Corning Sub-basin GSA Committee Meeting Materials

April 11, 2024 | 2:00 p.m.

Glenn-Colusa Irrigation District Main Pump Station
7854 County Road 203, Orland, CA 95963

Remote Public Participation Option:

Microsoft Teams meeting

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1. **Call to Order**

   The Chair will call the meeting to order.

2. **Roll Call**

   Staff will conduct roll call.

3. **Period of Public Comment**

   Members of the public are encouraged to address the Corning Sub-basin GSA Committee. Public comment will be limited to three minutes. No action will be taken on items under public comment.

4. *** Adopt Resolution No. 2024-01 Establishing A Well Mitigation Program for the Corning Subbasin.**

   As part of the Corning Subbasin Groundwater Sustainability Plan Revisions, it has been recommended that the GSAs consider developing a well mitigation program. On February 22, 2024, the CSGSA discussed and concurred with the approach to develop a resolution committing to establishing a well mitigation program by January 1, 2026. On March 6, 2024, the Corning Subbasin Advisory Board (CSAB) made a recommendation to the GSAs

225 N. Tehama St. ● Willows, CA 95988 ● 530.934.6540

to develop the resolutions. On March 27, 2024, the CSAB provided input on draft resolutions and on March 28, 2024, the CSGSA reviewed a draft resolution. On April 4, 2024 at the Joint CSGSA and Tehama County Flood Control and Water Conservation District (TCFCWCD) meeting, the TCFCWCD approved a Resolution Establishing a Well Mitigation Program for the Corning Subbasin. The attached Resolution presented for consideration of adoption includes the same content as the resolution approved by the TCFCWCD.

Attachments:

- Resolution No. 2024-01 Establishing A Well Mitigation Program for the Corning Subbasin

CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY

RESOLUTION NO. 2024-01

RESOLUTION ESTABLISHING A WELL MITIGATION PROGRAM FOR THE CORNING SUBBASIN

WHEREAS, groundwater and surface water resources within the Corning Subbasin are vitally important resources for all beneficial uses and users, and to maintain the economic viability, prosperity, and sustainability of the Subbasin; and

WHEREAS, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014. and went into effect on January 1, 2015; and

WHEREAS, the Subbasin have been designated by the California Department of Water Resources (DWR) as a high-priority subbasin and is subject to the requirements of SGMA; and

WHEREAS, SGMA requires that all medium and high priority groundwater basins in California be managed by a GSA and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP); and

WHEREAS, in January of 2022, the Corning Sub-basin Groundwater Sustainability Agency (CSGSA) and Tehama County Flood Control and Water Conservation District (the District), collectively GSAs, submitted the Corning Subbasin GSP to DWR; and

WHEREAS, in October of 2023, DWR determined the GSP was incomplete and would require revisions prior to being determined as adequate under SGMA; and

WHEREAS, SGMA defines sustainability as the management of groundwater that can be maintained during the 20-year GSP Implementation Period without causing undesirable results; and

WHEREAS, under SGMA the GSAs are responsible for managing groundwater under the GSP to achieve and maintain sustainability according to conditions after SGMA was effective that are caused by groundwater management in the Subbasin; and

WHEREAS, it is acknowledged that sustainable management may result in some groundwater level decline during the GSP Implementation Period prior to achieving sustainable groundwater conditions by or before 2042 and this decline may give rise to adverse impacts to some wells; and

WHEREAS, it is acknowledged that the number of wells that may be adversely impacted during the 20-year GSP Implementation Period (prior to 2042) is heavily dependent on hydrologic conditions, including precipitation and snowpack during that time period; and

WHEREAS, the GSAs acknowledges that the number of wells that may be adversely impacted during the 20-year GSP Implementation Period (prior to 2042) may be affected by implementing projects and management actions in the Subbasins; and

WHEREAS, the GSAs recognize that in order to obtain a determination that the GSPs are adequate, DWR is seeking a firm commitment from the GSAs to develop well mitigation and related actions to address impacts caused by their management of the Subbasins; and

WHEREAS, it is acknowledged that SGMA does not require GSAs to develop well mitigation programs; and

WHEREAS, the GSAs acknowledge that SGMA requires sustainable groundwater management; however, SGMA does not make GSAs responsible for injury from overdraft, nor does it require or assign any liability to GSAs to provide, ensure, or guarantee any level of water quality or access; and

WHEREAS, the GSAs acknowledge that the consideration, adoption, or implementation of any mitigation program will be limited to impacts related to GSA management, will not extend to mitigation issues related to the effects of normal wear and tear on wells and appurtenances, and will include express disclaimer that the GSAs cannot be held liable for any impacts from overdraft; and

WHEREAS, it is acknowledged that well mitigation and related actions will be implemented in coordination with other programs related to mitigating and resolving well issues and impacts, as applicable, including County-administered programs; and

NOW, THEREFORE, in consideration of the conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the CSGSA has committed to review, consider, and undertake mitigation actions for water well impacts resulting from declining groundwater levels that occur from GSA management activities during the GSP Implementation Period, through development and implementation of a Well Mitigation Program (Program) as follows:

1. PROGRAM ELIGIBILITY AND APPLICATION

Program eligibility criteria will be finalized, potentially including:

- Property eligibility
- Eligible mitigation versus non-eligible mitigation (what will and will not be covered) based on evaluation of whether issues are related to groundwater management, which may include evaluation of:
    - **a.** Groundwater levels
    - **b.** Timing of groundwater decline
    - **c.** Groundwater quality
    - **d.** Well casing
    - **e.** Well depth
    - **f.** Minimum threshold exceedances
    - **g.** Historical overdraft
    - **h.** Recent hydrology
    - **i.** Recharge programs
    - **j.** Age and condition of well
- Acute, short-term mitigation
- Chronic, long-term mitigation
- Identified areas of concern where minimum threshold exceedances and/or undesirable results have been documented.

Program application process (how property owners will apply to and be approved to participate in the Program):

- The District and/or CSGSA will draft an application, the purpose of which is to support determining eligibility, prioritization, well owner agreement, award, and implementation.

Prioritization (order in which applications are processed and funding is allocated)

- Initial applications will be prioritized based on the date of submittal.

The District and/or CSGSA will consider whether there are other reasons to consider prioritization of well-mitigation, including, but not limited to, groundwater quality, number of people served, availability of interim supplies, and office of emergency services service**.**

The District and/or CSGSA will also specify non-eligible services, potentially including, but not limited to:

- Ongoing maintenance
- Non-essential uses of water
- Repair or replacement of piping/infrastructure associated with moving water from the well itself to any other location.

2. PROGRAM MITIGATION MEASURES

Program mitigation measures may include, but are not limited to:

- Short-term solutions in emergencies, such as delivery of bottled water and/or water tanks. (Considered only for temporary mitigation while other actions are in progress.)
- Deepening existing water wells, or otherwise rehabilitating or replacing such wells (including abandonment of existing wells).
- Drinking water well consolidation (many-to-one).
- Connection to or development of public water systems to serve impacted communities.
- Connection to municipal water systems.

The appropriate Program mitigation measures for each mitigated well will be informed by and determined following a structured, programmatic initial well evaluation process involving (but not limited to):

- Inspection of the conditions of the well, including assessment of the current or anticipated operational issue(s) associated with the well and underlying causes of those impacts.
- Determination that the well impacts are related to groundwater management during the GSP Implementation Period (e.g., not related to effects of normal wear and tear on drinking water wells)
- Determination and recommendation of an appropriate mitigation strategy (i.e., one of the potential Program mitigation measures above).

The Program is considered a temporary solution to mitigating well impacts before achieving and maintaining sustainable groundwater conditions (by 2042).

The Program and implementation of program mitigation measures will be coordinated with other applicable programs in the Subbasin, including County-administered programs.

The parties anticipate that mitigation will occur only once for each well, and will be appropriate to and commensurate with the actual or anticipated well impacts resulting from groundwater management during the GSP Implementation Period. By way of example only, if a well is dry due to groundwater level decline, and deepening that well is the appropriate Program mitigation measure, the well will be deepened below the minimum threshold of the associated representative monitoring site well to reduce the likelihood that the same well impacts will not occur again during GSP implementation.

It is also anticipated that potential Program measures may include, but will not be limited to, well permitting or ordinances to spatially and vertically isolate new wells to minimize adverse impacts on existing water wells. The design and implementation of such measures would be coordinated with existing and/or new County well permitting processes and ordinances.

3. FUNDING AND FINANCING

The District and CSGSA will fund the Program through long term GSA funding mechanisms as determined by the District Board and CSGSA respectively.

Estimated expenses for the Program are anticipated to range between:

- $300,000 for Program startup (years 1-2), and $75,000 for Program administration thereafter (years 3+)
- $3,000,000 for Program mitigation measures, assuming (for planning purposes), that approximately 150 wells may require mitigation and that the cost of mitigation per well is approximately $20,000, on average, although the precise number and costs of mitigation are subject to refinement during Program development.

However, these numbers are only estimated for planning purposes and are subject to revision during Program development.

It is anticipated that the Program funding will come from one, or a combination, of the following sources established by the Parties:

- GSA fees and assessment
- Funds generated through implementation of other projects and management actions (e.g., fines and/or penalties)
- County/state/federal funding, as available
- Other sources, as identified

4. TERM

The Program shall be developed, and implementation shall begin no later than January 1, 2026 (the Program start date). The Program shall cover eligible mitigation as of the Program start date and shall continue thereafter until groundwater sustainability is achieved during the GSP Implementation Period, or as otherwise directed by the GSAs.

5. PROGRAM IMPLEMENTATION AND MANAGEMENT

It is anticipated that a committee will be formed to create and set the final terms of the Program. A draft implementation flow chart is attached, as **Exhibit A** for reference however the final implementation and management of the Program will be approved by the GSAs prior to the program start date.

6. WELL OWNER AGREEMENTS

After application, eligibility, and mitigation development, mitigation will need to be accompanied by a well owner agreement that includes several components, including but not limited to the following:

- Mitigation award (how will the costs of mitigation be reviewed and approved);
- Recordation of mitigation award;
- Post-mitigation responsibility (property owner to be responsible for operations, maintenance and repair of water well);
- Indemnification of the GSA;
- Easement or land use permissions

7. ENVIRONMENTAL REVIEW

The GSAs will complete any environmental review as may be determined necessary for Program implementation.

PASSED, APPROVED AND ADOPTED by the Committee of Members of the CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY on this _____ day of April 2024.

AYES:

NOES:

ABSENT:

ABSTAIN:

CERTIFICATE OF RESOLUTION

We, the undersigned, hereby certify as follows:

1. That we are the Chair and Secretary of the CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY; and

2. That the foregoing resolution, consisting of 7 pages, including this page, is a true and correct copy of a resolution of the Committee of Members of the Corning Sub-basin Groundwater Sustainability Agency, passed at the meeting of the Committee of Members held on April ____, 2024, IN WITNESS WHEREOF, we have signed this certificate this ____ day of April 2024.

