonably experienced water supply and financial hardships due to overdraft conditions in the IWVGB. Many of the beneficial users that will benefit from the implementation of this project are members of disadvantaged communities. The implementation of the other proposed projects and management actions will also improve groundwater conditions and are anticipated reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E).

The metric for measuring project benefits will be the number of shallow wells that are impacted and mitigated under this program.

5.3.4.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Shallow Well Mitigation Program to mitigate undesirable results caused by chronic lowering of groundwater levels and degraded water quality that are directly impacting individual well owners and directly impacting their ability to meeting potable water demands, including demands for basic health and safety.

5.3.4.4 *Project Costs*

The estimated cost to develop the Shallow Well Mitigation Plan is $70,000. The estimated annual cost~~s~~ to administer the program is $20,000. The model results for the proposed projects and management actions indicate that potentially 22 shallow wells could be impacted. The estimated cost~~s~~ to mitigate these impacts is $1.65 million.

5.3.4.5 *Permitting and Regulatory Process*

The shallow well mitigation effort will require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. Furthermore, implementation of shallow well mitigation measures is anticipated to require a series of permits and approvals, including~~ but limited to~~, access agreements, construction permits, and indemnification agreements. The IWVGA will conduct a CEQA review to identify potential impacts for some mitigation projects. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.4.6 *Public Notice*

The public will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.4.7 *Implementation Process and Timetable*

The Shallow Well Mitigation Plan will be developed to describe the process and criteria used to evaluated impacted shallow wells and the process by which well owners can submit their wells for consideration for mitigation by the IWVGA. It is anticipated the Shallow Well Mitigation Plan will be developed by December 2020, with implementation of mitigation measures continuing throughout the planning horizon. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Shallow Well Mitigation Plan. In appropriate intervals throughout the planning horizon, shallow wells will be evaluated in accordance with the Shallow Well Mitigation Plan and the Impacted Shallow Well Priority List will be available for public review prior to implementing mitigation.

5.3.4.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Shallow Well Mitigation Program.

5.3.5 Project No. 5: Dust Control Mitigation Program

5.3.5.1 *Project Description*

Section 5.2.1 identifies the first planned management action as implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. Implementation of this management action will potentially result in an ~~potential~~ increase in windblown dust and sand~~, due to the climate of the IWV~~, which must be mitigated concomitant with decreased agricultural water use.

The IWVGA will prepare a study (Dust Control Mitigation Plan) to investigate best management practices to address windblown dust and sand that can be used on fallowed agricultural land and to identify the location and magnitude of the potential need for dust control. In 1991, the "Dustbusters Research Group" was formed to develop "…best management practices for mitigating wind erosion, reducing blowing dust and improving air quality" in the Antelope Valley, which has comparable issues as the IWV regarding windblown dust. (Agricultural Guide to Controlling Windblown Sand and Dust, October 2010). Mitigation measures applicable to farmland that do not require addition water use include, but are not limited to, the following:

- Wind breaks/wind barriers: According to the Agricultural Guide to Controlling Windblown San and Dust, wind typically does not lift sand much more than three feet into the air. Consequently, the wind breaks/wind barriers create a "trap" which interrupts to transport of blowing sand and causes the sand to deposit at the site of the wind break. Wind breaks may include, but are not limited to, solid or porous fences, straw bales, tilling soils to create surface roughness, and berms.

- Mulch: According to the Agricultural Guide to Controlling Windblown Sand and Dust, surface coverings to address blowing dust may include, but are not limited to, mulch (wood chips, gravel, and /or plastic products) and chemical dust suppressants.

Based on the results of the Dust Control Mitigation Plan and ~~what~~ which current IWVGB farms voluntarily fallow agricultural land, critical areas will be identified and prioritized for mitigation. The IWVGA initially will monitor dust issues as agricultural practices continue and are gradually phased out, to create a baseline by which to compare and evaluate future mitigation needs. IWVGA will continue to monitor the occurrence of windblown dust and sand and implement proactive mitigation measures as identified in the Dust Control Mitigation Plan.

5.3.5.2 *Project Benefits and Mitigation of Overdraft*

The proposed Dust Control Mitigation Program will directly mitigate secondary impacts caused by implementing necessary management actions to address impacts caused by the following sustainability indicators:

- Reduction of groundwater in storage; and
- Chronic lowering of groundwater levels;

The Dust Control Mitigation Program will provide a direct benefit to beneficial users in the IWVGB that may experience undesirable secondary impacts related to the reduction in vegetation and the reduction of use of applied water on agricultural lands. Implementation of mitigation efforts which do not involve use of water will result in an effective replacement of vegetation, and contribute to long-term decreased groundwater use.

The metric for measuring project benefits will be the number of acres of fallowed agricultural lands that have dust control mitigation measures implemented.

5.3.5.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement Management Action 1 (Annual Pumping Allocation Plan, Transient Pool and Fallowing Program) which may cause secondary impacts related to dust that must also be mitigated to achieve sustainability and prevent undesirable results in the IWVGB. If the Dust Control Mitigation Program is not implemented, IWV residents may ~~over time~~ experience impacts to finances, health, and quality of life as a result of unmitigated windblown dust and sand.

5.3.5.4 *Project Costs*

The estimated cost to develop the Dust Control Mitigation Plan is $70,000. The estimated annual cost~~s~~ to administer the program is $20,000. The estimated costs to mitigate these impacts may be up to $19 million.

5.3.5.5 *Permitting and Regulatory Process*

The study of the dust control mitigation effort will likely require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. However, implementation of dust control measure will like include a series of permits and approvals, including but not limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will likely be required to comply with CEQA requirements to identify potential impacts and to describe mitigation measures. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.5.6 *Public Notice*

The public will be given the opportunity and time to comment on the Dust Control Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.5.7 *Implementation Process and Timetable*

The Dust Control Mitigation Plan will be developed to investigate the magnitude and need for mitigation and best management practices to address windblown dust and sand that can be used on fallowed agricultural land. It is anticipated the Dust Control Mitigation Plan will be developed by June 2021, with implementation of mitigation measures continuing throughout the planning horizon as necessary based on the voluntary schedule of the fallowing of agricultural lands. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Dust Control Mitigation Plan. In appropriate intervals throughout the planning horizon, agricultural lands that may require dust mitigation measures will be evaluated with the recommended mitigation measures made available for public review prior to implementing mitigation. The IWVGA will implement certain proactive mitigation measures in areas of greatest rick and gradually ramp up dust control mitigation, as circumstances demonstrate.

5.3.5.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Dust Control Mitigation Program.

5.3.1 Project No. 6: Pumping Optimization Project

5.3.1.1 *Project Description*

Evaluation of the modeling results for the proposed groundwater management and project scenarios showed that some current groundwater pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells.

It is anticipated that the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, will greatly reduce groundwater pumping for agricultural uses in the northwestern portion of the IWGWB over time. The modeling results indicate groundwater levels in this area will not only stabilize but will increase as a result of the proposed management actions and projects.

It is also anticipated that groundwater pumping by the Water District west and southwest of the City will continue and that, along with pumping by Searles Valley Minerals~~,~~ Inc. and others, the groundwater levels in these areas will not completely stabilize by 2040.

The pumping optimization program will relocate some of the Water District, and potentially some of Searles Valley Minerals Inc., groundwater pumping to the northwest portion of the basin. The pumping optimization program will include the construction of two new wells in the northwest portion of the basin along Brown Road and approximately nine miles of pipeline to connect the wells to the Water District's water system.

Comment [CA36]: If the IWVGA intends to move the SVM wells, which are located on land that is owned by SVM, are they planning on doing some sort of land swap? Would the GA buy the land where SVM currently has wells? Who would own the new pipelines that would have to be constructed?

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Pumping Optimization Project will directly mitigate impacts due to the following:

- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Pumping Optimization Project will stabilize groundwater levels west and southwest of the City and reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E), due to both lower groundwater levels and from potential water quality impacts.

The metric for measuring project benefits for this project will be will be to monitor groundwater levels and water quality.

5.3.1.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Pumping Optimization Project to mitigate undesirable results that would directly impact the ability of shallow well owners to meeting potable water demands, including demands for basic health and safety.

5.3.1.4 *Project Costs*

Infrastructure costs are for the design and construction of a new well and new distribution system. The estimated cost to construct the facilities for the Pumping Optimization Project is $23 million.

5.3.1.5 *Permitting and Regulatory Process*

Implementation of the Pumping Optimization Project will require encroachment or excavation permits for construction of the pipeline, well permits from Kern County, and agreements for use of the facilities or to take water from the facilities with the Water District and perhaps Searles Minerals~~,~~ ~~I~~Inc. The IWVGA will conduct a CEQA review to identify potential impacts from construction of the facilities. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.1.6 *Public Notice*

The public will be given the opportunity and time to comment on the ~~Shallow Well Mitigation Plan~~Pumping Optimization Project prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.1.7 *Implementation Process and Timetable*

The Pumping Optimization Project will require significant funding from outside the IWV to be feasible. If adequate funding is obtained it is anticipated the Pumping Optimization Project will be complete by December 2025.

5.3.1.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Pumping Optimization Project.

5.4 CONCEPTUAL PROJECTS STILL UNDER CONSIDERATION

5.4.1 Brackish Groundwater Project

To further enhance the sustainable and adaptive management strategies for Indian Wells Valley (IWV), the Brackish Water Resources Partnership was formed, consisting of IWVWD, the Coso Operating Company, Mojave Pistachios, Searles Valley Minerals Inc, and Meadowbrook Dairy, to evaluate the feasibility of extracting and treating brackish groundwater to produce fresh water for potential multiple beneficial uses including, among other things:

- Providing a source of water as a bridge or buffer to assist in achieving SGMA sustainability;
- Diversifying local water supplies;
- Improving reliability as part of a portfolio of multiple sources of water; and
- Providing a local, beneficial industrial use for the waste brine.

There are areas in the IWVGB that have TDS concentrations greater than 1,000 mg/L, particularly in the intermediate and deep aquifer layers and primarily underlying NAWS China Lake. These groundwater areas are considered to be brackish, and are the subject of the Brackish Groundwater Feasibility Study.

The Brackish Groundwater Feasibility Study will examine the feasibility of extracting brackish groundwater, options for treating the brackish groundwater, and options for delivery of all water types to the various connection points. On the basis of examining several criteria, the "ideal" brackish groundwater extraction well has several characteristics:

- Completed in a sand layer that will yield a desirable volume of water over the long term;

- Completed where the long-term TDS concentrations of the brackish groundwater are greater than 1,000 milligrams per liter (mg/L) (up to 4,000 mg/L);
- Located away from existing freshwater production wells;
- Located in an area where the potential for impacts to freshwater resources are minimized (lateral transport, vertical transport); and
- Located in an area where impacts from subsidence are minimized.

An additional constraint is that all brackish groundwater extraction has to occur outside the boundary of NAWS China Lake.

After examining several areas within the basin that have proved to be unsuitable for project implementation, the Brackish Groundwater FS has now narrowed its focus to the northwest part of the IWVGB just south of Pearsonville and north of Brown Road. The Brackish Groundwater Feasibility Study is evaluating if brackish groundwater could be extracted from the deep aquifer zone in this geographical area. After the Brackish Groundwater Feasibility Study is complete, and if brackish groundwater extraction, treatment, and conveyance is found to be feasible, the next steps in the project process would include:

- Conduct a pilot test of brackish groundwater extraction and treatment in the area of interest;
- Design a full-scale brackish groundwater extraction system with associated treatment plant and conveyance works; and
- Construct and commission the full-scale brackish groundwater extraction, treatment, and conveyance system.

5.4.2 Direct Potable Reuse Project

California Water Code section 13561(b) defines direct potable reuse (DPR) as "the planned introduction of recycled water either directly into a public water system or into a raw water supply immediately upstream of a water treatment plant." Possible methods of DPR include:

- Raw water augmentation
    - The planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system.
- Reservoir water augmentation

  - The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, or into a constructed system conveying water to such a reservoir.
- Treated drinking water augmentation
  - The planned placement of recycled water into the water distribution system of a public water system.

The SWRCB currently has no regulatory criteria for DPR projects in California, though uniform water recycling criteria for DPR through raw water augmentation are required to be adopted by the SWRCB by December 31, 2023, in accordance with California Water Code Section 13561.2. At this time, uniform water recycled criteria for DPR through reservoir water augmentation or treated drinking water augmentation are not anticipated to be adopted.

Because no raw water treatment facilities currently exist in the Indian Wells Valley, a reservoir water augmentation project or treated drinking water augmentation project would currently be the only feasible alternatives for DPR of recycled water in the IWVGB. Significant coordination with the SWRCB, DDW, the Lahontan RWQCB, and potentially the USEPA would be required to implement such a project, including conceptual-level planning, treatment evaluations, permit issuance, pilot testing, regulation development, establishing monitoring requirements, etc. Should the IWVGA pursue imported water opportunities that would require construction of new surface water treatment and storage facilities, a raw water or reservoir water augmentation project may be a feasible alternative for a DPR project. Otherwise, the IWVGA will continue researching the feasibility of a potential DPR project through reservoir water augmentation or treated drinking water augmentation over the GSP planning and implementation horizon.

5.4.3 Additional Projects

The IWVGA is taking an adaptive management approach to IWVGB management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to reach sustainability in the IWVGB. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

5.5 REFERENCES

Antelope Valley Dustbusters 2010. *Agricultural Guide to Controlling Windblown Sand and Dust*. October 2010.

California Regional Water Quality Control Board, Lahontan Region (Lahontan RWQCB), 2016. *Water Quality Control Plan for the Lahontan Region, North and South Basins*. January 2016.

Carollo Engineers, 2008. *City of Ridgecrest Wastewater Treatment Plant Final Project Report*. Prepared for the City of Ridgecrest. September 2008.

DWR, 2017. *Management of the California State Water Project: Bulletin 132-16*. June 2017.

DWR, 2018. *Final State Water Project Delivery Capability Report 2017.* March 2018.

Environmental Science Associates (ESA), 2009. *City of Ridgecrest General Plan Update, Draft Environmental Impact Report*. Prepared for the City of Ridgecrest. May 2009.

Ecological Research Services (ERS), 1991. Elements of a Habitat Management Plan for the Mohave Tui Chub at the China Lake Naval Weapons Center Relative to the City of Ridgecrest's Wastewater Reclamation Project. Document provided by Stephan Bork of the Indian Wells Valley Technical Advisory Committee. October 1991.

GSP §## from California Code of Regulations (CCR), 2016. California Code of Regulations; Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans.

Plumlee, Megan H. et al. "Costs of Advanced Treatment in Water Reclamation." *Ozone: Science & Engineering: The Journal of the International Ozone Association* 36.5, 485-95. September 2014.

Provost & Pritchard, 2015. *Wastewater Treatment Plant Facility Plan*. Prepared for the City of Ridgecrest. October 2015.

RMC, 2018. *Draft Indian Wells Valley Groundwater Basin Salt and Nutrient Management Plan*. January 2018.