_________________________________ John Amaro, Chair of the Corning Sub-basin Groundwater Sustainability Agency

_________________________________ Lisa Hunter, Secretary

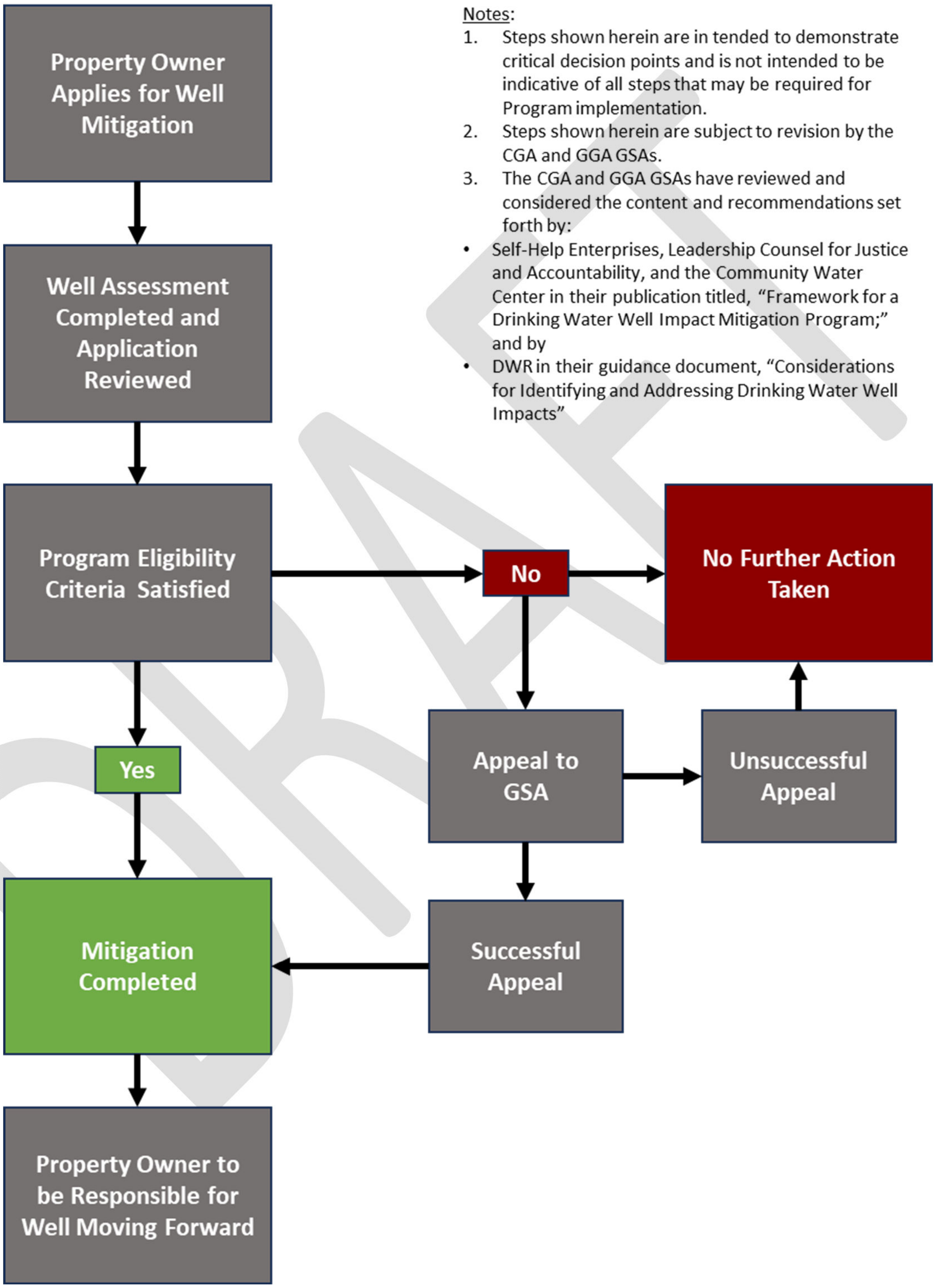
Exhibit A.

Well Mitigation Program
DRAFT Implementation Flowchart.

Notes:

1. Steps shown herein are in tended to demonstrate critical decision points and is not intended to be indicative of all steps that may be required for Program implementation.
2. Steps shown herein are subject to revision by the CGA and GGA GSAs.
3. The CGA and GGA GSAs have reviewed and considered the content and recommendations set forth by:

- Self-Help Enterprises, Leadership Counsel for Justice and Accountability, and the Community Water Center in their publication titled, "Framework for a Drinking Water Well Impact Mitigation Program;" and by
- DWR in their guidance document, "Considerations for Identifying and Addressing Drinking Water Well Impacts"



5. ***Adopt Resolution No. 2024-02 Establishing a Demand Management Program for the Corning Subbasin.**

As part of the Corning Subbasin Groundwater Sustainability Plan Revisions, it has been recommended that the GSAs consider developing a demand management program. On February 22, 2024, the CSGSA discussed and concurred with the approach to develop a resolution committing to establishing a demand management program by January 1, 2027. On March 6, 2024, the Corning Subbasin Advisory Board (CSAB) made a recommendation to the GSAs to develop the resolutions. On March 27, 2024, the CSAB provided input on draft resolutions and on March 28, 2024, the CSGSA reviewed a draft resolution. On April 4, 2024 at the Joint CSGSA and Tehama County Flood Control and Water Conservation District (TCFCWCD) meeting, the TCFCWCD approved a Resolution Establishing a Demand Management Program for the Corning Subbasin. The attached Resolution presented for consideration of adoption includes the same content as the resolution approved by the TCFCWCD.

Attachments:

- Resolution No. 2024-02 Establishing a Demand Management Program for the Corning Subbasin

CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY

RESOLUTION NO. 2024-02

RESOLUTION ESTABLISHING A DEMAND MANAGEMENT PROGRAM FOR THE CORNING SUBBASIN

WHEREAS, groundwater and surface water resources within the Corning Subbasin are vitally important resources for all beneficial uses and users, and to maintain the economic viability, prosperity, and sustainability of the Subbasin; and

WHEREAS, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014. and went into effect on January 1, 2015; and

WHEREAS, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasins and is subject to the requirements of SGMA; and

WHEREAS, SGMA requires that all medium and high priority groundwater basins in California be managed by a GSA and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP); and

WHEREAS, in January of 2022, the Corning Sub-basin GSA (CSGSA) and Tehama County Flood Control and Water Conservation District (the District), collectively the GSAs, submitted the Corning Subbasin GSP to DWR; and

WHEREAS, in October of 2023, DWR determined the GSP was incomplete and would require revisions prior to being determined as adequate under SGMA; and

WHEREAS, SGMA defines sustainability as the management of groundwater that can be maintained during the 20-year GSP Implementation Period without causing undesirable results; and

WHEREAS, under SGMA the GSAs are responsible for managing groundwater under the GSP to achieve and maintain sustainability according to conditions after SGMA was effective that are caused by groundwater management in the Subbasin; and

WHEREAS, it is acknowledged that sustainable management may result in some groundwater level decline during the GSP Implementation Period prior to achieving sustainable groundwater conditions by or before 2042 and this decline may give rise to adverse impacts to some wells; and

WHEREAS, the GSAs acknowledge that during the GSP Implementation Period it will be necessary to implement projects and management actions to achieve and maintain sustainable groundwater conditions in the Subbasins by or before 2042; and

WHEREAS, it is acknowledged that successful implementation of planned GSP projects to achieve their intended recharge benefits during the 20-year GSP Implementation Period (prior to 2042) is dependent in part on uncertainties related to hydrologic conditions, including precipitation and snowpack, and available water supply during that time period; and

WHEREAS, the GSAs acknowledge that implementation of management actions will be necessary to offset these uncertainties related to project implementation and project benefits to ensure that sustainable groundwater conditions are achieved in the Subbasin by or before 2042; and

WHEREAS, it is acknowledged that wet hydrologic conditions and faster implementation of projects may result in diminished need for management actions, and

WHEREAS, the GSAs acknowledge that dry hydrologic conditions, prolonged drought, and delayed implementation of projects may result in an accelerated need for management actions; and

WHEREAS, the GSAs recognize that in order to obtain a determination that the GSPs are adequate, DWR is seeking a firm commitment from the GSAs for their consideration of management action(s) to address and mitigate overdraft and groundwater level decline during their management of the Subbasin; and

WHEREAS, the GSAs acknowledge that they cannot control groundwater conditions not caused by actions taken by the GSA; and

WHEREAS, the GSAs acknowledge that SGMA requires sustainable groundwater management; however, SGMA does not make GSAs responsible for injury from overdraft; and

WHEREAS, the GSAs acknowledge that management action(s) to address and mitigate overdraft, groundwater level decline, and subsidence will be implemented in coordination with other related programs in the Subbasin and in the region, as applicable.

NOW, THEREFORE BE IT RESOLVED, in consideration of the conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Tehama County Flood Control and Water Conservation District has committed to review, consider, and undertake mitigation actions for demand management through development of a Demand Management Program (Program) as follows:

1. PROGRAM MEASURES

The Program is anticipated to include some subset of the following Program measures:

- Measures to be considered and moved forward for **<u>immediate implementation (at the Program start date)</u>**. Measures may include, but are not limited to, the following voluntary measures for reducing demand:
    - o Best management practices (agronomic practices, soil moisture monitoring and management, delayed irrigation and/or regulated

deficit irrigation, runoff capture, etc. to reduce groundwater extraction)
    - Water conservation (focusing on activities to reduce consumptive use and groundwater extraction)
    - Encouraging use of all available surface water in lieu of groundwater pumping
    - Multi-benefit land repurposing (e.g., recharge basins, renewable energy, habitat, recreational spaces)
    - Incentivized land use changes that provide net groundwater benefit
    - Dry farming
    - Fallowing (not associated with groundwater substitution transfers)

- Measures to be considered and moved forward for **phased adaptive implementation** (i.e., develop the actions further so that they are ready to implement in phases, commensurate with issues). Measures may include, but are not limited to:
    - Allocations, considering:
        - Well restrictions
        - Pumping restrictions
        - Water market/trading and/or fee structures

- Phased adaptive implementation measures are to be implemented commensurate with:
    - The amount of demand reduction required.
    - The issue(s) facing the area(s) where the measure(s) are to be implemented, considering, but not confined to:
        - Options for regional implementation of certain actions (around a "Special Zones" where undesirable results are occurring), and/or
        - Options for Subbasin-wide implementation of certain actions (equal treatment of the Subbasin as a whole).
        - Options for Management Area-wide implementation of certain actions (equal treatment for all subbasins within the Subbasin or the entirety of the Subbasin)

2. FUNDING AND FINANCING

The District and CSGSA will fund the Program through long term GSA funding mechanisms as determined by the District Board and CSGSA respectively.

Estimated expenses for the Program are difficult to ascertain due to the significant variables involved. However, budgetary numbers will range from $150,000 to $1,000,000 annually.

However, these numbers are only estimated for planning purposes and are subject to revision during Program development.

It is anticipated that the Program funding will come from one, or a combination, of the following sources established by the Parties:

- GSA fees and assessment
- Funds generated through implementation of other projects and management actions (e.g., fines and/or penalties)
- County/state/federal funding, as available
- Other sources, as identified

3. TERM

The Program shall be developed and implementation shall begin no later than January 1, 2027 (the Program start date). Upon implementation, the Program shall continue in perpetuity unless otherwise directed by the GSAs.

4. PROGRAM DEVELOPMENT

The GSAs shall, as part of Program development, define the Program's purpose, objectives, scope, roles and responsibilities, requirements, and potential outcomes.

The anticipated goal of the Program is to address and mitigate overdraft and groundwater level decline, and related undesirable results during the GSP Implementation Period, as defined in the Revised GSP, by reducing demand for groundwater.

Items for consideration during Program development include, but are not limited to:

- Definitions
- Program measures, including:
    - Measures for immediate implementation (i.e., measures that will move forward at the Program start date)
    - Measures for phased adaptive implementation (i.e., measures that will be developed further so that they are ready to implement in phases, commensurate with issues)
- Public outreach and engagement process
- Coordination of Program with other related programs in the region, as applicable
- Implementation considerations and protocol for phased adaptive implementation measures:
    - Identification of area(s) where measures are applicable
    - Determination of sustainable yield for those areas

- Determination of an appropriate transition period from current to sustainable conditions (prior to 2042), considering uncertainties of the basin setting and of the timelines for other projects.
- Process and timeline for implementing phased measures.
- Process and timeline for evaluating and adapting measures to respond to changing conditions (in annual reports and periodic GSP evaluations).
- Considerations for allocation development and enforcement, as applicable, related to consumed versus extracted groundwater.
- Monitoring and enforcement process
- Funding and financing, including the planned annual Program funding responsibilities.

5. PROGRAM IMPLEMENTATION AND MANAGEMENT

It is anticipated that a committee will be formed to create and set the final terms of the Program. The final implementation and management of the Program will be approved by the GSAs prior to the program start date.

6. ENVIRONMENTAL REVIEW

The GSAs will complete any environmental review as may be determined necessary for Program implementation.

PASSED, APPROVED AND ADOPTED by the Committee of Members of the CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY on this _____ day of April 2024.

AYES:

NOES:

ABSENT:

ABSTAIN:

CERTIFICATE OF RESOLUTION

We, the undersigned, hereby certify as follows:

1. That we are the Chair and Secretary of the CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY; and

2. That the foregoing resolution, consisting of 6 pages, including this page, is a true and correct copy of a resolution of the Committee of Members of the Corning Sub-basin Groundwater Sustainability Agency, passed at the meeting of the Committee of Members held on April ____, 2024, IN WITNESS WHEREOF, we have signed this certificate this _____ day of April 2024.

__________________________________ John Amaro, Chair of the Corning Sub-basin Groundwater Sustainability Agency

__________________________________ Lisa Hunter, Secretary

6. **2:15 p.m. Public Hearing: Adoption of the Revised Corning Subbasin Groundwater Sustainability Plan**

    a. Conduct a Public Hearing to receive public comments on the Revised Corning Subbasin Groundwater Sustainability Plan

    b. *Consider adopting the Revised Corning Subbasin Groundwater Sustainability Plan

On October 26, 2023, the Department of Water Resources (DWR) determined the Corning Subbasin GSP to be “incomplete” The GSAs have 180 days to address the deficiencies and resubmit the GSP for evaluation no later than April 23, 2024.

The consulting team, Luhdorff & Scalmanini Consulting Engineers (LSCE), are supporting the efforts to revise the Corning Subbasin GSP to address DWR’s comments. LSCE will provide a presentation on key changes included in the Draft Revised Corning Subbasin GSP.

Pursuant to Water Code section 10728.4, a notice was sent on January 5, 2024 to cities and counties within the area of the proposed plan. There were no requests for consultation meetings by the cities or counties.

Components of the revisions have been discussed at various meetings, including the Corning Subbasin Advisory Board, Corning Sub-basin GSA, Tehama County Flood Control and Water Conservation District, and Tehama County Groundwater Commission, all of which are open to the public and comments were encouraged.

The Revised Corning Subbasin GSP is being presented for consideration of adoption and is available for review at:
https://www.countyofglenn.net/CorningSub-basinGSA/RevisedCorningGSP.

A printed copy can be reviewed at the Glenn County Planning and Community Development Services Agency lobby located at 225 North Tehama Street in Willows.

Attachments:

- Presentation
- Notice to Cities and Counties
- Legal Notice: newspaper publication
- Comments Received

Corning Sub-Basin GSA Committee

Public Hearing:

Adoption of the Revised Corning Subbasin Groundwater Sustainability Plan

CORNING SUB-BASIN GSA

April 11, 2024

Luhdorff & Scalmanini Consulting Engineers

Public Hearing - Background

On October 26, 2023 the California Department of Water Resources (DWR) determined the Corning Subbasin GSP to be "incomplete." Three primary concerns:

- **Overdraft:** Approach to use average over range of recent years and includes empirical method based on water levels. **(Chapter 4)**
  - Will be evaluated in annual reports and water budget will be based on the updated numerical integrated groundwater/surface water model in the 5-year update.
- **PMAs: (Chapter 7)**
  - **Projects**: Update details on timeline, funding, and benefits.
  - **Management Actions:** GSA Resolution and formal agreement.
- **SMC Revisions: (Chapter 6)**
  - Define and quantify unreasonable result conditions.
  - Revise water level SMC with explanation and justification.

LSCE

GSP Revisions Overview

- Three Meetings (12/2/23, 1/24/24 and 2/29/24) with DWR Technical Staff
- All revisions to the 2022 GSP are completed using track changes (red-line strikeout)
- Majority of changes occurred within:
  - Chapter 4 (Water Budget, specific to overdraft)
  - Chapter 6 (Sustainable Management Criteria)
  - Chapter 7 (Projects and Management Actions)
    - Management Actions:
      - Well Mitigation Program Resolution
      - Demand Management Program Resolution
    - Projects:
      - Recharge Projects

LSCE

Chapter 4 – Water Budget

- Original GSP = + 6,900 AFY (through WY 2021)
- Revised GSP = - 31,200 AFY (through WY 2023)

The Revised GSP addresses the current estimate of the annual change in storage related to overdraft. A complete and comprehensive water budget analysis for current and future conditions will be conducted as part of the 5-year Periodic Evaluation in January 2027.

The GSAs recognize that the updated annual groundwater storage is negative and constitutes overdraft. This value of -31,200 AFY will affect the sustainable yield calculation downward. The recalculation of the sustainable yield will also be conducted as part of the 5-year Periodic Evaluation.

LSCE

Chapter 6 - Current/Proposed MO, MT and IM Summary

Table 6-1. Sustainable Management Criteria Summary

Sustainability Indicator	Measurement	Minimum Threshold	Measurable Objective	Interim Milestones	Quantification of Undesirable Result
Chronic lowering of groundwater levels	Annual fall groundwater elevation measured in representative monitoring well network by county or DWR.	Focus Areas: Five (5) feet higher than MTs as published in the 2022 GSP Outside Focus Areas: MTs ~~as published in the 2022 GSP~~as published in the 2022 GSP ~~Stable wells: Minimum fall groundwater elevation since 2012 minus 20-foot buffer.~~ ~~Declining wells: Minimum fall groundwater elevation since 2012 minus 20% of minimum groundwater level depth.~~	Stable wells: Maximum fall groundwater elevation since 2012 Declining wells: Maximum fall groundwater elevation in 2015	Linear trend between current conditions and measurable objective.	20% of groundwater elevations measured at RMP wells drop below the associated minimum threshold during 2 consecutive ~~years~~fall measurements. ~~If the water year type is dry or critically dry then levels below the MT are not undesirable if groundwater management allows for recovery in average or wetter years.~~

LSCE

Chapter 6 - SMC Revisions (Undesirable Results)

- Undesirable results occur when significant and unreasonable effects for any of the six sustainability indicators defined by SGMA are caused by groundwater conditions occurring in the Subbasin.

- The GSAs define the negative effects to beneficial uses and users that would be experienced at undesirable result conditions in the future as 1) 10 supply wells becoming dry (after the GSP revision) within each Thiessen polygon (Figure 6-2) established in the revised GSP (2024) or 2) when water levels at any RMP in the future decline 7.5 ft or more within a per year over five (5) year period at any RMP.

- The GSAs will address any adverse impacts through projects to supplement supplies of water and through a well mitigation program. The impacts to groundwater dependent ecosystems that may occur without rising to significant and unreasonable levels constituting undesirable results will be evaluated within the next three years of GSP implementation (by January 2027).

LSCE

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Chapter 6 - SMC Revisions (Undesirable Results)

- The GSAs are actively addressing data gaps and conducting monitoring to establish the relationship between interconnected surface water and groundwater and evaluating the potential adverse effects of depletion of groundwater on interconnected surface water and related beneficial users.
- The GSAs will update the Undesirable Results definition to include depletion of interconnected surface water in the 5-year GSP Periodic Evaluation due in January 2027, and following the release of DWR’s guidance on interconnected surface water analysis and SMC setting.
- All reported dry wells will be investigated by the GSAs. Reports will be considered factual until investigated and proven otherwise. The GSAs will the determine why each reported dry well no longer produces water. Reported dry wells will be confirmed to be dry wells if the cause is due to the GSA’s management of the subbasin and declining water levels, instead of mechanical, electrical, or structural problems with the well and pump unrelated to declining water levels.
- The confirmation of dry wells and the subsequent solutions will be included in the Well Mitigation Program.

LSCE

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Chapter 6 - SMC Revisions

- Overview
- Special Zones – Based on Dry Well Reporting or Based on Historical Declining Groundwater Levels
  - Dry wells within a polygon
  - Equal to or greater than 1.5 feet/year (period of record at RMP well)
- Minimum Thresholds (MT)
  - Within Special Zones – Original MT, minus 5’
  - Outside Special Zones – Original MT

LSCE

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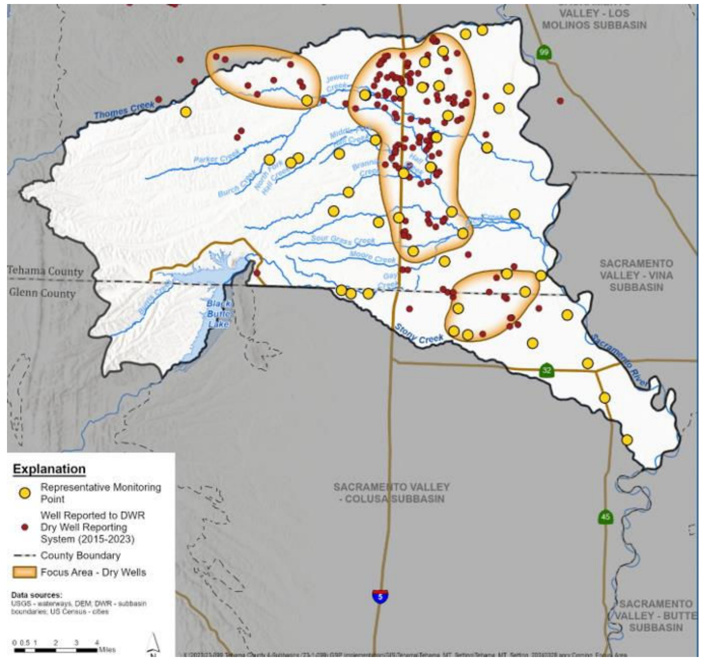
Chapter 6 - SMC Revisions

- Reported Dry Wells
  - All reported dry wells will be investigated by the GSAs. Reports will be considered factual until investigated and proven otherwise.