State Water Resources Control Board (SWRCB), 2016. *Investigation on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse*. December 2016.

Todd Engineers (Todd), 2014. *Indian Wells Valley Resource Opportunity Plan, Water Availability and Conservation Report*. Prepared for Kern County Planning and Community Development Department. January 2014.

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 6~~5~~– ~~PROJECTS AND MANAGEMENT ACTIONS~~IMPLEMENTATION PLAN

DRAFT

November 4, 2019

SECTION 6: IMPLEMENTATION PLAN

6.1 IMPLEMENTATION PLAN SUMMARY

Due to prolonged overdraft conditions in the IWVGB, the community is currently experiencing the undesirable impacts of prolonged overdraft and will continue to experience increasing environmental, social, and economic impacts if sustainability is not achieved. The IWVGB is currently experiencing unreasonable reduction of groundwater in storage, chronic lowering of groundwater levels which result in shallow wells going dry or being impacted by poorer water quality, degradation of water quality, and possible localized land subsidence impacting structures/facilities at NAWS China Lake.

Comment [CA1]: This is probably due to seismic and not groundwater issues.

Increasing water reliability and preserving groundwater resources are critical tasks of the IWVGA and are critical to accomplishing the mission at NAWS China Lake and sustaining the entire IWV community. The sustainability goal is to preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of the IWV residents, and sustain the mission at NAWS China Lake. The absence of significant and unreasonable undesirable results throughout the planning horizon will ~~be indicative~~indicate the sustainability goal has been achieved. The sustainability goal will be accomplished by achieving the following objectives:

- Operate the IWVGB groundwater resource within the sustainable yield.
- Implement projects and management actions to reduce groundwater demands (including pumping reduction and conservation), increase reuse of current supplies (recycled water), and obtain additional supplemental water supplies (imported water).
- Monitor the IWVGB actively and thoroughly and adaptively management the program to ensure the plan is effective and undesirable results are avoided.

A suite of project and management actions have been evaluated and selected to address current and projected undesirable results with the goal of bringing the IWVGB into sustainable balance (see Section 5). There are currently no reliable sources of supplemental water available to help achieve sustainability. Therefore, the initial priority is on demand reductions, at least until a reliable supplemental water supply is secured. These projects and management actions are the following:

- Pumping Limitations Program
- Dust Control Mitigation Program
- Conservation Program including programs that assist Severely Disadvantaged Communities in the IWVGB
- Shallow Well Mitigation Program for shallow well failures due to water quality degradation and lowering of groundwater levels
- Recycled Water Project
- Imported Water Project
- Pumping Optimization Program

In addition to the proposed projects and management actions, GSP implementation requires continual monitoring of the proposed monitoring networks to evaluate IWVGB conditions and the sustainable management criteria, as well as annual and periodic GSP updates to DWR, pursuant to SGMA regulations. Data gaps will continue to be analyzed and monitoring and data management programs will be implemented as necessary. The IWVGA is taking an adaptive management approach to reach sustainability; therefore, additional projects and management actions not discussed in this GSP will be evaluated and implemented over the planning horizon, as necessary.

6.2 SCHEDULE FOR IMPLEMENTATION

Comment [CA2]: Is any project or management action other than Management Action 1 based on prioritization of any kind; either availability of funds, ease of project, amount of water saved, etc.? Prioritization chart might be useful or at least a matrix showing parameters of how the projects will be evaluated prior to the determination of whether the project will be started.

The IWVGA will start implementation of the GSP after adoption of the GSP by the IWVGA Board. The anticipated implementation timelines and schedules for the projects and management actions are discussed in Section 5. The anticipated implementation timeline for the projects and management actions range from 2020 to 2035. With this broad range of implementation timelines, there are likewise broad estimates of the project and management action task schedules.

Some of the proposed projects and management actions are dependent on activities and schedules beyond the control of the IWVGA. The schedule for the proposed Recycled Water Project is dependent on the completion of the upgraded City of Ridgecrest's wastewater treatment facility. The schedule for the proposed Imported Water Project is dependent on securing an imported water supply source, completing agreements for the transportation and exchange of water, and obtaining sufficient funding to construct the needed infrastructure. Accordingly, there is uncertainty ~~of~~ in project implementation schedules at this stage of planning.

The GSP Implementation Schedule is provided in Figure 6-1. This implementation schedule will be revised as necessary to reflect any changes based on updated information and to provide more specificity as the projects are further developed.

6.3 GSP IMPLEMENTATION COSTS AND FUNDING

6.3.1 Implementation Costs

The GSP Implementation costs can be categorized in the following manner:

- Administrative Costs
    - GSP Reporting
    - Funding Administration
        - Fee Administration
        - Grant/Loan administration
    - Stakeholder Involvement/Outreach
- Program/Project Development and Implementation for Projects and Management Actions
- GSP Monitoring/Data Management System maintenance
- GSP Data Gap Analyses and Updates

The IWVGA may also incur additional costs that include, but are not limited to, additional administrative expenses, salaries and benefits, legal services, etc. These costs, when eligible, will also be funded through the funding sources discussed in 6.3.2.

The estimated costs for each project and management action and IWVGA implementation is provided in Table 6-1. These estimates will be refined and revised during GSP implementation as more information becomes available.

Table 6-1. Estimated GSP Implementation Costs.

Task	Total Development / Capital Costs	Total Annual Costs
Administration	xx	xx
Projects and Management Actions		
Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program	$9,200,000	$40,000
Project No. 1: Develop Imported Water Supply		
Option 1:	$226,365,000	$8,140,000
Option 2:	$103,436,000	$4,440,000
Project No. 2: Optimize Use of Recycled Water		
Option 1:	$42,757,200	$395,500
Option 1a:	10,183,200	$129,300
Option 2:	$22,798,000	$480,300
Project No. 3: Basin-wide Conservation Efforts		$20,000
Project No. 4: Shallow Well Mitigation Program	$1,720,000	$20,000
Project No. 5: Dust Control Mitigation Program	$19,000,000	$20,000
Project No. 6: Pumping Optimization Project	$23,000,000	
GSP Monitoring/Data Gap Analyses		$60,000
Annual GSP Reporting		$30,000
GSP 5-Year Updates [1]	$360,000	
Data Management System		$20,000

[1] *Assumes four 5-year updates through 2040.*

Comment [CA3]: These costs should be based on current costs for administration.

Comment [CA4]: Does this amount also include the possibility of drilling new or re-drilling failed monitoring wells?

6.3.2 Potential Funding Sources

Development of this GSP was funded through the following sources:

- Proposition 1 Sustainable Groundwater Planning Grant
- Pump Fee applicable to all non de minimis pumpers in the IWVGB (with the exception of U.S. Navy pumping to support NAWS China Lake)
- Local c~~C~~ontributions by IWVGA Member Agencies and other local entities
- In-kind s~~S~~ervices by IWVGA Member Agencies and other local agencies and entities

GSP i~~I~~mplementation costs will require a broad variety of funding sources, from federal, state, and local sources. Supplemental water supplies, as required for the IWVGB to be sustainable, are extremely costly and limited. Even if supplemental water supplies are available, the IWV community is not financially capable of supporting an imported water supply without significant public funding. As such, the IWVGA will pursue all reasonable funding opportunities to support GSP implementation tasks. Federal and state funding sources that have been identified as potential options for GSP implementation funding include the following:

- Federal Sources
  - Water Infrastructure Financing and Integration Act (WIFIA)
  - Reclamation Integration Financing and Integration Act (RIFIA)
  - Bureau of Reclamation – WaterSMART Program
  - Department of Defense – Defense Communities Infrastructure Program
  - Department of Defense – Readiness and Environmental Protection Integration Act (REPI)
  - Water Resources Development Act (WRDA)
  - U.S. Department of Agriculture
    - Community Facilities program
    - Regional Conservation Program
- State Sources
  - State Water Resources Control Board Loans and Grants
    - Clean Water State Revolving Fund (CWSRF)
    - Drinking Water State Revolving Fund (DWSRF)
    - Small Community Grant Fund
    - Groundwater Grant Fund (Chapter 10, Prop 1)
    - Parks and Water Bond (Chapter 11, Prop 68)
  - Legislative Appropriations

Local sources of funding will include administering a pump fee on groundwater production, similar to the fee that was used to partially fund the GSP preparation. The pump fee structure may have multiple components such as an administration fee, a remediation fee (for mitigation for impacted shallow wells, and an augmentation fee (for imported water supplies). With that said, the remediation and augmentation fees may be combined into one fee since those that will be subject to these fees are likely the same. Additionally, the administration fee may not be adopted at the outset because the current structure and operation of the IWVGA is such that there is limited, if any, costs for general administration.

Comment [CA5]: Is there any estimate on what this fee will be?

The U.S. Navy receives royalties from the sale of electricity generated at the geothermal power plants located on NAWS China Lake in the Coso Geothermal Field to fund local energy or water security initiatives that support the NAWS China Lake mission. GSP implementation projects and related tasks may be eligible to receive funding from these royalties if deemed necessary and a priority to support the NAWS China Lake mission.

6.4 PROGRESS ASSESSMENT AND REPORTING

6.4.1 Annual Reports

As required by SGMA, the IWVGA will prepare an annual report which will describe the progress being made toward implementation of this GSP and reaching sustainability. The content of the annual report will include, but is not limited to, progress made toward implementation of the planned projects, progress made on achieving the interim milestones identified in the GSP, and a discussion on sustainability progress.

6.4.2 Periodic Evaluations and Assessments

The IWVGA recognizes that IWVGB management requires an adaptive management approach and supports the necessity of periodic updates to the GSP. Accordingly, in five-year increments, the IWVGA will evaluate the GSP and prepare a Five-Year Evaluation Report. The Five-year Evaluation Report will include discussions on 1) Sustainability Evaluation, 2) GSP Implementation Progress, 3) GSP Elements

Evaluation, 4) Monitoring Network and Data Gaps, 5) New Information and Data, 6) Instituted Regulations, Ordinances, and Legal Actions, 7) GSP Amendments, and 8) On-going C~~c~~oordination.

- Sustainability Evaluation: A summary of the groundwater conditions for each of the identified sustainability indicators and a summary of progress toward IWVGB sustainability will be provided. A discussion of progress on each of the identified milestones and a summary of the measurable objectives in relation to the minimum thresholds will be included.
- GSP Implementation Progress: A summary of the implementation of GSP projects and management actions, including an updated implementation schedule and summary of the quantifiable benefits realized from implementation of projects and management actions, will be provided.
- GSP Elements Evaluation: If new or additional data from the monitoring program or the implementation of projects and management actions is available, GSP elements, including the suitability of the established sustainable management criteria, will be evaluated and reconsidered. Based on the findings, the IWVGA may suggest revisions to the GSP.
- Monitoring Network and Data Gaps: A description of the monitoring network will be provided. Data gaps that have been identified and efforts to fill those gaps will be described. An assessment of the effectiveness of the monitoring programs will be provided, along with a schedule to address the data gaps.
- New Information and Data: New data obtained since the last GSP update will be provided.
- Regulations, Ordinances, and Legal Actions: A summary of regulations and/or ordinances the IWVGA has implemented to assist with implementation of the GSP will be provided. IWVGA legal actions and enforcement activities will be discussed.
- GSP Amendments: Any approved or proposed GSP amendments will be discussed.
- On-going Coordination: A summary of the coordination between the IWVGA and other agencies within the IWVGB will be provided.

J:\2652 IWVGA\08 GSP\Draft_Chapters\Section_6\IWVGA_GSP_Section6_Implementation_PAC_TAC_review_draft_clean.docx

DRAFT GSP

COMMENTS ON SECTIONS 5 & 6

West E. Katzenstein

11-14-2019

GENERAL OBSERVATIONS:

1. Overall I feel positive about the draft GSP and the foundations it has put in place in key areas, such as the technical understanding of the basin; the sustainable management criteria with related minimum thresholds; a comprehensive approach for achieving sustainability; and an allocation approach that appears to have a strong legal basis, makes reasonable use of groundwater, and provides a basic allocation to all citizens which includes health and safety.
2. I am pleased to see the introduction of the Fallowing Program, since it provides an opportunity for those who choose to fallow their land to be compensated for that land.
3. The undeniable imperative to import water to maintain current lifestyles is clearly communicated in the draft GSP. The GSP should require periodic reassessments of the feasibility, amount, quality, and schedule for imported water. These reassessments should drive updates in the 'Pumping Limitations Plan' (including updating the Augmentation Fee), 'Conservation Program', and 'Pumping Optimization Plan' tasks. The GSP should explicitly address the possibility that importing water could prove unfeasible.
4. Interim results from the 'GSP Monitoring Program' and 'Data Gap Analysis and project Implementation' tasks should also drive the periodic updates in the 'Pumping Limitations Plan', 'Conservation Program', and 'Pumping Optimization Plan' tasks. Examples of interim results: deviations of groundwater measurements from predicted values, refined estimates of recharge, threats to minimum thresholds, and new data.
5. I feel that key interactions between Tasks of the plan over time discussed above are communicated in the text but are not shown in the 'Preliminary GSP Implementation Schedule'. The schedule makes the plan appear static. See hand-modified 'Preliminary GSP Implementation Schedule' below.
6. I have provided comments on sections 5 and 6.

COMMENTS ON SECTION 5

Suggested changes for section 5 are shown in the attached marked-up copy of section 5 (IWVGA_GSP_Section5_PMAs_TAC_PAC_review_draft_clean - KATZENSTEIN COMMENTS).

COMMENTS ON SECTION 6

Suggested changes for section 6 are shown in the attached marked-up copy of section 6 (IWVGA_GSP_Section6_Implementation_PAC_TAC_review_draft_clean - KATZENSTEIN COMMENTS)

Suggested changes to the 'Preliminary GSP Implementation Schedule' (figure 6-1) are described below in the table. I have also provided a hand-drawn markup of figure 6-1, below, that shows the suggested changes.

Suggested Changes to Preliminary GSP Implementation Schedule (Figure 6-1):

Line	Task	Schedule	Rationale
3	Pumping Limitations Plan Development / Updates	Insert blue task bar about 6 months long before / overlapping each DWR update (lines 34-37).	This is to update the pumping limitations plan, if needed. Key drivers to this update are deviations of groundwater measurements from predicted values, refined estimates of recharge, threats to minimum thresholds, data gap analysis, and assessments of imported water feasibility. Goal: adjust pumping if required.
4	Board Adoption of Pumping Allocations and Pumping Limitations Plan	Insert a black milestone diamond at the end of each bar on line 3.	This is for board adoption of pumping limitations updates.
12	Conservation Program Development / Updates	Insert blue task bar about 6 months long before / overlapping each DWR update (lines 34-37).	This is to update the conservation plan, if needed. Key drivers to this update are deviations of groundwater measurements from predicted values, refined estimates of recharge, threats to minimum thresholds, data gap analysis, and assessments of imported water feasibility.
15	Pumping Optimization Plan Development / Updates	Insert blue task bar about 6 months long before / overlapping each DWR update (lines 34-37).	This is to update the Pumping Optimization Plan, if needed. Key drivers to this update are deviations of groundwater measurements from predicted values, refined estimates of recharge, threats to minimum thresholds, data gap analysis, and assessments of imported water feasibility.
23	Imported Water Supply Feasibility / Planning / Design	Insert a black milestone diamond roughly at the start of each DWR update (lines 34-37). Draw arrows from each diamond to the task bars added in line 3.	The added milestones are for periodic reassessment of the feasibility of importing water, amount of imported water, and its timeline. It may be necessary to update pumping limitations based on this feasibility reassessment, including potentially reducing total pumping to recharge.