LSCE

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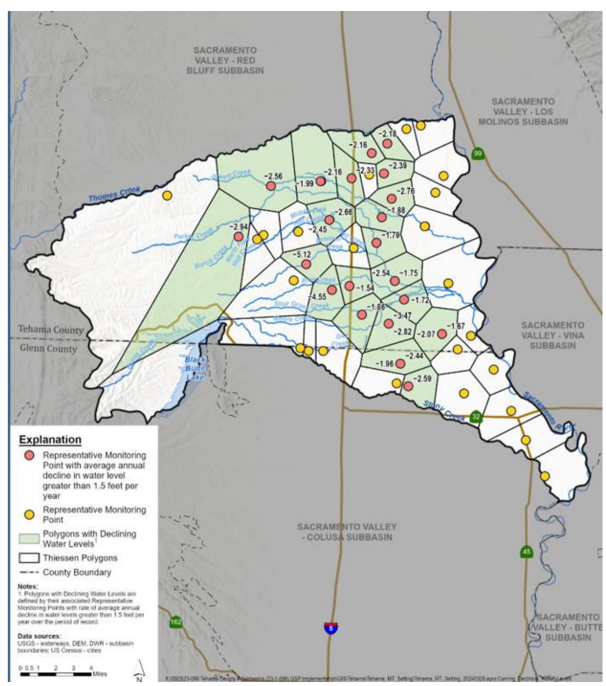
Chapter 6 - SMC Revisions

- Declining Groundwater Level Polygons
  - Address Overdraft Concerns by DWR
  - Polygons could be utilized to address proposed well moratorium in Tehama County
  - MT from the original 2022 GSP, minus 5 feet.



LSCE

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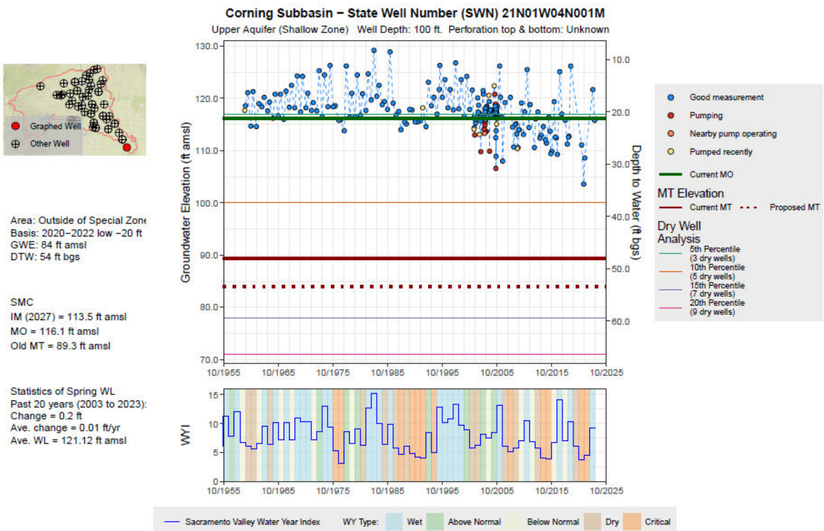
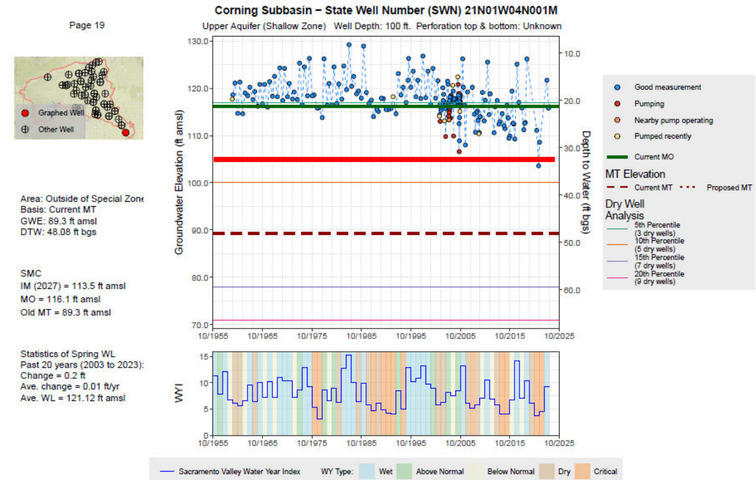
Chapter 6 - Previous & Proposed Approach for Areas Outside the Special Zone



	All wells	Domestic	Agriculture	Industrial	Public	Unknown
Total Well Count	43	6	30	0	0	7
Number and Percent Impacted	5 (12%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	3 (7%)

Previous



	All wells	Domestic	Agriculture	Industrial	Public	Unknown
Total Well Count	43	6	30	0	0	7
Number and Percent Impacted	5 (12%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	3 (7%)

Approved

LSCE

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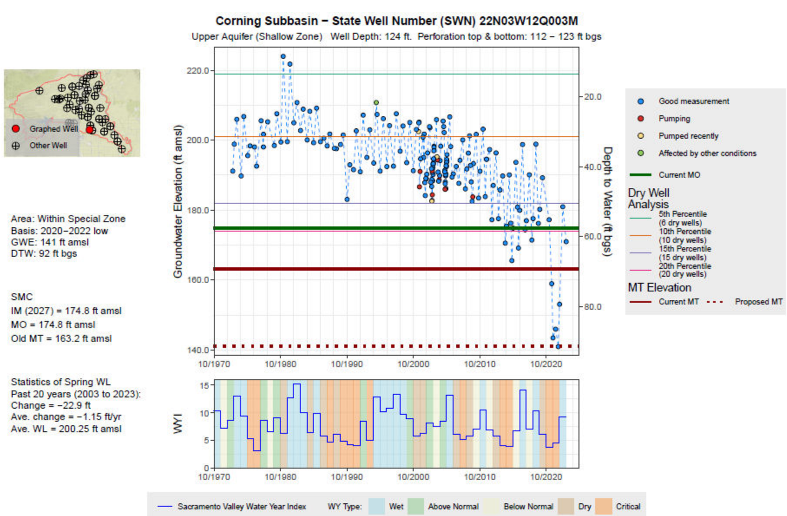
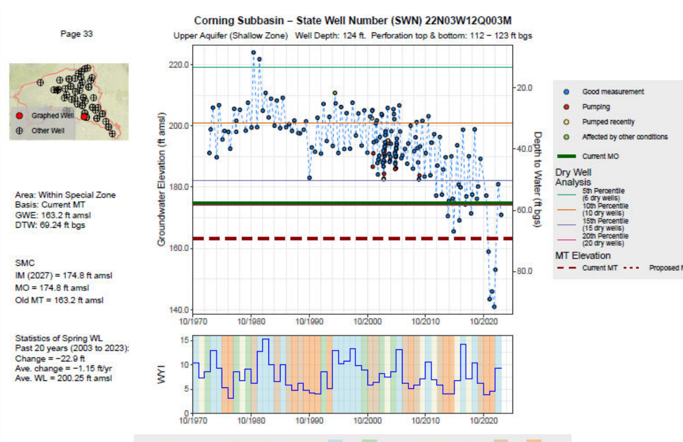
Chapter 6 - Previous & Proposed Approach for Areas Outside the Special Zone



	All wells	Domestic	Agriculture	Industrial	Public	Unknown
Total Well Count	98	67	21	0	0	10
Number and Percent Impacted	35 (36%)	24 (24%)	2 (2%)	0 (0%)	0 (0%)	9 (9%)

Previous



	All wells	Domestic	Agriculture	Industrial	Public	Unknown
Total Well Count	98	67	21	0	0	10
Number and Percent Impacted	26 (27%)	15 (15%)	2 (2%)	0 (0%)	0 (0%)	9 (9%)

Approved

LSCE

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Chapter 7 – Projects and Management Actions

Project Name	Project Type	Purpose	Location	Project Development Status	Estimated Recharge Potential (AFY)
OUWUA Infrastructure Improvements for In-Lieu Recharge	In-lieu groundwater recharge	Improve surface water conveyance and irrigation infrastructure for surface water use in lieu of groundwater pumping	Orland Project Area	Pre-Design/Planning Stage	12,000 - 25,000
Regional Surface Water Transfers for In-Lieu Recharge	In-lieu groundwater recharge	Incentivize the use of surface water within the subbasin by transferring water into the Subbasin from other CVP districts	Water Districts	Implementation-Ready	4,000 – 17,000
Invasive Plant Removal	Reduction of Non-Beneficial ET	Invasive plan removal to reduce shallow groundwater use and restore native habitat	Focus on Stony Creek	Pre-Design/Planning Stage	9,240
Groundwater Recharge through Unlined Conveyance Features	Direct Groundwater Recharge	Groundwater recharge through unlined canals and natural drainages including ephemeral streams	Tehama County	Conceptual	TBD
Off-stream Surface Water Storage and Recharge	Direct and In-lieu groundwater recharge	Off-stream temporary storage and recharge of flood waters on private lands	Outside District Areas - Tehama County	Pre-Design/Planning Stage	1,400 – 6,700
City of Corning Stormwater Recharge	Direct Groundwater Recharge	City of Corning stormwater improvements/groundwater recharge	City of Corning	Conceptual	TBD
Groundwater Recharge Pond South of Corning	Direct Groundwater Recharge	Groundwater recharge using Section 215 water from the Tehama-Colusa Canal on currently existing stormwater retention pond	Near city of Corning	Coordination Stage	1,000
Multi-benefit Recharge Projects	Direct Groundwater Recharge	Cooperative project to provide wetland habitat on private land which will also enhance groundwater recharge	Entire Subbasin	Conceptual	100 - 300
California Olive Ranch Groundwater Recharge Project	Direct Groundwater Recharge	Project to utilize Section 215 water from the Tehama-Colusa Canal to recharge groundwater on private land	South of City of Corning	Planning Stage	TBD
Thomes Creek Flood Water Diversions for Recharge	Direct and In-lieu Groundwater Recharge	Project to divert flood flows from Thomes Creek into off-stream temporary storage and recharge on private lands	Thomes Creek	Conceptual	150 - 950
Stony Creek Flood Water Diversions for Recharge	Direct Groundwater Recharge	Project to divert flood flows from Stony Creek through existing infrastructure into Hambright and Gay Creeks for groundwater recharge	Stony Creek	Coordination Stage	400

Total 28,000 - 60,000 AFY

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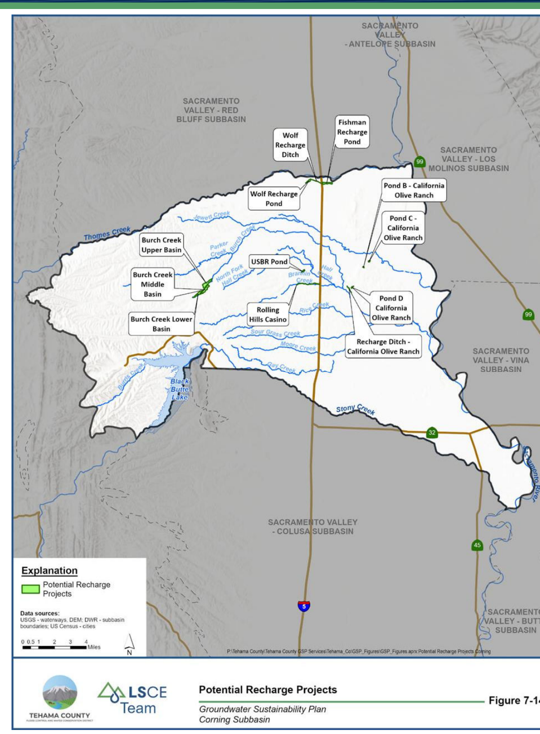
Chapter 7 – Projects and Management Actions

- Demand Management - Resolution
- Well Mitigation - Resolution
- Priority Projects includes estimated recharge potential
- Off-stream Surface Water Storage Projects
  - Fisherman Recharge Pond
  - Wolf Ranch
  - Duck Pond
  - Thomes Creek
  - Middle Fork Hall
  - Rice Creek
  - Burch Creek



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Chapter 7 – Projects and Management Actions

Project Name	Description	Recharge Area	Funding Source	Estimated Recharge (AFY)
Fishman Recharge Pond	Water conveyed to recharge pond	34 acres	TBD	600 - 1800
Wolf Ranch	Water conveyed to recharge ditch and field	68 acres	Prop 68 Grant	600 - 900
Duck Ponds	Water conveyed from Corning Water District outlet to farmland	TBD	Tehama County	152 - 912
Thomes Creek - NW Corning	Water pumped from Thomes Creek onto farmland	31 acres	Prop 68 Grant[3]	124 - 744
Middle Fork Hall Creek	Water conveyed from Corning Water District outlet to on-farm unlined ditch to Middle Fork Hall Creek	TBD	Tehama County	150-600
Rice Creek	Water conveyed from outlet on Tehama Colusa Canal to on-farm pipe to Rice Creek	TBD	Tehama County	318
Burch Creek	Water pumped from Burch Creek directly into basins	164 acres	Prop 68 Grant[3]	656 - 3936

Total 3,000 – 10,000 AFY

[1] Assumes a diversion period of 120 days
[2] Grant funds will be utilized for project development, but not for purchase of water during project operation

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Next Steps

- Public Comment Period – Stakeholder and Public Feedback
- Adopt GSP – Formally Accepted, Approved or Conditionally Approved
- Incorporate Well Mitigation and Demand Management Resolutions (as appendices) into final GSP
- Updated GSP to DWR SGMA Portal (4/23/2023)
- DWR Review Process – Period during which DWR will review submitted GSP
  - Decision could be in late 2024

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Questions?