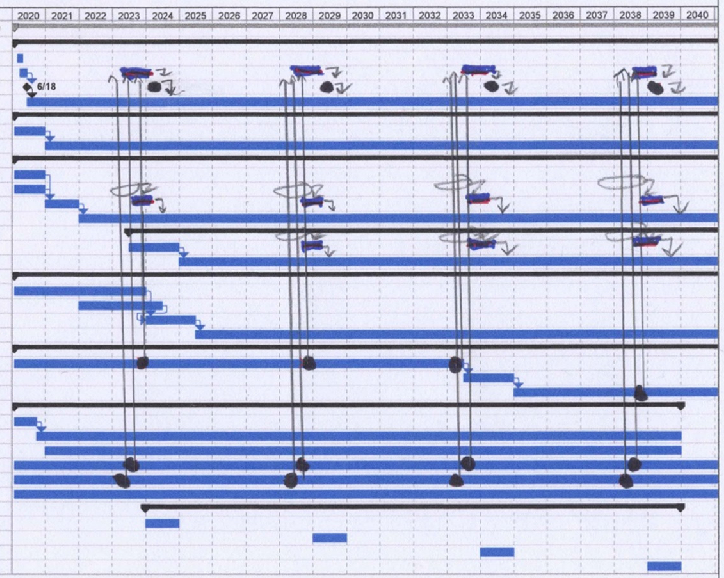
			Goal: adjust pumping if required, including the possibility that imported water may not be feasible. Without these added milestones to react to the success or failure of importing water, this task is too drawn out, unfocused, and just a huge kick of the can down the road. We will be in competition for available water, if it can be found. Sooner is much better. The need to succeed at importing water is stated clearly in this draft GSP. This may be an important element of the plan for its adoption by DWR.
30	GSP Monitoring Program	Insert a black milestone diamond roughly at the start of each DWR update (lines 34-37). Draw arrows from each diamond to the task bars added in line 3.	This is to provide an ongoing assessment of groundwater conditions, particularly regarding groundwater status compared to minimum thresholds and revised assessments of recharge. Required for pumping limitations plan update.
31	Data Gap Analysis and Project Implementation	Insert a black milestone diamond roughly at the start of each DWR update (lines 34-37). Draw arrows from each diamond to the task bars added in line 3.	Note: this is to provide an assessment of any new data that might impact the GSP. Required for pumping limitations plan update.

KATZENSTEIN
11-6-19

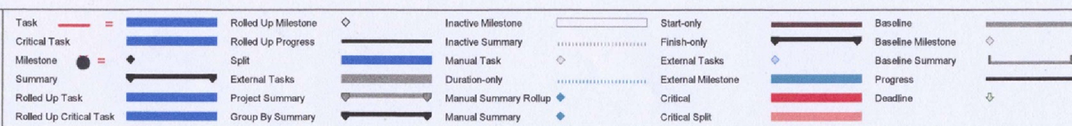
Figure 6-1

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY
Preliminary GSP Implementation Schedule
November 4, 2019

ID	Task Name	Start	Finish
0	**Preliminary GSP Program Development and Implementation Schedule**	**Mon 2/3/20**	**Wed 1/1/70**
1	**Pumping Limitations**	**Mon 2/3/20**	**Wed 1/1/70**
2	Pumping Verification Process	Wed 3/4/20	Thu 4/30/20
3	Pumping Limitations Plan Development / Updates	Wed 4/1/20	Thu 6/18/20
4	Board Adoption of Pumping Allocations and Pumping Limitations Plan	Thu 6/18/20	Thu 6/18/20
5	Pumping Limitations Plan Implementation	Fri 6/19/20	Wed 1/1/70
6	**Dust Control Mitigation Plan**	**Mon 2/3/20**	**Wed 1/1/70**
7	Dust Control Feasibility/Planning/Permitting	Mon 2/3/20	Thu 12/31/20
8	Dust Control Mitigation Plan Implementation	Fri 1/1/21	Wed 1/1/70
9	**Conservation Efforts**	**Mon 2/3/20**	**Wed 1/1/70**
10	SDAC Pilot Project: Water Audit, Leak Detection, and Leak Repair Program	Mon 2/3/20	Thu 12/31/20
11	SDAC Pilot Project: Rebate Program	Mon 2/3/20	Thu 12/31/20
12	Conservation Program Development / Updates	Fri 1/1/21	Fri 12/31/21
13	Conservation Program Implementation	Mon 1/3/22	Wed 1/1/70
14	**Pumping Optimization**	**Mon 7/3/23**	**Wed 1/1/70**
15	Pumping Optimization Plan Development / Updates	Mon 7/3/23	Tue 12/31/24
16	Pumping Optimization Implementation	Wed 1/1/25	Wed 1/1/70
17	**Recycled Water Project**	**Mon 2/3/20**	**Wed 1/1/70**
18	Ridgecrest WWTP Upgrades (Non-IWVGA) *	Mon 2/3/20	Mon 1/1/24
19	Recycled Water Project Feasibility/Planning/Design	Mon 1/3/22	Fri 6/28/24
20	Recycled Water Project Construction	Tue 1/2/24	Mon 6/30/25
21	Recycled Water Project Implementation	Tue 7/1/25	Wed 1/1/70
22	**Imported Water Project**	**Mon 2/3/20**	**Wed 1/1/70**
23	Imported Water Supply Feasibility/Planning/Design	Mon 2/3/20	Thu 6/30/33
24	Imported Water Supply Project Construction	Fri 7/1/33	Fri 12/29/34
25	Imported Water Supply Project Implementation	Mon 1/1/35	Wed 1/1/70
26	**Shallow Well Mitigation Program**	**Mon 2/3/20**	**Mon 1/2/40**
27	Shallow Well Evaluation Criteria Development	Mon 2/3/20	Wed 9/30/20
28	Impacted Shallow Well Identification and Characteriztaion	Thu 10/1/20	Mon 1/2/40
29	Shallow Well Mitigation Program Implementation	Fri 1/1/21	Mon 1/2/40
30	**GSP Monitoring Program**	Mon 2/3/20	Wed 1/1/70
31	**Data Gap Analysis and Project Implementation**	Mon 2/3/20	Wed 1/1/70
32	**GSP Annual Reports**	Mon 2/3/20	Wed 1/1/70
33	**GSP DWR Updates**	**Mon 1/1/24**	**Fri 12/30/39**
34	2025 Update	Mon 1/1/24	Tue 12/31/24
35	2030 Update	Mon 1/1/29	Mon 12/31/29
36	2035 Update	Mon 1/2/34	Fri 12/29/34
37	2040 Update	Mon 1/3/39	Fri 12/30/39



Notes:
* Schedule subject to Navy and Ridgecrest negotiations.



INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 5– PROJECTS AND MANAGEMENT ACTIONS

DRAFT

November 4, 2019

SECTION 5: PROJECTS AND MANAGEMENT ACTIONS

5.1 INTRODUCTION

As established in Section 3, the IWVGB is in critical overdraft. Projects and management actions are required to be implemented in order to respond to changing conditions in the groundwater basin such that undesirable results are avoided and/or mitigated. Groundwater pumping estimates for 2016 indicate that groundwater production in the IWVGB is approximately four times the estimated Current Sustainable Yield of the basin. This level of overdraft, and the current depletion rates of groundwater reserves (see Sections 3.3.4 and 4.3), has already resulted in undesirable results in the basin and it will continue to do so until the IWVGB is brought within the Future Sustainable Yield of the basin. As stated by DWR, "SGMA requires local agencies to develop and implement GSPs that achieve sustainable groundwater management by implementing projects and management actions..." Implementation of the management actions and projects presented below will bring operation of the IWVGB within its Future Sustainable Yield.

While it would be beneficial to immediately reduce all pumping to the Current Sustainable Yield of 7,650 AFY, it is not feasible for the community to make such immediate and drastic reductions without extreme lifestyle changes, alteration of the community character, loss of livelihoods, great financial costs, and other significant negative impacts. Water demands in 2015 for municipal and domestic use alone were greater than the Current Sustainable yield of the IWVGB. A high percentage of the municipal and domestic water demands support the domestic needs of the staff needed to support the mission of NAWS China Lake.

It is anticipated that with the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production will reduce to approximately 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation, anticipated to be 2021. This program will greatly reduce the amount of annual overdraft that will continue until supplemental water supplies, Project No. 1 – Imported Water Supply Project, and Project No. 2 – Optimization of Recycled Water Use are implemented.

Demand management measures, Project No. 3 – Conservation, will be implemented to reduce demands on groundwater.

There will potentially be continuing shallow domestic well impacts, either lost well production capacity due to lower groundwater levels or increasing TDS concentrations, until the IWVGB is operated within the Future Sustainable Yield. Project No. 4 – Shallow Well Mitigation Program, will be implemented to mitigate impacted wells.

The implementation of Augmentation Fees and the Fallowing Program, discussed in Management Action No. 1 below, will lead to a reduction of agricultural operations in the IWVGB. Project No. 5 – Dust Mitigation Plan, discussed below, will be implemented to mitigate secondary impacts caused by windblown dust due to fallowed agricultural land.

Evaluation of groundwater management and project scenarios showed that some current pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells. Project No. 6 – Optimization of Basin Pumping will be implemented mitigate these localized conditions.

According to CWC § 354.44, the GSP shall include a description of the projects and management actions that include the following:

1. **A list of projects and management actions** proposed in the GSP with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The GSP shall include the following:
    a. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which an agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.
    b. The process by which an agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

2. If overdraft conditions are identified through the analysis required by Section 354.18, the GSP shall describe projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
3. A summary of the **permitting and regulatory process** required for each project and management action.
4. The status of each project and management action, including a **time-table** for expected initiation and completion, and the accrual of expected benefits.
5. An **explanation of the benefits** that are expected to be realized from the project or management action, and how those benefits will be evaluated.
6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of an agency, an explanation of the source and reliability of that water shall be included.
7. A description of the **legal authority** required for each project and management action, and the basis for that authority within an agency.
8. A description of the **estimated cost** for each project and management action and a description of how the Agency plans to meet those costs.
9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or deletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The proposed projects and management actions are supported by the best available information and best available science and have considered the level of uncertainty associated with the IWVGB basin setting during development.

The IWVGA planned projects and management actions and the potential projects and management actions are discussed in the subsections below. Given the magnitude of overdraft and the current basin conditions, the planned projects and management actions shall be implemented with the earliest feasible timetable.

5.2 PLANNED MANAGEMENT ACTIONS

5.2.1 Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program

5.2.1.1 *Management Action Description*

The primary initial management action is the establishment of annual groundwater pumping allocations ("Annual Pumping Allocations") of the safe yield. These Annual Pumping Allocations will be used for the purpose of assigning pumping fees (“Administration Fees” and “Augmentation Fees”). The Augmentation Fees ~~that~~ will in turn provide the funding for the development of supplemental water supplies and other projects and management actions to achieve sustainability. Accordingly, these Annual Pumping Allocations are not a determination of water rights in that they do not prohibit the pumping of groundwater. Rather, all groundwater pumpers continue to possess the right to produce groundwater provided they pay the ~~Augmentation~~ appropriate Fee. While this action will not directly limit groundwater extraction by any individual entity, it is anticipated that the costs associated with the Augmentation Fee will result in voluntary pumping reductions and the implementation of additional conservation measures to lower demands.

Commented [WK1]: Does this allow new pumpers? For example, could new de minimis wells be developed?

Commented [WK2]: Does this fall apart when the full amount of imported water is subscribed? Or perhaps additional imported water sources are sought at that time, with their own augmentation fee.

In accordance with California law, water produced within the safe yield [1] of the basin, generally considered to be equal to the long-term average natural recharge of the basin, may be charged a General Administration fee but it shall be free of any Augmentation Fees. Water produced in excess of the safe yield shall be subject to an Augmentation Fee as set forth below. The Federal entities (NAWS China Lake and BLM) are exempt from these fees through the legal principles of sovereign immunity.

The Annual Pumping Allocation program will assign each ~~qualified~~ groundwater pumper an Annual Pumping Allocation of the safe yield, if any, if they qualify after consideration of:

Commented [WK3]: Isn’t clear to me what ‘qualified’ means as written. My suggested change may not be correct.

1) Federal Reserve Water Rights (FRWR) of NAWS China Lake;
2) California water rights;
3) Beneficial use priorities under California Law;
4) Historical groundwater production; and,
5) Municipal requirements for health and safety.

SGMA recognizes FRWR as distinct from water rights that are based in state law and directs that FRWR be respected in full, and in case of any conflict between federal and state law, federal law shall prevail (Water Code Section 10720.3(d)). SGMA also directs that IWVGB consider the interests of all beneficial uses and

[1] The safe yield is equal to the long-term average natural recharge of the basin, currently estimated to be 7,650 AFY. The current estimate of the sustainable yield, defined by SGMA as the maximum quantity of water that can withdrawn annually without causing undesirable results, is also currently estimated to be 7,650 AFY. The sustainable yield may will change as projects and management actions are implemented that artificially recharge the basin and increase the volume of water that can be withdrawn annually without causing undesirable results.

users of groundwater, listing the federal government, including, but not limited to, the military and managers of federal lands among those interests (Water Code Section 10723.2).

While NAWS China Lake may voluntarily agree to an allocation under the GSP less than its full FRWR, the IWVGA has no legal authority to enforce such an allocation and NAWS China Lake has not provided a final accounting of its FRWR. In recognition of these facts and the acknowledgment of the limits on the IWVGA to regulate the federal government, any such FRWR allocation shall be directly assigned to the federal agency and shall not be subject to the requirements of any allocation ordinance, including but not limited to allocation carryovers, borrowing, transfers, reductions and/or variances and fees.

In accordance with SGMA and California Water law, a five-year base period defined as January 1, 2010 through December 31, 2014 ("Base Period") will be used to evaluate groundwater production for all groundwater pumpers, with the exception of NAWS China Lake and de minimis users. An Annual Pumping Allocation of a share of safe yield, based on California water rights law and historical pumping during the Base Period, will be assigned to groundwater pumpers. The Annual Pumping Allocations will be regularly reevaluated to ensure sustainability.