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January 5, 2024

County of Tehama
P.O. Box 250
Red Bluff, CA 96080

Re: Notice of Intent to Adopt an Amended Groundwater Sustainability Plan for Corning Subbasin

The Corning Sub-basin Groundwater Sustainability Agency, the Groundwater Sustainability Agency (GSA) for the portion of the Corning Subbasin located within Glenn County, hereby gives notice it intends to adopt an amended Groundwater Sustainability Plan (GSP) for the Corning Subbasin pursuant to California Water Code Section 10728.4.

Water Code Section 10728.4 reads:

> *A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.*

The GSP, originally adopted by the Corning Sub-basin GSA on December 8, 2021 and the Tehama County Flood Control and Water Conservation District Board of Directors on December 20, 2021, was submitted to the Department of Water Resources (DWR) by January 31, 2022 in compliance with the Sustainable Groundwater Management Act (SGMA). DWR completed its review, and by letter dated October 26, 2023 determined the GSP to be incomplete and identified corrective actions that must be completed within 180 days of the determination.

A public hearing will be held in April 2024 to consider the adoption of the amended GSP. The Tehama County Flood Control and Water Conservation District (Tehama County GSA) will provide a separate NOI with their public meeting date.

Pursuant to SGMA, representatives from the Corning Sub-basin GSA are available to provide consultation with and receive comments on the GSP from your organization should consultation be requested. Consultation can be arranged by contacting Lisa Hunter at LHunter@countyofglenn.net or 530.934.6540. Comments may also be provided in writing to 225 N. Tehama St., Willows, CA 95988.

Sincerely,

Lisa Hunter
Water Resource Coordinator
County of Glenn

CORNING SUB-BASIN GSA

County of Glenn
Glenn-Colusa Irrigation District
Monroeville Water District

January 5, 2024

County of Glenn
525 West Sycamore Street, Suite B1
Willows, CA 95988

Re: Notice of Intent to Adopt an Amended Groundwater Sustainability Plan for Corning Subbasin

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Sincerely,

Lisa Hunter
Water Resource Coordinator
County of Glenn

CORNING SUB-BASIN GSA

County of Glenn
Glenn-Colusa Irrigation District
Monroeville Water District

January 5, 2024

City of Corning
794 Third Street
Corning CA 96021

Re: Notice of Intent to Adopt an Amended Groundwater Sustainability Plan for Corning Subbasin

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Sincerely,

Lisa Hunter
Water Resource Coordinator
County of Glenn

NOTICE OF PUBLIC HEARING FOR ADOPTION OF THE AMENDED CORNING SUBBASIN GROUNDWATER SUSTAINABILITY PLAN BY THE CORNING SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY COMMITTEE

Notice is hereby given, pursuant to Water Code section 10728.4 and Government Code section 6066, the Corning Sub-basin Groundwater Sustainability Agency Committee shall hold a public hearing at 7854 County Road 203, Orland, CA 95963 on April 11, 2024 at 2:00 p.m. to consider adoption of the Amended Corning Subbasin Groundwater Sustainability Plan (GSP). The GSP was developed pursuant to the Sustainable Groundwater Management Act (CA Water Code, Section 10720 et seq.) for the Corning Subbasin (Groundwater Subbasin Number: 5-021.51) and provides information regarding the subbasin geology, hydrology and water supplies; the formation of Groundwater Sustainability Agencies; establishment of sustainable management criteria and monitoring networks; and programs and projects to be developed and implemented to achieve groundwater sustainability by 2042. Comments received prior to and during the public hearing will be considered by the Corning Sub-basin Groundwater Sustainability Agency Committee prior to adoption of the proposed Amended GSP. A copy of the Final Amended GSP will be located online by April 8, 2024 at: https://www.corningsubbasingsp.org/. A printed copy will be available for public review during regular business hours by April 8, 2024 at 225 North Tehama Street, Willows, CA 95988.

April 7, 2024

Lisa Hunter (County of Glenn)
225 North Tehama Street
Willows, CA 95988
lhunter@countyofglenn.net

Re: Corning Subbasin Groundwater Sustainability Plan

Dear Ms. Hunter and the Corning Subbasin GSAs:

AquAlliance, the California Sportfishing Protection Alliance, and the California Water Impact Network (hereinafter AquAlliance) submit the following comments and questions on the proposals to revise the Corning Subbasin Groundwater Sustainability Plan ("revised GSP" or "revised Plan"). Revisions to the 2022 GSP are necessary since the Plan was deemed "Incomplete" by the California Department of Water Resources ("DWR"). There are serious flaws in the 2022 Plan that appear not to be addressed in the current review process and the proposals for the revised Plan have yet to be finalized.

A. Public Process

The process used to revise the 2022 GSP is a maze of challenges for the public. First we haven't seen the revised GSP, yet presentations at past meetings state that written comments are due *Sunday*, April 7th. However, the Legal Notice in the Sacramento Valley Mirror indicates "Comments received prior to and during the public hearing [April 11, 2024] will be considered by the Corning Sub-basin Groundwater Sustainability Agency Committee prior to the adoption of the proposed Amended GSP." The Legal Notice then mentions the "Final Amended GSP will be located online by April 8, 2024…" The Legal Notice says nothing about comments due on April 7 or if there are any constraints on the type of comments accepted.

Second, the Corning GSA and the Tehama County Flood Control and Conservation District ("TCFCCD") (collectively the "GSAs") failed to reach a decision about a potential moratorium in certain areas of the Corning subbasin at the April 4, 2024 meeting. Third, when AquAlliance sent e-mails asking Lisa Hunter, the Plan Manager, when the revised GSP would be available and what the comment period was, we were provided with the url and informed that the revised GSP would be released April 8th, the day after one of the comment deadlines disclosed at public meetings.

In light of the egregiously short time frame for comments (whether the 7th or the 11th), a non-existent revised GSP, major decisions by the GSAs still in flux over Minimum Thresholds and a moratorium on new wells, and the mixed messages about timing, AquAlliance will submits these comments on April 7, 2024 and add additional written comments to the record by April 11, 2024. Below are comments submitted in 2022 to DWR on the original GSP with some modifications and additions. The comments are as germane today as they were then, particularly since much of the 2022 GSP will remain in effect and the revised GSP is not available. No matter how we refer to the GSP in these comments, either as final, revised, amended, or any other nomenclature, our intention is that the comments and questions here apply to all forms of the GSP that have been approved by the GSAs or are planned for approval by the GSAs in 2024. Anything in our comments that seems confusing is due to the fact we are trying review a document that has yet to be released and, as stated above, major decisions are still pending and there is completely inadequate time allowed for public comments.

B. Introduction

The goal of the Sustainable Groundwater Management Act (SGMA) is to sustainably manage groundwater resources for long-term reliably and multiple economic, social, and environmental benefits for current and future beneficial uses based on the best available science (Water Code 113). The people of California have a primary interest in the protection, management, and reasonable beneficial use of the water resources of the state, both surface and underground, and in the integrated management of the state's water resources to meet the state's water management goals. Proper management of groundwater resources will help protect communities, farms, and the environment against prolonged dry periods and climate change, while preserving water supplies for existing and potential beneficial use. Failure to manage groundwater to prevent long-term overdraft infringes on overlying and other proprietary rights to groundwater.

California's Water Code specifically established as state policy that *every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes* (WC 106.3(a)). State agencies, including DWR the State Water Resources Control Board ("SWRCB"), and the State Department of Public Health, are required to *consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria when those policies, regulations, and criteria are pertinent to the uses of* water (WC 106.3(b)). The Water Code also creates a state policy *that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation* (WC 106). The Groundwater Sustainability Agencies (GSAs) were created by SGMA and are delegated by the state the authority to create and implement a Groundwater Sustainability Plan (GSP), which makes the GSA(s) a political subdivision of the state. Therefore, approval of any SGMA GSP created by a GSA(s) or county agency, which is then approved by the CDWR and the SWRCB, must be consistent with the state policies that protect and prioritize the public's right to safe and available supply of groundwater for all beneficial uses.

Implementation of the SGMA requires the creation of a GSP that provides for the development and reporting of those data necessary to support sustainable groundwater management, including those data that help describe the basin's geology, the short- and long-term trends of the basin's water balance, and other measures of sustainability, and those data necessary to resolve disputes regarding sustainable yield, beneficial uses, and water rights. A presumption inherent in SGMA is that sustainable management of a groundwater basin won't repeat or perpetuate the management errors of the past. That the design of the Corning Subbasin GSP sustainability monitoring program requires years of declining groundwater levels before an undesirable result can occur suggests that the past mismanagement practices will persist. The November 2021 Corning Subbasin[1] Final GSP fails to meet the SGMA goal of water resource sustainability and protection of the water rights of all beneficial users and uses.

The proposed sustainable management criteria presented in the Corning GSP fail to demonstrate as required by SGMA that the goal of groundwater sustainability is achievable and will occur within 20 years of GSP adoption for: (1) chronic lowering of groundwater levels, (2) reduction of groundwater storage, (3) degraded water quality, (4) depletions of interconnected surface waters, and (5) inelastic land subsidence. The final 2022 Corning GSP and the revised GSP fail to protect the beneficial uses for all users of groundwater in the subbasin because of the following:

- The final plan sets the minimum thresholds (MTs) for unreasonable results in the management the groundwater levels at depths that can result in 16% or more of the domestic wells going dry for sustained periods, if not permanently.
- The final plan requires without analysis or justification that before an unreasonable result can occur, the MTs for a sustainability indicator must be continuously and simultaneously exceeded for 24 months (2 years) at a minimum of 20% at representative groundwater monitoring wells.
- The final plan estimates that sustainable management of the groundwater levels and groundwater storage with the projected 2070 scenario will allow for a cumulative change in storage of -19,700 acre-feet (af) in the next 50 years, which is contrary to the estimated Historical baseline cumulative surplus from 1974 to 2015 of 290,300 af.
- The estimated difference between the Historical average annual and the projected 2070 average annual change in storage is -7,200 acre-feet per year (afy), or 360,000 af by 2070.
- The 2070 scenario estimated maximum annual change in storage during critically dry and dry water years is -41,800 afy, approximately 50% greater than the Historical baseline change of -27,450 afy, and over 100 times the 2070 annual average loss in groundwater storage.
- The final plan *operational flexibility* (OF) for sustainable management, the difference between the depths of the management objectives (MOs) and the MTs, is sufficient to allow for an average decline in groundwater levels that's approximately 3 times greater than the difference between the MOs and lowest groundwater levels since 2012 before an undesirable result can be declared.
- The final plan OF volume is large enough to allow for groundwater level decline for 5 continuous critically dry and dry water years before the minimum threshold depth is reached, which must then be followed by two more consecutive years with levels continuously below the MTs before an undesirable result needs to be declared.

[1] California Groundwater Basin number 5-021.51, part of the Sacramento Valley Groundwater Basin.

- The final plan assumes that sustainable management of the subbasin will allow groundwater pumping to increase by 36,300 afy above the Historical baseline, a 27% increase, with 96% of the increase going to agricultural uses.
- The final plan assumes that sustainable management of the subbasin with the 2070 scenario will result in annual average net stream gains (groundwater discharge minus stream seepage) of -4,600 afy, which is -37,700 afy below the Historical baseline of a +33,100 afy. This is a loss of approximately -114% in annual average net stream gains over the Historical baseline.
- The final plan assumes that sustainable management of the subbasin with the 2070 scenario will result in annual average net stream gains of -37,700 afy below the Historical baseline while groundwater pumping increases 36,300 afy above the Historical baseline, a change ratio of -104%. In other words, the proposed 2070 scenario increase in groundwater pumping will cause a decline in interconnected surface waters that exceeds the pumping increase.
- The final plan requirement for simultaneous, continuous exceedance of the MT at multiple representative monitoring wells can result in significant magnitudes and expansive areas of decline in groundwater levels, groundwater storage, water quality, interconnected surface waters, and possibly surface elevations (inelastic subsidence) as long as one of the monitored stations in the group doesn't continuously exceed the MT. In other words, there is no limit to decline in the beneficial uses of groundwater if measurements in *one* of the monitoring stations within a group is above the MT at least once every 24 months.
- The final plan fails to analyze, monitor, or consider the potential impacts to water quality from the proposed allowable changes in groundwater levels and storage, except for one constituent, salinity. Although the final plan calls for coordination in management of water quality with other governmental agencies, the plan doesn't indicate what the MTs are for all the potential contaminants of concern in the Corning subbasin, or what and how GSP management actions will be taken whenever a water quality impact is identified.
- The final plan requires that at least 25% of the 15 RMP water quality network monitoring wells, i.e., 3 wells, must exceed the MT for 2 consecutive years *where it is established that the GSP implementation is the cause of the exceedance to trigger an undesirable resul*t. The justification for requiring water quality exceedance in multiple wells for multiple years isn't clear and seems to allow the expansion of water quality degradation before the Corning GSAs will act to prevent an undesirable result. The requirement that someone must prove that the GSP implementation caused the water quality exceedance isn't consistent with the SGMA requirement to protect water quality.
- The final plan sets the MT rate of inelastic subsidence that appears to exceed the current conditions while providing no current assessment of the sensitivity of local infrastructure to subsidence.
- The final plan doesn't provide a requirement for frequent monitoring of subsidence benchmarks or monitoring of critical infrastructure, but instead leaves the responsibility of subsidence monitoring and analysis to others with the frequency of reporting dependent on the work schedules and funding of DWR and others.

C. The Final Corning GSP and the Revised GSP Fail to Comply with SGMA and the Water Code.

The following sections provide expanded discussions of the deficiencies listed above regarding how the Corning GSP fails to protect the beneficial uses for all users of groundwater in the subbasin.

1. The Corning GSP sets the MTs for unreasonable results in the management of groundwater levels at depths that can result in 16% or more of the domestic wells going dry for sustained periods, if not permanently, Section 6.6.2.2 (pages 6-21 to 6-26, pdf 430 to 435). This could possibly result in 315 of the 1,970 domestic wells in the subbasin going dry, see well count in Table 2-5 (page 2-34, pdf 100).

   The representative monitoring point (RMP) network of wells for measuring groundwater levels includes 37 shallow wells and 21 deep wells, Section 5.2.4 (pages 5-7 to 5-11, pdf 369 to 374). The RMP wells are subdivided into three regions: stable, slight decline, and declining, based on the historical stability of groundwater levels, Figures 6-1 and 6-2 (pages 6-12 and 6-13, pdf 421 and 422, and AquAlliance Exhibit 1. The MTs for the RMP groundwater level wells are set based on whether the recent historical (2010 to 2019) groundwater levels are stable or declining. Minimum thresholds were set using one of the two criteria (page 6-8, pdf 417):

   - *For wells that had recent historical (between 2010 and 2019) stable groundwater elevations (stable wells): Minimum fall groundwater elevation since 2012 minus 20-foot buffer.*

   - *For wells that had recent historical (between 2010 and 2019) declining groundwater elevations (declining wells): Minimum fall groundwater elevation since 2012 minus 20% of minimum groundwater level depth.*

   Both criteria appear to be arbitrary and designed to allow for the groundwater level to decline below the recent lowest elevation measured during a drought. This will likely subject many domestic well owners to experience their lowest groundwater levels with all the accompanying negative impacts: dry wells, poor water quality, higher pumping cost, etc. AquAlliance Exhibit 1-2 has a summary at the bottom of the table of the average MOs and MTs depths and depth differences for each class of RMP monitoring well taken from Tables 5-2, 5-7 and 6-2 (pages 5-8 and 5-9, 5-37, and 6-15 and 6-16, pdf 370-371, 399, 424-425). The average difference in depth in the shallow wells between the MO and the lowest groundwater elevation since 2012) (MO – 2012) ranges from 4.1 feet to 15.9 feet, with the basin-wide average at 6.9 feet. The difference in the shallow well elevation from the lowest groundwater levels since 2012 to the MTs (2012 – MT) ranges from 16.5 feet to 23.12 feet, with a basin-wide average of 17.8 feet. The shallow well MTs allow for a decline in depth ranging from 2.6 to 5.9 times greater than the historical decline from the MOs to the 2012 low [(MO-MT)/(MO-2012)], with a basin-wide average of 3.7 times, or 370% greater. In other words, domestic wells that on average experience a historical decline of 6.9 feet will now be allowed to experience an average maximum decline of 25.6 feet. This increase appears to be significant and unreasonable, and it apparently allows for the **dewatering of 16% of the known domestic wells, or possibly more,** because of the requirement for 2 consecutive years below the MT depth before an undesirable result occurs, Table 6-1 and Section 6.6.4.1 (pages 6-1, 6-34 and 6-35, pdf 416, 443 and 444).

The Corning GSP apparently considers a 370% increase from the average MO-to-MT depths to be a beneficially practical sustainable management criterion, stating that *[t]he proposed minimum thresholds for groundwater elevation will not necessarily protect all domestic wells because it is impractical to manage a groundwater basin in a manner that fully protects the shallowest wells* (page 6-26, pdf 436). By "shallowest wells" the plan seems to consider the shallowest 16%, or 315 wells, unworthy of protection regardless of which wells that have already gone dry since 2012 (i.e., past droughts) as well as those that will go dry in the future under Corning GSP sustainability criteria.

2. The Corning GSP does propose to establish a Well Mitigation Program, Section 7.3.2.1 to 7.3.2.7 (pages 7-12 to 7-15, pf 490 to 493) with various objectives and costs estimated at $100,000 to $500,00 per year, but the funding source(s) isn't clearly specified. The plan states that this well mitigation program would help identify and avoid impacts to well owners with a more complete inventory of wells and by … *the GSAs providing education and outreach to well owners to deepen or replace wells*, Section 7.3.2.1.7 (page 7-15, pdf 493). The outline for the Well Mitigation Program generally describes determination of which well owners might benefit from the program:

   > *Eligibility and access documentation to determine which Subbasin residents are eligible to participate in the mitigation program, well eligibility based on well construction parameters, and protocols to determine potential mitigation actions such as well deepening, repair, or replacement.*

   The description of the Well Mitigation Program only commits to taking potential mitigation actions without giving any specifics on how the $500,000 per year cost was determined or the amount of funds committed to each potential mitigation action, or any matching fund requirements for eligible well owners. It is also unclear whether there will be retroactive mitigation.

   The Well Mitigation Program in its current form is just a concept, not an actual commitment to mitigate the impacts from the proposed increased groundwater pumping. The Corning GSP doesn't link the increase in groundwater production to the implementation of this mitigation program. In other words, increased pumping can apparently go forward, without a program to deepen, repair, or replace impacted domestic wells.

   To be a functional mitigation program, the Corning GSAs need to make a firm commitment to implement the program within the next 3 years as shown in Table 7-3 (page 7-15, pdf 493) and expand the description of the program to include specific information on the funding source(s), the availability of these funds (local, state, or federal), the legal requirements for acquiring the funds, the criteria for prioritizing expenditures, the requirements for eligibility to receive funds, the funding match requirements for eligible well owners, the criteria for deciding to deepen, repair a well, add a water quality treatment system, or replace it with new well construction, the administrative procedures for the program, and the steps a resident must take to obtain well repair or replacement funds. In addition, the GSP should address criteria that will be used to evaluate a well that needs to be the deepened, repaired, or replaced to comply with the recent Governor's Executive Order N-7-22,[2] and any additional local agency permitting requirements.

3. The Corning GSP requires that groundwater levels fall below their minimum groundwater elevation thresholds for 24 consecutive months (2 years) in 20% of the wells before an undesirable result can be declared, Table 6-1 and Section 6.6.4.1 (pages 6-1, 6-34 and 6-35, pdf 416, 443 and 444). The plan apparently assumes that harm to the "long-term" beneficial uses and users only occurs when there are 24 continuous months of harm across a broad area of the subbasin, which then triggers an undesirable result and the need for the GSAs to take action.

   The Corning GSP provides additional language to the definition of a SGMA undesirable result, noting that this language isn't part of the definition given in the SGMA regulations. The GSP lists the six groundwater conditions from Water Code Section 10721 that can trigger an undesirable result, Section 6.1, (pages 6-2 to 6-4, pdf 411 to 413). The plan then adds the following explanatory text to the definition of undesirable result:

   > *Undesirable Result is not defined in the GSP Regulations. However, the description of undesirable result states that it should be a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the subbasin. An example undesirable result is more than 20% of the measured groundwater levels being lower than the minimum thresholds. Undesirable results should not be confused with significant and unreasonable conditions. Significant and unreasonable conditions are physical conditions to be avoided; an undesirable result is a quantitative assessment based on minimum thresholds.* (underline added)

   Apparently, the Corning GSP is making a distinction between a groundwater condition that's undesirable to only a few from a condition that affects many. This seems to be making an arbitrary threshold on the *practical* number of residents that can be inconvenienced by a dry or impaired well. For example, the assumption that it is *practical* to allow 16% of domestic wells to go dry in the Corning Subbasin, which is a significant and unreasonable condition for those residents, but apparently not sufficiently "significant and unreasonable" to the residents of the subbasin as a whole so as to trigger an undesirable result and the need for sustainable management action(s). The GSAs' authority to set the *practical* threshold of how many residences can be made to have a significant and unreasonable condition is unclear. When combined with the 20% requirement for collective MT exceedance for 24 consecutive months, the GSP sustainability management criterion for chronic lowering of groundwater levels may violate Water Codes 106, 106.3(a) and 106.3(b) because it fails to prioritize groundwater for

[2] https://www.gov.ca.gov/wp-content/uploads/2022/03/March-2022-Drought-EO.pdf

domestic purposes and protect the groundwater in the subbasin to provide an adequate supply of safe, clean and affordable water for human consumption, cooking and sanitary purposes.