The IWVGA recognizes that the safe yield is significantly lower than current pumping and some groundwater pumpers with inferior rights will not be granted any Annual Pumping Allocations. As this groundwater may have been put to significant and important economic use and to ease the transition from current pumping levels to sustainable pumping levels, the IWVGA has determined that some additional loss of storage is acceptable and necessary to ease the transition from current pumping to the Future Sustainable Yield. See Section 4 for the sustainable management criteria for the reduction of groundwater in storage.

All groundwater pumpers who were producing groundwater during the Base Period and who are not given an Annual Pumping Allocation -will be eligible to receive a Transient Pool Allocation. The Transient Pool, which consists of a limited non-transferable one-time allocation of water to be used prior to 2040, will be created to facilitate coordinated production reductions and to allow groundwater users to plan and coordinate their individual groundwater pumping termination. The Transient Pool Allocation water is a single use, non-transferable, non-exportable from the IWVGB, one-time allocation of water, and once all

Commented [WK4]: Does this extend beyond AG? For example, can IWVWD receive a TPA? SVM? Why wouldn't SVM or IWVWD request a TPA, since it appears to be without fees, and then start pumping augmentation-Fee water once the TPA is used up?

water in the Transient Pool has been consumed (or sold through the Fallowing Program as set forth below), the Transient Pool will cease. Each party's share of the Transient Pool will be determined pursuant to the same principals of water law used to establish the Annual Pumping Allocations. The total allocations from Transient Pool will be limited to no more than 51,000 acre-feet. Each party will be assessed the Administration Fee for water pumped from the Transient Pool.

Groundwater production in excess of Annual Pumping Allocations and Transient Pool Allocations will be subject to an Augmentation Fee in an amount that is determined to be sufficient for the acquisition of supplemental water supplies pursuant to this plan. The size of the Augmentation Fee will be revised yearly based on the ongoing assessment of the feasibility, schedule, and cost of supplemental water supplies.

All groundwater pumpers who are assigned a Transient Pool Allocation may be enrolled, at their sole election, in a Fallowing Program. Pursuant to the Fallowing Program, the groundwater pumper may elect to sell their Transient Pool Allocation back to the IWVGA in exchange for a price equal to the fair market value of the overlying lands associated with their shares of the Transient Pool. This payment shall be made in three equal payments to be paid annually. In exchange for this payment, Transient Pool shareholders shall agree to transfer ~~all property interests in their overlying land along with~~ all water rights, if any.

Commented [WK5]: I understood the statement at the last PAC meeting to state that this is not the case.

Given the amount of overdraft and the cost and scarcity of supplemental water supplies (see Section 5.3.2), the IWVGA will allow some reasonable overdraft of the IWVGB due to groundwater production to continue until supplemental water supplies are acquired. It is anticipated that with the implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production is anticipated to reduce to around 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation. Some overdraft will continue until the augmentation program is able to increase supplies with estimated importation supplies becoming operational by 2035, but not later than 2040 to reach sustainability. Under baseline conditions, which assumes no GSP projects and management actions are implemented, annual average pumping from 2020 to 2070 is anticipated to be approximately 37,000 AFY. The Annual Pumping Allocation Plan is anticipated to significantly reduce pumping to an annual average of approximately 14,000 AFY from 2020 to 2070.

The difference between pumping and the long-term natural recharge to the IWVGB will be augmented with supplemental water to bring operation of the basin within the Future Sustainable Yield.

5.2.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in significantly less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

The corresponding cumulative loss of groundwater in storage under Baseline conditions is estimated to be approximately 1.6 million acre-feet, while the cumulative loss of groundwater storage with the Annual Pumping Allocation Plan, and the proposed projects and management actions, is estimated to be approximately 215,000 acre-feet. These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program will assist with the preservation of NAWS China Lake and the community.

The metric for measuring management actions benefits will be to monitor groundwater levels, groundwater quality, ~~and~~ change in groundwater in storage in the IWVGB, and the avoidance of undesirable results as defined by minimum thresholds in section xxx.

5.2.1.3 *Justification*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program are a necessity to reach sustainability due to the current state of overdraft, the current unavailability of a supplemental water supply, and the costs of building the infrastructure and obtaining the supplemental supplies once they become available. The estimated Current Sustainable Yield of 7,650 AFY does not support current groundwater production. As discussed previously, it is infeasible for the community to make such immediate reductions to the Current Sustainable Yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. The distribution and volume of groundwater production in the IWVGB is such that proportional reductions to reach the Current Sustainable Yield are infeasible because the majority of individual groundwater users would not have a large enough allocation to maintain an acceptable quality of life and the drastic community changes would impact the support of NAWS China Lake. Economically viable agricultural operations cannot be sustained with a greatly reduced water supply (pumping allocation) as would be required with a proportional reduction to the Current Sustainable Yield. Similarly, domestic and municipal users would not be able to meet basic health and safety requirements under a proportional reduction allocation. Accordingly, the IWVGA is currently working with groundwater users in the IWV to determine an equitable process for assigning allocations. In order to implement the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, the IWVGA must consider and evaluate the following: 1) FRWR of NAWS China Lake, 2) California water rights, 3) beneficial use priorities, 4) historical groundwater production, and 5) municipal requirements for health and safety.

Under U.S. Supreme Court case law defining the FRWR, federal agencies have an implied right to water to support the primary mission for which Congress and the Federal government have designated that land, including a provision of water for growth to support that mission[2]. It is well established in the Supremacy Clause of the U.S Constitution, Article VI, Clause 2, that the Federal Government is not subject to state regulation, unless Congress clearly and unambiguously waives this sovereign immunity. There is no such waiver for state regulation of groundwater, except in the case of a comprehensive state court adjudication of all rights to water, as expressed in the McCarran Amendment (43 U.S.C § 666). SGMA does not meet the requirements set forth in the McCarran Amendment and the IWVGA is therefore unable to regulate NAWS China Lake.

[2] The FRWR was first recognized by the U.S. Supreme Court in the context of tribal interests (See Winters v. United States, 207 U.S. 564 (1908)) and subsequently expanded to federal agencies (See Cappaert v. United States, 426 U.S. 128 (1976)), Federal Power Commission v. Oregon, 349 U.S. 435 (1955)).

Due to the NAWS China Lake FRWR being currently unquantified and not established, the IWVGA is faced with planning and management hurdles related to allocations. In June 2019, the U.S. Navy provided the IWVGA documentation regarding historical water use, workforce trends, and current water requirements. This letter, provided in Appendix 5-A, estimates the NAWS China Lake water requirement to be 6,530 AFY. While this U.S. Navy estimate is not NAWS China Lake's FRWR, it demonstrates that the majority, if not all, of the estimated safe yield of 7,650 could be held as a federal right and must be respected by the IWVGA and the GSP. For planning purposes, the U.S. Navy recommended the IWVGA use 2,041 AFY as a reasonable estimate of current and future annual groundwater production on the installation. The Navy's response also expressly provides that, because of the movement of Navy staff and dependents off-Station, "the water requirements of the Navy cannot be determined solely by the Navy's recent direct production amounts". The response further provides that "[s]ince the Navy mission at China Lake requires its workforce, the full Navy water requirements are the combination of the on-Station requirements and those of the Navy workforce and their dependents off-Station." The IWVGA does not have legal authority to restrict, assess, or regulate production for NAWS China Lake; therefore, NAWS China Lake groundwater production is considered of highest beneficial use.

According to CWC 10723.2, the IWVGA must "consider the interest of all beneficial uses and users of groundwater…" The groundwater user categories in the IWV currently are:

- Municipal
- Domestic (De Minimis private well owners and mutuals/co-ops)
- City/County
- NAWS China Lake
- Industrial
- Large Agriculture
- Small Agriculture

CWC Section 106 expressly declares that it is "the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." Accordingly, aside from NAWS China Lake production, which cannot be regulated, and use by SGMA defined de minimis pumper, which also cannot be reduced, the highest beneficial use of water in the IWVGB is for domestic purposes including human consumption, cooking, and sanitary uses. In the IWVGB, groundwater pumpers in the domestic category which would provide the highest beneficial use include production by the IWVWD, Inyokern CSD, individual domestic well owners (de minimis pumpers), and mutual water companies serving domestic users. These groundwater pumpers can and should implement additional conservation measures (see Section 5.2.4); however, the allocations for these pumpers would be continual and annual. In addition, the City and Kern County overlying groundwater production rights are superior to all other overlying rights because public entity rights may not be prescribed against.

The beneficial uses of other groundwater users, including agricultural and industrial users, will subsequently be evaluated based on water rights priorities. The IWVGA will allow all IWVGB groundwater pumpers the opportunity to provide documentation on historical groundwater production and other pertinent information. Current groundwater production that has existed and has been continuous prior to the establishment of NAWS China Lake will be given a priority over more recent pumping that has occurred since the IWVGB has been documented to be in overdraft conditions. Accordingly, all groundwater users and uses will be equitably considered and prioritized, as required by SGMA.

5.2.1.4 *Costs*

The IWVGA will incur costs to develop the annual Pumping Allocations and Transient Pool Allocations. There will be administrative costs and engineering costs for conducting hearings, verifying pumping documentation, and preparing the final report to the IWVGA Board with the recommendations, among other implementation tasks, estimating to be $200,000.

The IWVGA will incur administrative costs to implement and manage the Fallowing Program. Additionally, the IWVGA may incur costs to purchase Transient Pool Allocations from groundwater pumpers electing to enroll in the Fallow Program estimated to be $9 million. These costs will be equal to the fair market value of the overlying lands.

Administrative costs to run all program components are estimated to be $40,000 annually.

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program costs will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof. See Section 6.3 for details of funding options.

5.2.1.5 *Permitting and Regulatory Process*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program does not require the IWVGA to obtain or issue any permits and the preparation and adoption of a GSP is exempt from Division 13 of the Public Resources Code.

5.2.1.6 *Public Notice*

The public will be given the opportunity and time to present historical pumping documentation provided to the IWVGA. The IWVGA will provide sufficient public notice of a public hearing to adopt the Annual Pumping Allocation and the Transient Pool Allocation. See Section 5.2.1.7 below for additional details.

5.2.1.7 *Implementation Process and Timetable*

The IWVGB shall determine each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation following the adoption of this plan. All groundwater pumpers shall be instructed to submit records of their historical pumping and any other relevant material to the IWVGA prior to March 1, 2020. On or before April 15, 2020, the IWVGA Water Resources Manager shall review these materials and provide a draft recommendation of each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation to each groundwater pumper who submitted materials and to the IWVGA TAC members. By April 30th, 2020, all groundwater pumpers shall submit comments on the draft recommendation to the Water Resources Manager. The Water Resources Manager shall consider these comments and present a final report and recommendation to the IWVGA Board for consideration at its June 2020 meeting. Those receiving a Transient Pool Allocation may elect to join the Fallowing Program by no later than August 1, 2020.

5.2.1.8 *Legal Authority*

SGMA broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, CWC Section 10726.2 provides the IWVGA with the authority to develop and implement an

Annual Pumping Allocation Plan, Transient Pool and Fallowing Program to meet the needs of the basin and CWC Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement the GSP management action set forth above.

Although not subject to formal regulation under SGMA, NAWS China Lake is committed to being a good steward of water resources and to exploring partnerships that help to achieve groundwater sustainability, including projects and management actions that benefit both the Navy and the community.

5.3 PLANNED PROJECTS

5.3.1 Project No. 1: Develop Imported Water Supply

5.3.1.1 *Project Description*

The IWVGA does not currently have access to any water supply from outside of the IWVGB. Procuring an imported water supply will require purchasing water supplies (with all required contractual and/or appurtenant water rights) as well as obtaining access to existing water conveyance facilities and constructing additional infrastructure to bring imported water to the IWVGB. The majority of the IWVGB is within the boundaries of the KCWA, a SWP Contractor. KCWA does not have unused SWP water that can be made available to the IWVGB. A small portion of the southern portion of the IWVGB is within the boundaries of Antelope Valley – East Kern Water Agency (AVEK). The nearest existing imported water conveyance facilities are the Los Angeles Department of Water and Power's (LADWP) Los Angeles Aqueduct (LA Aqueduct) and AVEK's water transmission pipeline that terminates near California City (California City Pipeline). The LA Aqueduct conveys to LADWP's service area surface water runoff from the Easter Sierra Nevada Mountains in Inyo County as well as groundwater from the Mono Basin in Inyo County (collectively referred to in this section as Owens Valley water). The LA Aqueduct extends through the western portion of the IWVGB, including through the Freeman-Dixie Wash and El Paso areas. The California City pipeline is located at California City, approximately 15 miles south of the IWVGB boundaries and 50 miles south of the City of Ridgecrest.

The IWVGA has identified the following two imported water project options as conceptually feasible for potential implementation. Each of the options is briefly described below, and a technical memorandum that more fully describes the projects is included in Appendix 5-B. It is anticipated that either one of the two imported water project options will be fully implemented by 2035.

Option 1: Direct Use Project with AVEK

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be wheeled through existing AVEK facilities, specifically through existing AVEK surface water treatment facilities and the California City Pipeline. AVEK staff has indicated that there is currently unused capacity in the California City pipeline. The California City Pipeline would require an extension of approximately 50 miles along Interstate Highway 14 into the populated centers of the IWVGB. Due to the elevation profiles of the proposed pipeline alignment, at least two (2) pump stations will be required to lift the IWVGA's imported water supplies over the El Paso Mountains and through the El Paso area. A potable water storage tank would also be required. The treated water would be used directly to meet water demands that exceed the long-term natural recharge to the IWVGB. A map of the facilities required for Imported Water Option 1 is shown on Figure 5-1, including approximate locations of pump stations.

Option 2: Groundwater Recharge Project with LADWP

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be delivered to MWD and subsequently provided to LADWP for use in LADWP's service area. In exchange, LADWP would provide Owens Valley water from the LA Aqueduct to the IWVGB for use in a groundwater recharge project. A new turnout from the LA Aqueduct would be required, along with a raw water pipeline conveying Owens Valley water to a potential new spreading grounds located northwest of the Inyokern Airport. The Owens Valley water would be recharged into the IWVGB at the spreading grounds and serve as a supplemental source of recharge to replace any groundwater pumping that exceeds the long-term natural recharge to the IWVGB. A map of the facilities required for the Option 2 project is shown on Figure 5-2, including a preliminary location of the surface spreading grounds.

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Option 1 project will directly meet groundwater demands above the current sustainable yield of the IWVGB. The proposed Option 2 project will replace any groundwater produced above the natural recharge to the IWVGB and allow the IWVGB to be operated within the Future Sustainable Yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. By reducing groundwater production in the IWWGB, development of imported water supplies will assist with the preservation of China Lake NAWS and the community.

The metric for measuring management actions benefits will be to monitor groundwater levels, groundwater quality, change in groundwater in storage in the IWVGB, and the avoidance of undesirable results as defined by minimum thresholds in section xxx.

~~The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.~~

5.3.1.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Economically viable agricultural operations and industrial operations cannot be sustained without an augmented water supply. Similarly, current domestic and municipal users would not be able to demands without an augmented water supply. Accordingly, the IWVGA is currently working with potential water supply sellers and transfers partners to secure opportunities to purchase and convey imported water supplies to the IWVGB.

See Section 5.2.1.3 for additional justification.

5.3.1.4 *Costs*

A summary of the conceptual capital costs, water rights acquisition costs, annual operations and maintenance (O&M costs), and annual service costs for the necessary infrastructure for Imported Water Project Option 1 is shown in Table 5-1. Annual O&M for Imported Water Project Option 1 would primarily consist of maintenance on the two pump stations and power to lift water across the El Paso Mountains into the IWVGB. Annual service costs for Imported Water Project Option 1 would consist of transportation, wheeling, and treatment fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5-1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-1. Conceptual Costs for Direct Use Project with AVEK (Imported Water Project Option 1).

Item	Total
Capital Costs[1]	$177,975,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$2,280,000
Annual Service Costs[4]	$5,860,000

Notes:

1) Includes two 8,800 gpm pump stations; a 28" steel pipeline extension approximately 50 miles in length; and a one million gallon steel reservoir

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes pump station maintenance and pump station power supply.

4) Includes estimated State Water Project transportation charges, wheeling charges, and treatment charges.

A summary of the conceptual costs, water rights acquisition costs, annual O&M costs, and annual service costs associated with Imported Water Project Option 2 is shown in Table 5-2. Annual O&M for Imported Water Project Option 2 would primarily consist of maintenance on the IWVGA's new surface spreading grounds. Annual service costs for Imported Water Project Option 2 would consist of transportation and wheeling fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5.1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-2. Conceptual Costs for Option 2: Groundwater Recharge Project with LADWP.

Item	Total
Capital Costs[1]	$55,046,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$180,000
Annual Service Costs[4]	$4,260,000

Notes:

1) Includes a new turnout from the Los Angeles aqueduct; a new 28" steel pipeline approximately 10 miles in length; and an approximately 800-acre surface spreading grounds.

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes spreading grounds maintenance.

4) Includes estimated State Water Project transportation charges and wheeling charges.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.1.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. Imported Water Project Options 1 and 2 will require encroachment permits from Kern County Public Works to secure right-of-way for the IWVGA's new imported water pipelines. The Option 1 project will require an encroachment permit from the California Department of Transportation to secure right-of-way for the new California City pipeline extension along Interstate Highway 14.

An application may need to be submitted to the Bureau of Land Management to secure a Land Use Permit for construction of the new imported water pipelines (Options 1 and 2) and surface spreading grounds (Option 2 only) on lands within the jurisdiction of the Bureau of Land Management.

Implementation of either Imported Water Option is subject to CEQA regulations and would require the preparation of a CEQA Initial Study to determine what, if any, further CEQA review will be required. Due to the presence of lands managed by the China Lake NAWS and by the Bureau of Land Management, implementation of either Imported Water Option may also be subject to National Environmental Policy Act (NEPA) regulations and would require the preparation of a NEPA Environmental Impact Statement. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

If treated water is delivered to the IWVWD for direct use through Imported Water Project Option 1, an amendment to the IWVWD's current Domestic Water Supply Permit from the State Water Resources Control Board – Division of Drinking Water will be required.

Transportation and wheeling of imported water supplies will need either approvals from or agreements with the Department of Water Resources; KCWA; AVEK (for Imported Water Project Option 1 only); and MWD and LADWP (for Imported Water Project Option 2 only).

Per the IWVGA's Joint Powers Authority Agreement, this GSP shall not authorize any water supply augmentation to the IWVGB with groundwater from a basin within the jurisdiction of a general member of the IWVGA without the approval of the Primary Director representing that general member. Any proposal to transfer groundwater from Inyo County to the IWVGB (i.e. under Imported Water Project Option 2) would require the approval of the Inyo County Board of Supervisors, who will consider the existing environmental, agricultural, business, and civic interests in Inyo County in their decision to approve such a proposal. Inyo County Code Section 18.77 requires that any transferor of water pursuant to California Water Code Section 1810 obtain a conditional use permit (CUP) from the Inyo County Planning Commission (ICPC). The CUP would only be approved should the ICPC—as well as the Inyo County Water Commission and the Inyo County Water Department—find that the transfer of water does not unreasonably affect the environmental interests of Inyo County.

5.3.1.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the procurement of imported water supplies through the project's CEQA and NEPA processes.

5.3.1.7 *Implementation Process and Timetable*

The IWVGA has retained the services of Capitol Core Group, a water marketing and lobbying firm, to identify potential water supplies available for purchase as well as potential funding opportunities for the Imported Water Project Options. Capitol Core Group has provided the IWVGA with written deliverables outlining the potential future water supply opportunities available for the IWVGA to purchase and the potential strategic funding plans to pay for the infrastructure associated with the Imported Water Project Options. These written deliverables are confidential and are neither provided nor discussed in this GSP.

The IWVGA will continue to develop an imported water project as a post-GSP action. The IWVGA will meet with AVEK to discuss use of the existing California City pipeline capacity and the transfer agreements with DWR, KCWA, and AVEK. The IWVGA will also meet with LADWP to discuss Inyo County public approval, the nature of the exchanges with MWD and LADWP, and the transfer agreements with DWR, KCWA, LADWP, and MWD. The IWVGA will also conduct additional engineering studies of both Imported Water Project Options. It is anticipated that final selection of the most feasible Imported Water Project Option will occur in January 2023 after preparation of an engineering report and negotiation with the relevant transfer agencies. It is anticipated that the permitting and regulatory process will commence in January

2023 and will be completed in January 2026. Design, permitting, and construction of the infrastructure for the final Imported Water Project Option will begin in January 2026 and will be completed in January 2035. Throughout this process the implementation schedule and feasibility of the options will be examined on a regular schedule, and management actions and projects will be adjusted if needed. As a minimum, this will occur in a timely fashion so that it can be reported to the DWR at the scheduled 5-year report periods.

5.3.1.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code Section 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface or groundwater into the agency, and conserve and store within or outside the agency that water for any purpose necessary or proper to carry out the provisions of this part, including, but not limited to, the spreading, storing, retaining, or percolating into the soil of the waters for subsequent use or in a manner consistent with the provisions of Section 10727.2."Accordingly, SGMA grants the IWVGA the legal authority to implement the development of imported water supplies as a GSP management action.

5.3.1.9 *Source and Reliability*

Imported Water Project Options 1 and 2 will require the IWVGA to secure temporary transfer(s) or a single permanent transfer of external water supplies from a water district or water rights holder. The water rights acquisition costs shown in Tables 5-1 and 5-2 assume that the IWVGA will be able to secure a permanent transfer of SWP Table A Entitlement. The annual availability of SWP water supplies is highly variable due to hydrologic conditions. From 2007-2016, total historical annual deliveries of Table A allocation ranged from 475 TAF in 2014 (approximately 11% of the total Table A entitlement) to 2,901 TAF in 2011 (approximately 70% of the total Table A entitlement). The ten-year average of Table A deliveries from 2007-2016 was 1,778 TAF, but the running long-term average of Table A deliveries is currently **2,571 TAF**, or approximately **62%** of the total Table A entitlement (DWR 2018).

The hydrologic variability of SWP and other external water supplies may be addressed through water banking. The IWVGA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the IWVGB. Participation in a groundwater banking program would improve the reliability of the IWVGA's purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries. Participation in a groundwater banking program may also allow the IWVGA to purchase additional water supplies during wet periods. The potential groundwater banks in relative proximity to the IWVGB include:

- Willow Springs Water Bank
- Semitropic Water Storage District
- Rosedale Rio Bravo Water Storage District
- AVEK Water Banks
    - Westside Water Bank, Eastside Water Bank, and High Desert Water Bank
- Kern Water Bank

The IWVGA will continue to evaluate the availability and reliability of external water supplies, including SWP water supplies, in its effort to define the most feasible Imported Water Project Option. The IWVGA will also continue to evaluate potential groundwater banking opportunities to enhance the reliability of its purchased water supplies.

5.3.2 Project No. 2: Optimize Use of Recycled Water

5.3.2.1 *Project Description*

The IWVGA, working with the City of Ridgecrest (City), will optimize the use of recycled water supplies in the IWVGB. The City currently operates an existing 3.6 million gallon per day (MGD) WWTF[3] located on the NAWS base, approximately 3.5 miles northeast of the City center. Annual average day flows at the WWTF were approximately 2.44 MGD in 2017, or approximately 2,739 AFY. The City WWTF produces recycled water that is currently applied at a City site for irrigation of alfalfa fields with a recycled water demand of approximately 220 AFY, and at the China Lake NAWS for irrigation of a golf course with a recycled water demand of approximately 500 AFY. The remaining treated wastewater generated at the City WWTF—approximately 2,010 AFY—is discharged to evaporation/percolation ponds at the City WWTF site. A portion of the treated wastewater discharged to the evaporation/percolation ponds serves as seepage flow to the Mojave Tui Chub habitat, located north of the City WWTF. It has been estimated that the annual water demands to maintain the habitat is approximately 805 AFY (ERS 1991). The existing uses of recycled water in the IWVGB are discussed further in Section 2.7.5 of this GSP.

The City of Ridgecrest's existing WWTF is currently the only facility which generates a recycled water supply for direct beneficial or controlled use within the IWVGB. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The new recycled water facilities would provide up to 1.8 MGD (2,016 AFY) of recycled water for City use in landscape irrigation and/or groundwater recharge (Provost & Pritchard, 2015).

The IWVGA will coordinate with the City to further optimize the use of recycled water in the IWVGB. The IWVGA has identified the following three (3) recycled water subprojects as conceptually feasible for potential implementation in accordance with this GSP.

---

[3] A Memorandum of Agreement dated April 1, 1993, between the Navy and the City states that the City owns and operates the WWTF, though there is a general lack of consensus among the IWVGB stakeholders regarding the ownership and operations of the WWTF. The term "City WWTF" is used in this GSP for the sole purpose of distinguishing between the two existing WWTFs in the IWVGB.

- Recycled Water Subproject 1 – Landscape Irrigation in the City and the China Lake NAWS
- Recycled Water Subproject 1a – Landscape Irrigation at Cerro Coso Community College
- Recycled Water Subproject 2 - Groundwater Recharge

Each of the IWVGA's recycled water subprojects is briefly described below. A technical memorandum that more fully describes the recycled water subprojects is included in Appendix 5-C. Further evaluation of the other potential opportunities for recycled water subprojects in the IWVGB (including industrial use of recycled water) will be conducted as a post-GSP action.

Recycled Water Subproject 1: Landscape Irrigation in the City and the China Lake NAWS

The City currently operates five (5) groundwater wells that provide irrigation for approximately 53 acres of landscaping located at City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Indian Wells Valley Water District (Water District) serves a large portion of the City, and it is assumed that the Water District provides groundwater for landscape irrigation within City boundaries with the exception of City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Navy operates wells that provide groundwater for landscape irrigation within the China Lake NAWS.

Under Recycled Water Subproject 1, the IWVGA will replace the groundwater currently used for landscape irrigation within the City and the China Lake NAWS with recycled water. Approximately 119 acres of existing landscaping have been identified within the City (95 acres) and the China Lake NAWS (24 acres) for potential landscape irrigation with recycled water (see Appendix 5-C). The estimated annual recycled water demand for landscape irrigation within the City and China Lake NAWS for Recycled Water Subproject 1 is estimated to be 930 AFY. The new facilities for Recycled Water Subproject 1 include a new 5,100 gpm recycled water booster pump station; approximately 15 miles of new purple pipe distribution system; and site retrofits for existing landscape areas including connections to existing irrigation mains, recycled water meters, pressure-reducing valves, and backflow prevention devices. A map of facilities required for Recycled Water Subproject 1 is shown on Figure 5-3.

Recycled Water Subproject 1a: Landscape Irrigation at Cerro Coso Community College

Under Recycled Water Subproject 1a, the IWVGA will extend the recycled water distribution system from Recycled Water Subproject 1 to replace existing groundwater use for landscape irrigation at Cerro Coso Community College (Cerro Coso) with recycled water. Approximately 25 acres of landscaping at Cerro Coso have been identified for potential irrigation with recycled water, and the estimated annual recycled water demand at Cerro Coso is approximately 194 AFY. The facilities to be constructed under Recycled Water Subproject 1 as well as additional new facilities will be required to deliver 194 AFY of recycled water to Cerro Coso. The additional new facilities include an additional 900 gpm recycled water booster pump station; approximately 4 miles of additional purple distribution pipe; and appropriate site retrofits at Cerro Coso. A map of facilities required for Recycled Water Subproject 1a is shown on Figure 5-4.

Recycled Water Subproject 2: Groundwater Recharge

Under Recycled Water Subproject 2, the IWVGA will further treat the produced recycled water supplies at the City WWTF for groundwater recharge through subsurface applications (deep injection). A recycled water groundwater recharge project through surface applications (surface spreading grounds) would not be feasible due to the limiting geologic and hydrogeologic conditions in the vicinity of the City WWTF. The presence of thick lacustrine clay layers and the minimal groundwater flow between water-bearing zones would prevent surface application of recycled water in the vicinity of the City WWTF from recharging the active production zones in the IWVGB. For effective recharge of the IWVGB, deep injection facilities will be required for Recycled Water Subproject 2.

The IWVGA estimates that approximately 352 AFY of recycled water will be available for groundwater recharge under Recycled Water Subproject 2. Additional quantities of recycled water for groundwater recharge may become available should any of the existing recycled water practices, such as maintaining seepage flow to the Tui Chub habitat (see Section 2.7.5.3), be discontinued.

The new facilities for Recycled Water Subproject 2 include new advanced wastewater treatment facilities; a new 300 gpm recycled water booster pump station; approximately 3 miles of new transmission pipeline; and deep injection wells. The City has developed efforts independent of this GSP to construct a new WWTF including tertiary treatment facilities with the capacity to treat 1.8 MGD (2,016 AFY) of wastewater. In accordance with the provisions for subsurface applications of recycled water as published in Title 22

Section 60320.201 of the California Code of Regulations, the recycled water supplies produced for deep injection must undergo advanced treatment through reverse osmosis and advanced oxidation. The IWVGA will construct the appropriate advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation) solely for the recycled water produced for groundwater recharge through deep injection. A map of facilities required for Recycled Water Subproject 2 is shown on Figure 5-5.

5.3.2.2 *Project Benefits and Mitigation of Overdraft*

The proposed Recycled Water Subprojects 1 and 1a will directly reduce groundwater produced above the current sustainable yield of the IWVGB for landscape irrigation. The proposed Recycled Water Subproject 2 will replace some groundwater produced above the natural recharge to the IWVGB and contribute to allowing the IWVGB to be operated within the future sustainable yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. In addition, the proposed project will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, optimization of recycled water supplies will assist with the preservation of China Lake NAWS and the community.