4. The Corning GSP doesn't specify how the 20% of the RMP wells will be selected, or whether they can be adjacent, discontinuous, or spread across the subbasin. Can there be more than one 20% group? The monitoring plan does split the groundwater level monitoring network into 37 shallow and 21 deep wells (greater than 450 feet below the ground surface,(bgs)) so that suggests that at least two 20% groups are allowed. The reasoning for selecting the 20% well groups raises several questions:

   - What are the selection criteria for 20% groups of groundwater level monitoring wells? Are they based on the portion of the subbasin being monitored by these wells, how groundwater production in the subbasin is being managed, where sustainability projects are being implemented, when the groundwater levels wells drop below their MT elevations, or some combination of these and other criteria?
   - How many wells are required to make a 20% group? Can it be 8 wells out of the 37 shallow wells, 5 wells from the 21 deep wells, or does it need to be 12 wells from a total of 58 wells?
   - How many 20% MT exceedance groups are possible in each aquifer zone, only one, up to 5, or more?
   - Can the areas of the subbasin monitored by multiple 20% groups overlap?
   - Can a well be in multiple 20% groups at the same time?
   - Can an undesirable result be declared after 24 months of MT exceedance in the deep aquifer, but not be declared for the overlying shallow aquifer, or vice versa?
   - What is the start date of the 24-consecutive-month clock? Does it start on the earliest day that any one of the 20% wells exceeds its MT, on the day the last of the 20% well exceeds its MT, or some other intermediate date?
   - What happens to the start date of the 24-consecutive-month clock if additional RMP wells exceed their MTs after the day that there's a minimum number of wells needed for a 20% group? In other words, does the start date begin anew when a well is added to an existing group?
   - Are these additional wells made part of the existing group or does a new group have to be formed once there are enough additional wells to make another 20% group?
   - If there are multiple 20% MT exceedance groups, how is the determination of an undesirable result made if the exceedance in any one group is less than 24 months, but the combined duration of the exceedance for all groups is greater than 24 months?
   - It is unclear if the wells assigned to a group stay in the same group forever, change when there are fewer than 20% of the wells in the group, or change when the 24-month clock stops.
   - What happens when the locations of the first 20% group of wells cover a large portion of the subbasin, and then additional MT exceedance wells are clustered with in the first group's area around a local pumping depression in numbers sufficient to form another 20% group?

- Why does the MT exceedance need to be continuous in 20% of the monitoring wells for 24 months when dewatering of a single domestic or small agricultural well can cause significant harm to the user(s) if it occurs repeatedly for only a few months?
- Why is the dewatering of a domestic and/or small agricultural well for less than 24 months considered a beneficially sustainable practice that's in compliance with Water Code Sections 106 and 106.3(a)?
- Why is dewatering of domestic and/or small agricultural wells that might occur cyclically each summer considered a beneficially sustainable practice, and who is benefitting? Certainly it is not to the small landowner.

5. AquAlliance Exhibits 2 through 5 are modifications of groundwater, land surface, and surface water budgets in the Corning GSP. The modifications include columns and rows that calculate the budget component differences between the average values, differences in the component values by water year type, calculated sums and differences for groundwater pumping and storage, stream gains and losses, and the difference between the Historical baseline and the Current baseline with the Projected 2070 water budget. Columns and rows in these exhibits have been labeled for these comments.

   AquAlliance Exhibit 2 lists the values and changes in the Historical and projected 2070 groundwater budget components with summaries for groundwater pumping and storage for the overall average, and the three different water year type groups, critically dry and dry (CD/D), below normal and above normal (BN/AN), and wet (W). The Historical baseline average annual groundwater pumping for all year types is 135,900 afy, Exhibit 2-1A (row 20, column C). Historical baseline pumping increased for CD/D water years by 7% to 145,050 afy and deceased for the other two water year types (row 20, columns G through J). For the projected 2070 scenario, the subbasin average groundwater pumping will be increased above the Historical baseline by 36,300 afy, or 27%, to 172,200 afy, Exhibit 2-2C (row 68, columns D and E) and Exhibit 2-1B (row 44, column C). Projected 2070 pumping will increase 37,250 afy during CD/D water years, 38,500 afy for AN/BN years, and 35,300 afy for W years, Exhibit 2-2C (rows 68, columns E through J).

   Increases in groundwater pumping for the 2070 scenario also result in changes in groundwater storage. The Historical baseline average annual change in groundwater storage is a positive 6,900 afy, which resulted in a cumulative change in groundwater storage of 290,300 acre-feet (af), Exhibit 2-1A (rows 21 and 22, column C). During Historical CD/D water years, the storage loss is negative at -27,450 afy (row 21, column E). The 2070 scenario annual average change in storage is -300 afy with a cumulative change of -19,700 af over 50 years (rows 45 and 46, column C). While the 2070 annual average change in groundwater storage doesn't seem significant, the loss in storage during CD/D years increases to -41,800 afy, an additional loss over the Historical baseline of -14,350 afy, Exhibit 2-1B (row 45, column E) and Exhibit 2-2C (row 69, column E). The additional loss in storage for the 2070 scenario is approximately 39% of the 37,250 afy increase in groundwater pumping (-14,350 afy / 37,250 afy = 0.385 = 39%), Exhibit 2-2C (rows 68 and 69, column E). This additional loss in groundwater storge during CD/D water years, or drought years, is important because the change in storage during droughts can be used to establish the depth of the MTs, which will be discussed below in Comment No. 11.

6. The additional loss in groundwater storage with the 2070 scenario isn't the only important decrease in the Corning GSP water budget caused by the increase in pumping. The increase in groundwater pumping also causes a significant decline in the interconnected surface water flows. AquAlliance Exhibit 2 calculates the change in the net stream gains, i.e., the amount of groundwater discharging to the streams minus the amount of surface water seeping to groundwater. For the Historical baseline, the annual average net stream gain is a positive 33,100 afy, Exhibit 2-1A (row 23, column C). In other words, the streams gain flow from discharging groundwater. There is an assumption that when streams gain flow from groundwater and the flow changes with the pumping of groundwater, then those streams are interconnected surface waters and subject to SGMA.[3]

   The Historical baseline net stream gain is also positive for all water year types (row 23, columns E through J). In contrast, the 2070 scenario has a net loss in average annual stream flow of -4,600 afy, Exhibit 2-1B (row 47, column C). This 2070 scenario loss in annual stream flow continues in the CD/D and BN/AN water years with a maximum loss of -11,000 afy, Exhibit 2-1B (row 47, columns E through J). Although the 2070 Wet year has a positive net stream gain of 3,700 afy, it is a -47,200 afy reduction from the Historical baseline wet year gain of 50,900 afy, Exhibits 2-1A and 2-1B (column I, rows 47 versus 23) and Exhibit 2-2C (row 70, column I).

   The 2070 scenario loss in net stream gain is greater than the increase in groundwater pumping. The 2070 scenario average annual loss in stream flow relative to the Historical baseline of -37,700 afy is approximately 104% of the 36,300 afy 2070 increase in average annual

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[3] See these articles about how the disconnection of streams and groundwater results in maximum stream flow losses that spread as the groundwater depression enlarges.

Brunner P., Cook P. G., and Simmons C. T., 2009, Hydrogeologic controls on disconnection between surface water and groundwater, Water Resources Research, v. 45, W01422, pp. 1-13.
https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2008WR006953

Brunner P., Cook P.G. and Simmons C.T., 2011, Disconnected Surface Water and Groundwater: From Theory to Practice, Ground Water, v. 49, no. 4, pp. 460-467.
https://libra.unine.ch/Publications/Philip_Brunner/25762

Cook P.G., Brunner P., Simmons C.T., Lamontagne S., 2010, What is a Disconnected Stream?, Groundwater 2010, Canberra, October 31, 2010 – November 4, 2010, p. 4.
https://www.researchgate.net/profile/Philip-Brunner/publication/266251504_What_is_a_Disconnected_Stream/links/54dfa2c80cf29666378b9e57/What-is-a-Disconnected-Stream.pdf

Fox G.A. and Durnford D.S., 2003, Unsaturated hyporheic zone flow in stream/aquifer conjunctive systems, Advances in Water Resources, v. 26, pp.. 989-1000.
http://www.geol.lsu.edu/blanford/NATORBF/5%20Modeling%20Papers%20of%20Groundwater%20Flow%20of%20Stream&Aquifer%20Systems/Fox%20et%20al_Water%20Resources_2003.PDF

groundwater production, Exhibit 2-2C (rows 68, 70 and 71, column C). The 2070 scenario stream flow loss from the Historical baseline continues for the different water year types ranging from -81% to -134%, Exhibit 2-2C (rows 70 and 71, columns E to J).

The Corning GSP planned increase in groundwater pumping with the 2070 scenario appears to result in both a loss in groundwater storage and a loss in surface water flows, Exhibit 2-1B (rows 45, 46 and 47, column C). These losses contrast with the Historical baseline where annual average for both water budget components is positive, Exhibit 2-1A (rows 21, 22 and 23, column C). The 2070 loss in surface water flow that exceeds the increase in pumping suggests that the subbasin may be at a hydraulic and ecological tipping point. The Corning GSP proposed 2070 management of subbasin raises the several questions about the sustainability of future stream flows:

- Why is a loss in stream flow that exceeds the increase in groundwater pumping by 104% considered a beneficially sustainable management practice?
- Shouldn't the loss in stream flow caused by an increase in pumping be considered an undesirable result to interconnected surface waters, and a negative impact to the Public Trust?
- Doesn't SGMA require that the proposed 2070 scenario groundwater production in the Corning Subbasin be reduced below the proposed sustainable yield of 171,800 afy, Section 4.4.6 (pages 4-88 and 4-89, pdf 361 and 362), to prevent the undesirable results of a significant and unreasonable loss of interconnected surface water flow?
- Does the additional loss of surface water proposed by the GSP require a water rights diversion and storage permit? If yes, where is the point of diversion and what are the permit conditions?
- Does SGMA allow a GSP to reduce surface water flows without a full water availability analysis that documents the impacts of the reductions on existing water rights, demonstrates that the minimum surface water flows and by-pass flow requirements will be met, and shows that ecological and Public Trust resources will be protected?

7. In addition to the calculation of the basin-wide loss in interconnected stream flow with the 2070 scenario, the Corning GSP provides data on the change in stream flows for three major surface water bodies in the subbasin: the Sacramento River, Stony Creek and Black Butte Lake, and Thomes Creek, Exhibit 4.

The Sacramento River is the only major stream during the Historical baseline period that had a positive net gain in flow from groundwater discharge, i.e., an increase in surface flows, Exhibit 4-1A (row 3, columns B through I). Stony Creek and Black Butte Lake received a small amount of discharge from groundwater, but that's minor compared to the seepage losses, so the net stream gain was negative, Exhibit 4-1A (row 4 through 8, columns B through I). For Thomes Creek, the net stream gain was all negative with apparently no groundwater discharging to the creek, Exhibit 4-1A (rows 9 through 11, columns B through I). Note, streams that don't receive discharge from groundwater can still be affected by changes in groundwater level and therefore be interconnected, see references listed in footnote 2 of Comment No. 6.