The metric for measuring management actions benefits will be to monitor groundwater levels, groundwater quality, change in groundwater in storage in the IWVGB, and the avoidance of undesirable results as defined by minimum thresholds in section xxx.

~~The metric for measuring project benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.~~

~~5.3.2.4~~5.3.2.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions to in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Accordingly, the IWVGA plans to work with the City to generate new recycled water supplies for replacement of existing groundwater uses in landscape irrigation and for augmentation of the current natural recharge to the IWVGB. Existing groundwater uses for landscape irrigation should be replaced with non-potable water supplies (i.e. recycled water) to the greatest extent feasible so that groundwater may be produced primarily for domestic purposes.

See Section 5.2.1.3 for additional justification.

~~5.3.2.5~~5.3.2.4 *Project Costs*

The City's independent efforts to construct a new WWTF include construction of tertiary treatment facilities to treat up to 1.8 MGD (2,016 AFY) of wastewater. The tertiary treatment capacity developed as part of the City's independent efforts is sufficient to treat 930 AFY of recycled water for Recycled Water Subproject 1 as well as the quantities of recycled water for Recycled Water Subprojects 1a and 2 discussed below. Therefore, the conceptual costs for the recycled water subprojects described below do not include estimates to construct new tertiary treatment facilities.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1 is shown in Table 5-3. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1 include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-3. Conceptual Costs for Recycled Water Subproject 1: Landscape Irrigation with Recycled Water at City/China Lake NAWS.

Item	Total
Capital Costs [1]	$42,757,200
Annual Operations & Maintenance Costs [2]	$395,500

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1a is shown in Table 5-4. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1a include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-4. Conceptual Costs for Recycled Water Subproject 1a: Landscape Irrigation with Recycled Water at Cerro Coso Community College

Item	Total
Capital Costs[1]	$10,183,200
Annual Operations & Maintenance Costs[2]	$129,300

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices.

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

It should be noted that the required facilities for Recycled Water Subproject 1a are considered an extension of the facilities required for Recycled Water Subproject 1. The costs presented above and in Table 5-4 are considered incremental extensions of the costs listed in Table 5-3.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 2 is shown in Table 5-5. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 2 include annual maintenance and power supplies for the new recycled water pump station, annual maintenance of the purple pipe distribution system, and annual maintenance of the advanced wastewater treatment facilities.

Table 5-5. Conceptual Costs for Recycled Water Subproject 2: Deep Injection with Recycled Water for Groundwater Recharge

Item	Total
Capital Costs[1]	$22,798,000
Annual Operations & Maintenance Costs[2]	$480,300

Notes:

1) Includes new purple pipe distribution pipelines; a 300 gpm recycled water pump station; advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation with UV/H_2O_2); and a 500 gpm deep injection well.

2) Includes pump station maintenance, pump station power supply, distribution system maintenance, and advanced treatment facilities maintenance.

Costs for this project may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

~~5.3.2.6~~5.3.2.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. The City will need to obtain a new National Pollutant Discharge Elimination System (NPDES) permit from the Lahontan Regional Water Quality Control Board (LRWQCB) for the new wastewater treatment facility. The IWVGA will need to prepare a Report of Waste Discharge for the new advanced wastewater treatment facilities and submit an application to the LRWQCB for a Waste Discharge Requirements/Water Reclamation Requirements (WDR/WRR) permit for a new groundwater replenishment project using recycled water. In accordance with the regulations for Groundwater Replenishment Reuse Projects (GRRPs) through subsurface application (per California Code of Regulations, Title 22, Division 4, Chapter 3, Article 5.2), the IWVGA will also need to submit and have approved by the State Water Resources Control Board – Division of Drinking Water a Title 22 Engineering Report to obtain the WDR/WRR permit.

The City's existing wastewater treatment facility is located within the boundaries of the China Lake NAWS. An easement permit from the U.S. Navy may be required to modify the existing wastewater treatment facility and/or to construct the recycled water pipelines for Recycled Water Subprojects 1, 1a, and 2.

Construction of the recycled water distribution system and transmission pipelines may require encroachment or excavation permits from the City.

Implementation of this project is subject to California Environmental Quality Act (CEQA) regulations and would require the preparation of a CEQA Initial Study. Due to of the need for easements on land managed by the China Lake NAWS, implementation of this project may also be subject to National Environmental Policy Act (NEPA) regulations and may require the preparation of a NEPA Environmental Impact Statement. The IWVGA will follow all regulatory requirements associated with the CEQA and NEPA processes including public noticing and review requirements.

~~5.3.2.7~~5.3.2.6 *Public Notice*

The public will be given the opportunity and time to participate in and provide feedback on the optimization of recycled water supplies through the project's CEQA and NEPA processes.

~~5.3.2.8~~5.3.2.7 *Implementation Process and Timetable*

Prior to implementing the optimization of recycled water supplies, the IWVGA will coordinate with and assist the City in its independent efforts to relocate, expand, and enhance the existing City WWTF. It is anticipated that the recycled water permitting and regulatory process will commence in January 2022 and will be completed in January 2023. Construction of the infrastructure for the Recycled Water Subprojects will begin in January 2023 and will be completed in January 2025.

~~5.3.2.9~~5.3.2.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "transport, reclaim, purify, desalinate, treat, or otherwise manage and control polluted water, wastewater, or other waters for subsequent use in a manner that is necessary or proper to carry out the purposes of this part." Accordingly, SGMA grants the IWVGA the legal authority to implement the optimization of recycled water supplies as a GSP management action.

~~5.3.2.10~~5.3.2.9 *Source and Reliability*

The IWVGA's recycled water subprojects will rely on the availability of treated effluent generated at the City WWTF. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The City has taken steps to initiate the City WWTF modifications/relocation, but progress on the City WWTF modifications/relocation is currently at a halt pending land use negotiations with the NAWS China Lake. The IWVGA's recycled water subprojects will build upon the tertiary treatment facilities that the City plans to construct at its new WWTF. Before implementation of the IWVGA's recycled water subprojects can commence, the City must complete negotiations with the NAWS China Lake and construct the modified/relocated City WWTF.

5.3.3 Project No. 3: Basin-wide Conservation Efforts

5.3.3.1 *Project Description*

An additional project is to develop additional voluntary and rebate-based conservation efforts for domestic beneficial uses in the IWVGB, and to also promote additional conservation efforts for the other beneficial uses (primarily industrial) that rely on groundwater from the IWVGB.

The IWVGA will confer with domestic and municipal groundwater producers (namely the Water District, City, Navy, and private/domestic well owners) to discuss historical and current conservation measures, which will be used as a guide to establish the new voluntary conservation measures on a basin-wide level. Specifically, the IWVGA will review the current conservation measures governing landscape irrigation, wash-downs, and other practices that potentially waste water. The IWVGA may also determine the health and safety water use requirements for domestic water use in the IWVGB and use these requirements as another guide to establish the new voluntary conservation measures. The IWVGA will retain the services of a professional water conservation consultant to prepare a Water Conservation Strategic Plan that will incorporate the IWVGA's discussions with domestic and municipal groundwater producers as well as the IWVGA's evaluation of health and safety water use requirements in the IWVGB. The IWVGA will implement the Water Conservation Strategic Plan in all domestic and municipal uses of groundwater in the IWVGB.

Historically, the Water District, the City, and the Navy have implemented mandatory water use restrictions within their service areas/jurisdictions in an effort to reduce groundwater production in the IWVGB (see Section 2.7.3). The IWVGA will build upon the historical and current mandatory water use restrictions to potentially establish new basin-wide mandatory conservation measures that will reduce per-capita water demands for domestic and recreational (irrigation) uses of groundwater to the greatest extent feasible. The new basin-wide mandatory conservation measures would also be enforced in the communities outside of the IWVGB that rely on groundwater from the IWVGB—namely the communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley.

The results of the IWVGA's Water Conservation Pilot Project (Rebate Program and Water Audit, Leak Detection, and Leak Repair Program) for Severely Disadvantaged Communities will be evaluated for potential implementation on a basin-wide level. Pending evaluation of the Rebate Program, the IWVGA may implement a basin-wide rebate program to promote the installation of water-conserving fixtures and appliances. Pending evaluation of the Water Audit, Leak Detection, and Leak Repair Program, the IWVGA may oversee a basin-wide leak detection and repair effort to reduce system water losses in the IWVGB.

The IWVGA will also coordinate with Searles Valley Minerals, Inc. (SVM) to investigate the potential for and feasibility of conservation in the industrial water uses of SVM. The IWVGA will reach out to SVM staff to discuss the historical conservation measures that have been implemented in SVM's mineral recovery process. In coordination with SVM staff, the IWVGA will also determine if SVM's mineral recovery process may be supplied with non-potable water resources such as recycled water and/or brackish water. If so, the IWVGA will conduct a feasibility study on the infrastructure and cost required to convey non-potable water resources to SVM for use in the mineral recovery process, including all necessary retrofits to SVM's existing mineral recovery facilities. If SVM's use of recycled and/or brackish water is determined to be feasible, the IWVGA will construct new facilities for production and conveyance of recycled and/or brackish water to SVM, as well as all necessary retrofits to SVM's existing mineral recovery facilities.

5.3.3.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the preservation of NAWS China Lake and the surrounding supporting communities will be upheld.

The metric for measuring management actions benefits will be to monitor groundwater levels, groundwater quality, change in groundwater in storage in the IWVGB, and the avoidance of undesirable results as defined by minimum thresholds in section xxx.

~~The metric for measuring management actions benefits will be to monitor groundwater levels and change in groundwater in storage in the IWVGB.~~

~~5.3.3.4~~5.3.3.3 *Justification*

Due to the current state of overdraft and the current unavailability of supplemental water supplies, further developing and expanding current conservation efforts are a necessity to reach sustainability. The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. In addition, the high cost to acquire and convey supplemental water supplies will impact the financial status of the IWVGB's residents and local entities. Accordingly, the IWVGA must work with groundwater users in the IWVGB to implement basin-wide conservation measures that will minimize groundwater production and therefore minimize the quantity (and cost) of supplemental water required to reach future basin sustainability.

~~5.3.3.5~~5.3.3.4 *Project Costs*

At this time, there are no capital costs anticipated with implementing basin-wide conservation efforts. The IWVGA will dedicate approximately $20,000 annually to find opportunities for additional conservation and implement the new basin-wide conservation measures. The associated costs will consist of evaluating current conservation measures, determining opportunities for additional conservation, conducting public outreach, meeting with groundwater producers, and drafting and adopting conservation ordinances.

The costs for implementing basin-wide conservation efforts may increase should the IWVGA determine that the Water Conservation Pilot Project for Severely Disadvantaged Communities be implemented at a basin-wide level. The costs associated with a basin-wide Rebate Program would consist of advertising, marketing, customer service, processing rebate applications, purchasing water-conserving fixtures and appliances, vendor coordination, and issuing rebates. The costs associated with a basin-wide Water Audit, Leak Detection, and Repair Program would consist of conducting water audits, conducting leak detection surveys, reporting distribution system and storage leak occurrences, and repairing identified leaks.

The costs for implementing basin-wide conservation efforts may also increase should the IWVGA pursue conservation efforts in SVM's mineral recovery process. The associated costs would consist of coordination, meetings, and site tours with SVM staff; review of SVM's historical conservation measures; and analysis of opportunities for additional conservation in the mineral recovery process. Should the IWVGA conclude that SVM's mineral recovery process may use non-potable water supplies (recycled and/or brackish water), other associated costs would consist of preparing a feasibility study and engineering report, permitting, construction of recycled/brackish water production facilities, construction of recycled/brackish water conveyance facilities, and installation of all necessary retrofits to SVM's existing mineral recovery facilities.

Costs may be funded through fees, grants, state and federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

~~5.3.3.6~~5.3.3.5 *Permitting and Regulatory Process*

This management action currently does not require the IWVGA to obtain approved permits. However, should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, construction of infrastructure to convey recycled and/or brackish water to SVM may be subject to the CEQA and NEPA regulatory processes.

~~5.3.3.7~~5.3.3.6 *Public Notice*

The public will be given notice of the IWVGA's adoption of ordinances that would enforce any additional conservation measures. As part of marketing the new voluntary conservation measures, the public will be provided with materials documenting the opportunities for voluntary conservation as well as the associated rebates issued by the IWVGA.

Should the IWVGA implement a Rebate Program on a basin-wide level, the public will be provided with materials documenting the methods by which domestic and municipal groundwater producers may apply for rebates for water-conserving fixtures and appliances. Should the IWVGA implement a Water Audit, Leak Detection, and Leak Repair Program, members of the public that own or operate a groundwater production and distribution system will be provided with opportunities for a consultant to conduct system water audits with leak detection surveys and repairs to minimize system water losses.

Should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, the public will be provided with the opportunity to participate in the required CEQA and NEPA regulatory processes.

~~5.3.3.8~~5.3.3.7 *Implementation Process and Timetable*

Prior to implementing basin-wide conservation measures, the IWVGA will determine acceptable conservation measures based on an analysis of historical current conservation measures enforced by the Water District, the City, and the Navy, as well as health and safety requirements for water use in the IWVGB. The IWVGA will confer with domestic and municipal groundwater producers to discuss opportunities for additional water conservation. The IWVGA will also retain its professional water conservation consultant to develop a Water Conservation Strategic Plan. It is anticipated that the Water Conservation Strategic Plan will be completed by no later than January 2023 and will be implemented over the GSP planning and implementation horizon.

The IWVGA's Water Conservation Pilot Program for Severely Disadvantaged Communities is expected to be completed by December 2020. The results of the Pilot Program will be evaluated by IWVGA staff for potential basin-wide implementation, which is tentatively planned for no later than January 2023.

IWVGA will coordinate with SVM staff starting as soon as practical regarding potentially additional opportunities for conservation in SVM's mineral recovery process. A feasibility study and engineering report describing the potential for SVM to use recycled and/or brackish water in the mineral recovery process will be completed as soon as practical. If SVM use of recycled and/or brackish water is feasible, construction of new production facilities, conveyance infrastructure, and site retrofits for SVM will commence no later than January 2025.

~~5.3.3.9~~5.3.3.8 *Legal Authority*

SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code 10725.2). Specifically, California Water Code Section 10726.4 grants the IWVGA authority to "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells". California Water Code Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement basin-wide conservation measures as a GSP management action.

5.3.4 Project No. 4: Shallow Well Mitigation Program

5.3.4.1 *Project Description*

As discussed in Section 3.3.4.4, the IWVGB has been overdrafted for many decades resulting in a significant lowering of the regional and local groundwater elevations, and a significant reduction in the amount of useable groundwater in storage. In addition, the IWVGB has areas with poor water quality (specifically high total dissolved solids) which has migrated to areas that previously had higher quality groundwater, resulting in water quality impacts to some wells. Most of the impacted wells are "shallow" wells, constructed to serve rural households, rural domestic/mutual water companies, small agricultural, and livestock water supply needs. Shallow well impacts are a direct result from both the chronic lowering of groundwater levels and degraded water quality, and therefore a Shallow Well Mitigation Program is necessary to reach IWVGB sustainability.

The IWVGA will prepare a mitigation plan (Shallow Well Mitigation Plan) to address the approximately 872 shallow wells in the IWVGB. The Shallow Well Mitigation Plan will include the development of criteria to characterize the level of impacts and the development of an evaluation process to access the viability of the wells. Shallow wells that experience impacts related to chronic lowering of groundwater levels and/or degraded water quality that have occurred after February 1, 2020 are eligible for mitigation, pending the evaluation of the impacts. The evaluation process will include, but not be limited to, analysis of:

1) loss of efficiency/performance reduction
2) the appropriateness of the original well design and construction
3) water level and water quality impacts, and
4) the percentage (if any) of well owner's mitigation responsibility.

The Shallow Well Mitigation Plan will also outline the process by which individual well owners can apply and submit wells for evaluation and consideration for mitigation by the IWVGA, including the evaluation and review process the IWVGA's Water Resources Manager will follow to process the applications and make recommendations to the IWVGA Board.

After the adoption of the Shallow Well Mitigation Plan, in appropriate intervals throughout the planning horizon, shallow wells will be evaluated based on the adopted criteria and organized into specific areas/zones for development of effective mitigation options. Some wells may be proposed to be abandoned (not mitigated) based on evaluation of impacts. Specific improvements will be identified for impacted shallow well which may include deepening the well, replacing the well, connecting to existing water systems, or other mitigation measures. The wells recommended for mitigation will be placed on an Impacted Shallow Well Priority List and will be scheduled for mitigation.

5.3.4.2 *Project Benefits and Mitigation of Overdraft*

The proposed Shallow Well Mitigation Project will directly mitigate impacts due to the following:

- Reduction of groundwater in storage;
- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Shallow Well Mitigation program will provide a direct benefit to beneficial users in the IWVGB who have unreasonably experienced water supply and financial hardships due to overdraft conditions in the IWVGB. Many of the beneficial users that will benefit from the implementation of this project are members of disadvantaged communities. The implementation of the other proposed projects and management actions will also improve groundwater conditions and are anticipated reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E).

The metric for measuring project benefits will be the number of shallow wells that are impacted and mitigated under this program.

5.3.4.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Shallow Well Mitigation Program to mitigate undesirable results caused by chronic lowering of groundwater levels and degraded water quality that are directly impacting individual well owners and directly impacting their ability to meeting potable water demands, including demands for basic health and safety.

5.3.4.4 *Project Costs*

The estimated cost to develop the Shallow Well Mitigation Plan is $70,000. The estimated annual costs to administer the program is $20,000. The model results for the proposed projects and management actions indicate that potentially 22 shallow wells could be impacted. The estimated costs to mitigate these impacts is $1.65 million.

5.3.4.5 *Permitting and Regulatory Process*

The shallow well mitigation effort will require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. Furthermore, implementation of shallow well mitigation measures is anticipated to require a series of permits and approvals, including but limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will conduct a CEQA review to identify potential impacts for some mitigation projects. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.4.6 *Public Notice*

The public will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.4.7 *Implementation Process and Timetable*

The Shallow Well Mitigation Plan will be developed to describe the process and criteria used to evaluated impacted shallow wells and the process by which well owners can submit their wells for consideration for mitigation by the IWVGA. It is anticipated the Shallow Well Mitigation Plan will be developed by December 2020, with implementation of mitigation measures continuing throughout the planning horizon. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Shallow Well Mitigation Plan. In appropriate intervals throughout the planning horizon, shallow wells will be evaluated in accordance with the Shallow Well Mitigation Plan and the Impacted Shallow Well Priority List will be available for public review prior to implementing mitigation.

5.3.4.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Shallow Well Mitigation Program.

5.3.5 Project No. 5: Dust Control Mitigation Program

5.3.5.1 *Project Description*

Section 5.2.1 identifies the first planned management action as implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. Implementation of this management action will result in a potential increase in windblown dust and sand, due to the climate of the IWV, which must be mitigated concomitant with decreased agricultural water use.

The IWVGA will prepare a study (Dust Control Mitigation Plan) to investigate best management practices to address windblown dust and sand that can be used on fallowed agricultural land and to identify the location and magnitude of the potential need for dust control. In 1991, the "Dustbusters Research Group" was formed to develop "…best management practices for mitigating wind erosion, reducing blowing dust and improving air quality" in the Antelope Valley, which has comparable issues as the IWV regarding windblown dust. (Agricultural Guide to Controlling Windblown Sand and Dust, October 2010). Mitigation measures applicable to farmland that do not require addition water use include, but are not limited to, the following:

- Wind breaks/wind barriers: According to the Agricultural Guide to Controlling Windblown San and Dust, wind typically does not lift sand much more than three feet into the air. Consequently, the wind breaks/wind barriers create a "trap" which interrupts to transport of blowing sand and causes the sand to deposit at the site of the wind break. Wind breaks may include, but are not limited to, solid or porous fences, straw bales, tilling soils to create surface roughness, and berms.

- Mulch: According to the Agricultural Guide to Controlling Windblown Sand and Dust, surface coverings to address blowing dust may include, but are not limited to, mulch (wood chips, gravel, and /or plastic products) and chemical dust suppressants.

Based on the results of the Dust Control Mitigation Plan and what current IWVGB farms voluntarily fallow agricultural land, critical areas will be identified and prioritized for mitigation. The IWVGA initially will monitor dust issues as agricultural practices continue and are gradually phased out, to create a baseline by which to compare and evaluate future mitigation needs. IWVGA will continue to monitor the occurrence of windblown dust and sand and implement proactive mitigation measures as identified in the Dust Control Mitigation Plan.

5.3.5.2 *Project Benefits and Mitigation of Overdraft*

The proposed Dust Control Mitigation Program will directly mitigate secondary impacts caused by implementing necessary management actions to address impacts caused by the following sustainability indicators:

- Reduction of groundwater in storage; and
- Chronic lowering of groundwater levels;

The Dust Control Mitigation Program will provide a direct benefit to beneficial users in the IWVGB that may experience undesirable secondary impacts related to the reduction in vegetation and the reduction of use of applied water on agricultural lands. Implementation of mitigation efforts which do not involve use of water will result in an effective replacement of vegetation, and contribute to long-term decreased groundwater use.

The metric for measuring project benefits will be the number of acres of fallowed agricultural lands that have dust control mitigation measures implemented.

5.3.5.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement Management Action 1 (Annual Pumping Allocation Plan, Transient Pool and Fallowing Program) which may cause secondary impacts related to dust that must also be mitigated to achieve sustainability and prevent undesirable results in the IWVGB. If the Dust Control Mitigation Program is not implemented, IWV residents may over time experience impacts to finances, health, and quality of life as a result of unmitigated windblown dust and sand.

5.3.5.4 *Project Costs*

The estimated cost to develop the Dust Control Mitigation Plan is $70,000. The estimated annual costs to administer the program is $20,000. The estimated costs to mitigate these impacts may be up to $19 million.

5.3.5.5 *Permitting and Regulatory Process*

The study of the dust control mitigation effort will likely require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. However, implementation of dust control measure will like include a series of permits and approvals, including but not limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will likely be required to comply with CEQA requirements to identify potential impacts and to describe mitigation measures. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

5.3.5.6 *Public Notice*

The public will be given the opportunity and time to comment on the Dust Control Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.5.7 *Implementation Process and Timetable*

The Dust Control Mitigation Plan will be developed to investigate the magnitude and need for mitigation and best management practices to address windblown dust and sand that can be used on fallowed agricultural land. It is anticipated the Dust Control Mitigation Plan will be developed by June 2021, with implementation of mitigation measures continuing throughout the planning horizon as necessary based on the voluntary schedule of the fallowing of agricultural lands. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Dust Control Mitigation Plan. In appropriate intervals throughout the planning horizon, agricultural lands that may require dust mitigation measures will be evaluated with the recommended mitigation measures made available for public review prior to implementing mitigation. The IWVGA will implement certain proactive mitigation measures in areas of greatest rick and gradually ramp up dust control mitigation, as circumstances demonstrate.

5.3.5.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Dust Control Mitigation Program.

~~5.3.1~~5.3.6 Project No. 6: Pumping Optimization Project

Formatted: Outline numbered + Level: 3 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0"

~~5.3.1.1~~5.3.6.1 *Project Description*

Evaluation of the modeling results for the proposed groundwater management and project scenarios showed that some current groundwater pumping needs to be redistributed in the basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells.

It is anticipated that the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, will greatly reduce groundwater pumping for agricultural uses in the northwestern portion of the IWGWB over time. The modeling results indicate groundwater levels in this area will not only stabilize but will increase as a result of the proposed management actions and projects.

It is also anticipated that groundwater pumping by the Water District west and southwest of the City will continue and that, along with pumping by Searles Valley Minerals, Inc. and others, the groundwater levels in these areas will not completely stabilize by 2040.

The pumping optimization program will relocate some of the Water District, and potentially some of Searles Valley Minerals Inc., groundwater pumping to the northwest portion of the basin. The pumping optimization program will include the construction of two new wells in the northwest portion of the basin along Brown Road and approximately nine miles of pipeline to connect the wells to the Water District's water system.

~~5.3.1.2~~5.3.6.2 *Project Benefits and Mitigation of Overdraft*

The proposed Pumping Optimization Project will directly mitigate impacts due to the following:

- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Pumping Optimization Project will stabilize groundwater levels west and southwest of the City and reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E), due to both lower groundwater levels and from potential water quality impacts.

The metric for measuring management actions benefits will be to monitor groundwater levels, groundwater quality, change in groundwater in storage in the IWVGB, and the avoidance of undesirable results as defined by minimum thresholds in section xxx.

~~The metric for measuring project benefits for this project will be will be to monitor groundwater levels and water quality.~~

~~5.3.1.4~~5.3.6.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Pumping Optimization Project to mitigate undesirable results that would directly impact the ability of shallow well owners to meeting potable water demands, including demands for basic health and safety.

~~5.3.1.5~~5.3.6.4 *Project Costs*

Infrastructure costs are for the design and construction of a new well and new distribution system. The estimated cost to construct the facilities for the Pumping Optimization Project is $23 million.

~~5.3.1.6~~5.3.6.5 *Permitting and Regulatory Process*

Implementation of the Pumping Optimization Project will require encroachment or excavation permits for construction of the pipeline, well permits from Kern County, and agreements for use of the facilities or to take water from the facilities with the Water District and perhaps Searles Minerals, inc. The IWVGA will conduct a CEQA review to identify potential impacts from construction of the facilities. The IWVGA will follow all regulatory requirements associated with the CEQA process including public noticing and review requirements.

~~5.3.1.7~~5.3.6.6 *Public Notice*

The public will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the CEQA document, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

~~5.3.1.8~~5.3.6.7 *Implementation Process and Timetable*

The Pumping Optimization Project will require significant funding from outside the IWV to be feasible. If adequate funding is obtained it is anticipated the Pumping Optimization Project will be complete by December 2025.

~~5.3.1.9~~5.3.6.8 *Legal Authority*

The SGMA statue broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to “perform any act necessary or proper” to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Pumping Optimization Project.

5.4 CONCEPTUAL PROJECTS STILL UNDER CONSIDERATION

5.4.1 Brackish Groundwater Project

To further enhance the sustainable and adaptive management strategies for Indian Wells Valley (IWV), the Brackish Water Resources Partnership was formed, consisting of IWVWD, the Coso Operating Company, Mojave Pistachios, Searles Valley Minerals, and Meadowbrook Dairy, to evaluate the feasibility of extracting and treating brackish groundwater to produce fresh water for potential multiple beneficial uses including, among other things:

- Providing a source of water as a bridge or buffer to assist in achieving SGMA sustainability;
- Diversifying local water supplies;
- Improving reliability as part of a portfolio of multiple sources of water; and
- Providing a local, beneficial industrial use for the waste brine.

There are areas in the IWVGB that have TDS concentrations greater than 1,000 mg/L, particularly in the intermediate and deep aquifer layers and primarily underlying NAWS China Lake. These groundwater areas are considered to be brackish, and are the subject of the Brackish Groundwater Feasibility Study.

The Brackish Groundwater Feasibility Study will examine the feasibility of extracting brackish groundwater, options for treating the brackish groundwater, and options for delivery of all water types to the various connection points. On the basis of examining several criteria, the "ideal" brackish groundwater extraction well has several characteristics:

- Completed in a sand layer that will yield a desirable volume of water over the long term;
- Completed where the long-term TDS concentrations of the brackish groundwater are greater than 1,000 milligrams per liter (mg/L) (up to 4,000 mg/L);
- Located away from existing freshwater production wells;
- Located in an area where the potential for impacts to freshwater resources are minimized (lateral transport, vertical transport); and
- Located in an area where impacts from subsidence are minimized.

An additional constraint is that all brackish groundwater extraction has to occur outside the boundary of NAWS China Lake.

After examining several areas within the basin that have proved to be unsuitable for project implementation, the Brackish Groundwater FS has now narrowed its focus to the northwest part of the IWVGB just south of Pearsonville and north of Brown Road. The Brackish Groundwater Feasibility Study is evaluating if brackish groundwater could be extracted from the deep aquifer zone in this geographical area. After the Brackish Groundwater Feasibility Study is compete, and if brackish groundwater extraction, treatment, and conveyance is found to be feasible, the next steps in the project process would include:

- Conduct a pilot test of brackish groundwater extraction and treatment in the area of interest;
- Design a full-scale brackish groundwater extraction system with associated treatment plant and conveyance works; and
- Construct and commission the full-scale brackish groundwater extraction, treatment, and conveyance system.

5.4.2 Direct Potable Reuse Project

California Water Code section 13561(b) defines direct potable reuse (DPR) as "the planned introduction of recycled water either directly into a public water system or into a raw water supply immediately upstream of a water treatment plant." Possible methods of DPR include:

- Raw water augmentation
  - The planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system.
- Reservoir water augmentation
  - The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, or into a constructed system conveying water to such a reservoir.
- Treated drinking water augmentation
  - The planned placement of recycled water into the water distribution system of a public water system.

The SWRCB currently has no regulatory criteria for DPR projects in California, though uniform water recycling criteria for DPR through raw water augmentation are required to be adopted by the SWRCB by December 31, 2023, in accordance with California Water Code Section 13561.2. At this time, uniform water recycled criteria for DPR through reservoir water augmentation or treated drinking water augmentation are not anticipated to be adopted.

Because no raw water treatment facilities currently exist in the Indian Wells Valley, a reservoir water augmentation project or treated drinking water augmentation project would currently be the only feasible alternatives for DPR of recycled water in the IWVGB. Significant coordination with the SWRCB, DDW, the

Lahontan RWQCB, and potentially the USEPA would be required to implement such a project, including conceptual-level planning, treatment evaluations, permit issuance, pilot testing, regulation development, establishing monitoring requirements, etc. Should the IWVGA pursue imported water opportunities that would require construction of new surface water treatment and storage facilities, a raw water or reservoir water augmentation project may be a feasible alternative for a DPR project. Otherwise, the IWVGA will continue researching the feasibility of a potential DPR project through reservoir water augmentation or treated drinking water augmentation over the GSP planning and implementation horizon.

5.4.3 Additional Projects

The IWVGA is taking an adaptive management approach to IWVGB management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to reach sustainability in the IWVGB. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

5.5 REFERENCES

Antelope Valley Dustbusters 2010. *Agricultural Guide to Controlling Windblown Sand and Dust*. October 2010.

California Regional Water Quality Control Board, Lahontan Region (Lahontan RWQCB), 2016. *Water Quality Control Plan for the Lahontan Region, North and South Basins*. January 2016.

Carollo Engineers, 2008. *City of Ridgecrest Wastewater Treatment Plant Final Project Report*. Prepared for the City of Ridgecrest. September 2008.

DWR, 2017. *Management of the California State Water Project: Bulletin 132-16*. June 2017.

DWR, 2018. *Final State Water Project Delivery Capability Report 2017.* March 2018.

Environmental Science Associates (ESA), 2009. *City of Ridgecrest General Plan Update, Draft Environmental Impact Report*. Prepared for the City of Ridgecrest. May 2009.

Ecological Research Services (ERS), 1991. Elements of a Habitat Management Plan for the Mohave Tui Chub at the China Lake Naval Weapons Center Relative to the City of Ridgecrest's Wastewater

Reclamation Project. Document provided by Stephan Bork of the Indian Wells Valley Technical Advisory Committee. October 1991.

GSP §## from California Code of Regulations (CCR), 2016. California Code of Regulations; Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans.

Plumlee, Megan H. et al. "Costs of Advanced Treatment in Water Reclamation." *Ozone: Science & Engineering: The Journal of the International Ozone Association* 36.5, 485-95. September 2014.

Provost & Pritchard, 2015. *Wastewater Treatment Plant Facility Plan*. Prepared for the City of Ridgecrest. October 2015.

RMC, 2018. *Draft Indian Wells Valley Groundwater Basin Salt and Nutrient Management Plan*. January 2018.

State Water Resources Control Board (SWRCB), 2016. *Investigation on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse*. December 2016.

Todd Engineers (Todd), 2014. *Indian Wells Valley Resource Opportunity Plan, Water Availability and Conservation Report*. Prepared for Kern County Planning and Community Development Department. January 2014.

INDIAN WELLS VALLEY GROUNDWATER BASIN

GROUNDWATER SUSTAINABILITY PLAN

SECTION 6– IMPLEMENTATION

DRAFT

November 4, 2019

SECTION 6: IMPLEMENTATION PLAN

6.1 IMPLEMENTATION PLAN SUMMARY

Due to prolonged overdraft conditions in the IWVGB, the community is currently experiencing the undesirable impacts of prolonged overdraft and will continue to experience increasing environmental, social, and economic impacts if sustainability is not achieved. The IWVGB is currently experiencing unreasonable reduction of groundwater in storage, chronic lowering of groundwater levels which result in shallow wells going dry or being impacted by poorer water quality, degradation of water quality, and localized land subsidence impacting structures/facilities at NAWS China Lake.

Increasing water reliability and preserving groundwater resources are critical tasks of the IWVGA and are critical to accomplishing the mission at NAWS China Lake and sustaining the entire IWV community. The sustainability goal is to preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of the IWV residents, and sustain the mission at NAWS China Lake. The absence of significant and unreasonable undesirable results throughout the planning horizon will be indicative the sustainability goal has been achieved. The sustainability goal will be accomplished by achieving the following objectives:

- Operate the IWVGB groundwater resource within the sustainable yield.
- Implement projects and management actions to reduce groundwater demands (including pumping reduction and conservation), increase reuse of current supplies (recycled water), and obtain additional supplemental water supplies (imported water).
- Monitor the IWVGB actively and thoroughly and adaptively management the program to ensure the plan is effective and undesirable results are avoided.

A suite of project and management actions have been evaluated and selected to address current and projected undesirable results with the goal of bringing the IWVGB into sustainable balance (see Section 5). There are currently no reliable sources of supplemental water available to help achieve sustainability.

Therefore, the initial priority is on demand reductions, at least until a reliable supplemental water supply is secured. These projects and management actions are the following:

- Pumping Limitations Program
- Dust Control Mitigation Program
- Conservation Program including programs that assist Severely Disadvantaged Communities in the IWVGB
- Shallow Well Mitigation Program for shallow well failures due to water quality degradation and lowering of groundwater levels
- Recycled Water Project
- Imported Water Project
- Pumping Optimization Program

In addition to the proposed projects and management actions, GSP implementation requires continual monitoring of the proposed monitoring networks to evaluate IWVGB conditions relative to minimum thresholds and the sustainable management criteria, as well as annual and periodic GSP updates to DWR, pursuant to SGMA regulations. Data gaps will continue to be analyzed and monitoring and data management programs will be implemented as necessary. Progress on the Imported Water Project will be monitored, and management actions and projects will be revised if the schedule, amount, cost or feasibility of importing water dictates. The IWVGA is taking an adaptive management approach to reach sustainability; therefore, additional projects and management actions not discussed in this GSP will be evaluated and implemented over the planning horizon, as necessary.

6.2 SCHEDULE FOR IMPLEMENTATION

The IWVGA will start implementation of the GSP after adoption of the GSP by the IWVGA Board. The anticipated implementation timelines and schedules for the projects and management actions are discussed in Section 5. The anticipated implementation timeline for the projects and management actions range from 2020 to 2035. With this broad range of implementation timelines, there are likewise broad estimates of the project and management action task schedules.

Some of the proposed projects and management actions are dependent on activities and schedule beyond the control of the IWVGA. The schedule for the proposed Recycled Water Project is dependent on the completion of the upgraded City of Ridgecrest's wastewater treatment facility. The schedule for the proposed Imported Water Project is dependent on securing an imported water supply source, completing agreements for the transportation and exchange of water, and obtaining sufficient funding to construct the needed infrastructure. Accordingly, there is uncertainty of project implementation schedules at this stage of planning.

The GSP Implementation Schedule is provided in Figure 6-1. This implementation schedule will be revised as necessary to reflect any changes based on updated information and to provide more specificity as the projects are further developed.

6.3 GSP IMPLEMENTATION COSTS AND FUNDING

6.3.1 Implementation Costs

The GSP Implementation costs can be categorized in the following manner:

- Administrative Costs
  - GSP Reporting
  - Funding Administration
    - Fee Administration
    - Grant/Loan administration
  - Stakeholder Involvement/Outreach
- Program/Project Development and Implementation for Projects and Management Actions
- GSP Monitoring/Data Management System maintenance
- GSP Data Gap Analyses and Updates

The IWVGA may also incur additional costs that include, but are not limited to, additional administrative expenses, salaries and benefits, legal services, etc. These costs, when eligible, will also be funded through the funding sources discussed in 6.3.2.

The estimated costs for each project and management action and IWVGA implementation is provided in Table 6-1. These estimates will be refined and revised during GSP implementation as more information becomes available.

Table 6-1. Estimated GSP Implementation Costs.

Task	Total Development / Capital Costs	Total Annual Costs
Administration	xx	xx
Projects and Management Actions		
Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program	$9,200,000	$40,000
Project No. 1: Develop Imported Water Supply		
Option 1:	$226,365,000	$8,140,000
Option 2:	$103,436,000	$4,440,000
Project No. 2: Optimize Use of Recycled Water		
Option 1:	$42,757,200	$395,500
Option 1a:	10,183,200	$129,300
Option 2:	$22,798,000	$480,300
Project No. 3: Basin-wide Conservation Efforts		$20,000
Project No. 4: Shallow Well Mitigation Program	$1,720,000	$20,000
Project No. 5: Dust Control Mitigation Program	$19,000,000	$20,000
Project No. 6: Pumping Optimization Project	$23,000,000	
GSP Monitoring/Data Gap Analyses		$60,000
Annual GSP Reporting		$30,000
GSP 5-Year Updates [1]	$360,000	
Data Management System		$20,000

[1] *Assumes four 5-year updates through 2040.*

6.3.2 Potential Funding Sources

Development of this GSP was funded through the following sources:

- Proposition 1 Sustainable Groundwater Planning Grant

- Pump Fee applicable to all non de minimis pumpers in the IWVGB (with the exception of U.S. Navy pumping to support NAWS China Lake)
- Local Contributions by IWVGA Member Agencies
- In-kind Services by IWVGA Member Agencies and other local agencies

GSP Implementation costs will require a broad variety of funding sources, from federal, state, and local sources. Supplemental water supplies, as required for the IWVGB to be sustainable, are extremely costly and limited. Even if supplemental water supplies are available, the IWV community is not financially capable of supporting an imported water supply without significant public funding. As such, the IWVGA will pursue all reasonable funding opportunities to support GSP implementation tasks. Federal and state funding sources that have been identified as potential options for GSP implementation funding include the following:

- Federal Sources
  - Water Infrastructure Financing and Integration Act (WIFIA)
  - Reclamation Integration Financing and Integration Act (RIFIA)
  - Bureau of Reclamation – WaterSMART Program
  - Department of Defense – Defense Communities Infrastructure Program
  - Department of Defense – Readiness and Environmental Protection Integration Act (REPI)
  - Water Resources Development Act (WRDA)
  - U.S. Department of Agriculture
    - Community Facilities program
    - Regional Conservation Program
- State Sources
  - State Water Resources Control Board Loans and Grants
    - Clean Water State Revolving Fund (CWSRF)
    - Drinking Water State Revolving Fund (DWSRF)
    - Small Community Grant Fund
    - Groundwater Grant Fund (Chapter 10, Prop 1)
    - Parks and Water Bond (Chapter 11, Prop 68)
  - Legislative Appropriations

Local sources of funding will include administering a pump fee on groundwater production, similar to the fee that was used to partially fund the GSP preparation. The pump fee structure may have multiple components such as an administration fee, a remediation fee (for mitigation for impacted shallow wells, and an augmentation fee (for imported water supplies). With that said, the remediation and augmentation fees may be combined into one fee since those that will be subject to these fees are likely the same. Additionally, the administration fee may not be adopted at the outset because the current structure and operation of the IWVGA is such that there is limited, if any, costs for general administration.

The U.S. Navy receives royalties from the sale of electricity generated at the geothermal power plants located on NAWS China Lake in the Coso Geothermal Field to fund local energy or water security initiatives that support the NAWS China Lake mission. GSP implementation projects and related tasks may be eligible to receive funding from these royalties if deemed necessary and a priority to support the NAWS China Lake mission.

6.4 PROGRESS ASSESSMENT AND REPORTING

6.4.1 Annual Reports

As required by SGMA, the IWVGA will prepare an annual report which will describe the progress being made toward implementation of this GSP and reaching sustainability. The content of the annual report will include, but is not limited to, progress made toward implementation of the planned projects, progress made on achieving the interim milestones identified in the GSP, and a discussion on sustainability progress.

6.4.2 Periodic Evaluations and Assessments

The IWVGA recognizes that IWVGB management requires an adaptive management approach and supports the necessity of periodic updates to the GSP. Accordingly, in five-year increments, the IWVGA will evaluate the GSP and prepare a Five-Year Evaluation Report. The Five-year Evaluation Report will include discussions on 1) Sustainability Evaluation, 2) GSP Implementation Progress, 3) GSP Elements

Evaluation, 4) Monitoring Network and Data Gaps, 5) New Information and Data, 6) Instituted Regulations, Ordinances, and Legal Actions, 7) GSP Amendments, and 8) On-going coordination.

- Sustainability Evaluation: A summary of the groundwater conditions for each of the identified sustainability indicators and a summary of progress toward IWVGB sustainability will be provided. A discussion of progress on each of the identified milestones and a summary of the measurable objectives in relation to the minimum thresholds will be included.
- GSP Implementation Progress: A summary of the implementation of GSP projects and management actions, including an updated implementation schedule and summary of the quantifiable benefits realized from implementation of projects and management actions, will be provided.
- GSP Elements Evaluation: If new or additional data from the monitoring program or the implementation of projects and management actions is available, GSP elements, including the suitability of the established sustainable management criteria, will be evaluated and reconsidered. Based on the findings, the IWVGA may suggest revisions to the GSP.
- Monitoring Network and Data Gaps: A description of the monitoring network will be provided. Data gaps that have been identified and efforts to fill those gaps will be described. An assessment of the effectiveness of the monitoring programs will be provided, along with a schedule to address the data gaps.
- New Information and Data: New data obtained since the last GSP update will be provided.
- Regulations, Ordinances, and Legal Actions: A summary of regulations and/or ordinances the IWVGA has implemented to assist with implementation of the GSP will be provided. IWVGA legal actions and enforcement activities will be discussed.
- GSP Amendments: Any approved or proposed GSP amendments will be discussed.
- On-going Coordination: A summary of the coordination between the IWVGA and other agencies within the IWVGB will be provided.

J:\2652 IWVGA\08 GSP\Draft_Chapters\Section_6\IWVGA_GSP_Section6_Implementation_PAC_TAC_review_draft_clean.docx

Lorelei H. Oviatt, AICP, Director
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2323
Phone: (661) 862-8600
Fax: (661) 862-8601 TTY Relay 1-800-735-2929
Email: planning@kerncounty.com
Web Address: http://kernplanning.com/

PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

November 8, 2019

Indian Wells Valley Groundwater Authority
Policy Advisory Committee (PAC)
Attn: David Janiec
100 W. California Avenue
Ridgecrest, CA 93556

File: IWVG PAC

RE: Advisory Member
Comments on Groundwater Sustainability Plan – All Draft Chapters
Dated – November 4, 2019

Dear Mr. Janiec,

Thank you for the opportunity to provide comments on the Draft Groundwater Sustainability Plan (GSP) Draft Chapters - Dated November 4, 2019)

The draft GSP addresses the reduction in water availability and pumping allocations for commercial agriculture and designates this land as " fallow". Please include in the description of programs and opportunities for these lands alternative uses for the land as enhanced habitat or grazing lands. Many programs and opportunities are being developed with potential grant money and funding available to compensate the owners of these lands directly or in partnership with the GSA and landowners. A more complete description of possible alternative approachs are included in the Public Policy Institute of California (PPIC) " Water and the Future of the San Joaquin Valley" which can be found here https://www.ppic.org/publication/wate r-and-the-future-of-the-san-joaquin-valley/.

Thank you for the opportunity to provide comments. If you have any questions regarding these comments please don't hesitate to contact me at Loreleio@kerncounty.com. or 661-862-8866.

Thank you.

Sincerely,

Lorelei H. Oviatt, AICP, Director
Kern County Planning and Natural Resources Department

cc: Supervisor Gleason
County Counsel – Phillip Hall
CAO – Alan Christianson