The projected 2070 scenario exhibits a significant reduction in the net stream gain in all three of these surface water bodies, which is consistent with the basin-wide change, Exhibit 4-1B. **The Sacramento River will have the greatest change in net stream flow with an annual average of loss of -63,000 afy, a -178% loss from the Historical baseline**, Exhibit 4-2C (row 31, columns B and C). The majority of the subbasin stream flow losses continue with the Sacramento River for all water year types (row 31, columns B through I). The sum of the changes in the three surface water bodies is a loss averaging -86,000 afy with the water year type losses ranging from -57,850 afy to -84,200 afy, Exhibit 4-2C (row 42, columns B through I). Note that the sum of the losses in net stream gains for these three surface water bodies is greater than the basin-wide loss in net stream gains for the annual average and all water year types; compare Exhibit 4-2C (row 42, columns B through I) with Exhibit 2-2C (row 70, columns C through J). It is unclear what causes this difference even though the summation of the three stream net gains doesn't include the change in the net gains from Black Butte Lake. Including the lake doesn't make up for the difference between the two surface water budgets.

The conclusion that's reached from the change in net stream gains using both the basin-wide and the three itemized surface water body water budgets is that the 2070 scenario predicts significant and unreasonable losses from interconnected surface waters, which should be considered an undesirable result, and a negative impact to the Public Trust. The GSP doesn't quantify or analyze the effects of the interconnected surface water loss on beneficial uses of the surface water. Without the beneficial uses and water availability analyses, the management of the subbasin should maintain the Historical baseline surface water flows.

Maintaining Historical baseline surface water flows may require reductions in the annual groundwater pumping below the historical rates because of climate change. AquAlliance Exhibit 3 compares the Current scenario water budget to the Projected 2070 scenario. The Current scenario water budget evaluates the existing supply, demand, and change in storage under the most recently available population, land use, and hydrologic conditions, Section 4.1.3 (page 4-13, pdf 286). The Current water budget shows an increase in annual average groundwater pumping to 157,900 afy, an increase of 22,000 afy over the Historical baseline of 135,900 afy. The Current scenario has an annual average net stream gain of 10,000 afy, a change of -23,100 afy from the 33,100 afy Historical baseline, AquAlliance Exhibits 2-1A and 3-1A (rows 20 and 23, column C). As with the 2070 scenario, the Current scenario ratio of the change in net stream gain to change in groundwater pumping is negative and greater than one at -105% (-23,100 afy / 22,000 afy = -1.05 = -105%). This suggests that future climate changes may cause a reduction in net stream gain even with the Historical baseline rates of groundwater pumping.

Corning GSP and the management actions should be revised so that the 2070 scenario groundwater production is made sustainable by not causing losses in interconnected surface waters. Future subbasin groundwater management should maintain the flows in the subbasin stream and river to, at a minimum, match the Historical baseline in flow quantity, flow timing and flow location.

8. AquAlliance Exhibit 5 gives the values for the Land Surface Budget for the Historical baseline, part A, and the projected 2070 scenario, part B. The differences between the baseline and the 2070 scenario are given in part C. Overall there is an increase in the total inflow and outflow with the 2070 scenario, Exhibit 5C (rows 26 and 31, columns C through J). However, the direction of change is not the same for each water budget component.

   The 2070 scenario inflow for precipitation and applied groundwater both increase over the Historical baseline, but the applied surface water decreases. For the 2070 scenario the total outflow increases with the increases in evapotranspiration and overland flow. These increases in outflow appear to cause the decrease in deep percolation and return flow to streams, Exhibit 5C (rows 27 and 30, columns C through J). The total change in soil and unsaturated zone storage from Historical baseline to the 2070 scenario is negative for the annual average and the BN/AN water year, positive for the CD/D drought water years, and zero for the wet years, Exhibit 5C (row 32, columns C through J). It is unclear if the loss in return flow to streams in the Land Surface Budget, Exhibit 5 (row 30), is a part of the net stream gains component in the Groundwater and Surface Water budgets, Exhibits 2, 3 and 4.

9. The MT depths are apparently calculated assuming the sustainable yield of 171,800 afy for the 2070 scenario. The Corning GSP calculates a sustainable yield by subtracting the average annual negative change in annual groundwater storage in the projected 2070 scenario from the average annual groundwater production, Section 4.4.6 (pages 3-61 and 3-62, pdf 361 and 362), Table 4-15 (page 4-69, pdf 432), and AquAlliance Exhibit 2-1B (rows 44 and 45, Column C). As discussed in Comments Nos. 6 and 7, the proposed 2070 scenario management of the subbasin will result in a significant loss in interconnected surface waters while groundwater pumping is allowed to increase presumably up to this sustainable yield. Note that the projected pumping during CD/D water years is greater than the sustainable yield at 182,300 afy, AquAlliance Exhibit 2-1B (row 44, column E).

   The calculation of the 2070 scenario sustainable yield, using only the change in storage, doesn't address the undesirable loss to interconnected surface waters. The estimated 2070 scenario loss of interconnected surface waters should be considered an undesirable result for the Corning Subbasin unless beneficial uses and water availability analyses are done to demonstrate that the management actions and the GSP cause no significant and unreasonable impacts on the subbasin's beneficial uses of water, water users, and/or Public Trust resources. The GSP does cite a portion of the description of role of the sustainable yield estimate in SGMA from the 2017 Sustainable Management Criteria Best Management Practices,[4] Section 4.4.6 (page 4-88, pdf 361). The following is the full text from the BMP document with italics and underlines added:

[4] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf

Role of Sustainable Yield Estimates in SGMA

> *In general, the sustainable yield of a basin is the amount of groundwater that can be withdrawn annually without causing undesirable results. Sustainable yield is referenced in SGMA as part of the estimated basinwide water budget and as the outcome of avoiding undesirable results.*
>
> *Sustainable yield estimates are part of SGMA's required basinwide water budget. Section 354.18(b)(7) of the GSP Regulations requires that an estimate of the basin's sustainable yield be provided in the GSP (or in the coordination agreement for basins with multiple GSPs). A single value of sustainable yield must be calculated basinwide. This sustainable yield estimate can be helpful for estimating the projects and programs needed to achieve sustainability.*
>
> *SGMA does not incorporate sustainable yield estimates directly into sustainable management criteria. Basinwide pumping within the sustainable yield estimate is neither a measure of, nor proof of, sustainability. Sustainability under SGMA is only demonstrated by avoiding undesirable results for the six sustainability indicators.*

If this description of the role of the sustainable yield estimate in SGMA is followed, then the loss of flows in interconnected surface waters should be accounted for in the yield estimate. The Historical baseline water budget shows that the net stream gains are always positive for each water year type, AquAlliance Exhibit 2-1A (row 23, columns C through J). Even the Current scenario water years have positive net stream gains, although they are reduced from the Historical baseline, also see Comment No. 7, AquAlliance Exhibit 3-1A (row 23, columns C through J), whereas the net gains for the 2070 scenario are all negative, except for wet water years when a positive 3,700 afy gain is estimated, a 93% reduction from the Historical baseline of 50,900 afy for wet water years, AquAlliance Exhibit 2-1B (rows 23, 47 and 70, columns C through J).

The GSP's estimate of the sustainable yield for the Corning Subbasin using only the storage imbalance isn't consistent with the requirements of SGMA because it ignores the undesirable result to interconnected surface waters. The definition of sustainable yield in SGMA, WC 10721(w), requires that annual groundwater withdrawals do not cause *an undesirable result*, that is one or more. All six of the sustainability indicators listed in WC 10721(x) need to be considered when estimating the volume of groundwater that can be sustainably produced, that is, the sustainable yield.

The sustainable yield for the Corning Subbasin should be revised to account for impacts on interconnected surface water flows and the other five sustainability indicators. If [t]*he key to demonstrating a basin is meeting its sustainability goal is by avoiding undesirable results* (page 33 in DWR, 2017, Sustainability BMPs footnote 3), then the GSP must prevent impacts to interconnected surface waters and the other undesirable results.

Without an impact analyses, the Corning Subbasin sustainable yield must result in net stream gains to interconnected surface water that are equal to or greater than the Historical baseline at the start of SGMA. This may require a reduction in groundwater pumping from the Historical baseline if other components of the water budget result in additional losses to surface water flows or other undesirable results, see Comment No. 7. The multiple scenarios of the Corning Subbasin need to be run using the subbasin's groundwater model until a water budget that doesn't result in undesirable results is achieved. The estimated groundwater pumping from that iterative analysis would be the appropriate sustainable yield.

The conclusion that's reached from the changes in net stream gains with both the basin-wide and the three itemized surface water body water budgets is that the 2070 scenario predicts **significant and unreasonable losses from interconnected surface waters** which should be considered an undesirable result, and a negative impact to the Public Trust. The Corning GSP doesn't quantify or analyze the effects of the interconnected surface water loss on beneficial uses, users, or the Public Trust. Without the beneficial uses and water availability analyses, the management of the subbasin shouldn't allow degradation of the interconnected surface waters sustainability indicator below levels of the Historical baseline, and, in fact, may need to improve the conditions in the subbasin to correct the management problems that lead to the subbasin's SGMA high-priority status[5], which triggered the need to develop a GSP for the Corning Subbasin.

10. The apparently arbitrary decisions used in setting the MT depths were discussed above in Comment No. 1. A more appropriate method for establishing the MT depths to prevent undesirable results is to use the historical data of changes in groundwater levels and groundwater storage during periods of extended below-normal water years,(i.e., droughts). The Corning GSP provides information on the groundwater water budgets for each type of water year with the Historical baseline, Current, and Projected 2070 scenarios in Appendix 4D Tables 4D-6, 4D-14, and 4D-34, respectively (appendices only file pdf 421, 429, and 449). The cumulative change in groundwater storage for the Historical baseline is plotted in Figure 3-31 (page 3-75, pdf 224). The GSP doesn't provide a plot of the other scenario cumulative change in storage.

    AquAlliance Exhibit 6 is a plot of the Current and Projected 2070 cumulative changes in groundwater storage based on the groundwater model of the Corning Subbasin. A table is included on the exhibit that lists values for the averages and three water year types for the Historical baseline, Current, and 2070 scenario water budgets, see AquAlliance Exhibits 1, 2 and 3. Lines are drawn on top of the cumulative change graphs that estimate the slope of the annual loss groundwater storage during droughts lasting 3 or more years. The estimated annual loss in storage ranges from -34,375 afy to -57,600 afy. The estimated average annual loss in groundwater storage for the 2070 scenario in CD/D water years falls within this range at -41,800 afy, AquAlliance Exhibit 2-1B (row 45, column D).

    The Corning GSP also provides information on the changes in groundwater level in the subbasin from 2010 to 2015 on Figure 3-22 (page 3-55, pdf 204) and the change in groundwater storage during this time in Table 4D-2 (appendices only file pdf 417), and in

[5] Corning Subbasin 5-021.51, high priority with 22.5 priority points, accessed 4.16.2022; https://gis.water.ca.gov/app/bp-dashboard/final/

Section 3.2.3 (pages 3-72 and 3-74, pdf 222 and 223). Using the average changes in groundwater levels and the cumulative change in groundwater storage from 2010 to 2015, an estimate can be made of the basin-wide volume of groundwater yielded with each 1-foot decline in groundwater level. The volume in acre-feet per foot (af/f) can then be used to estimate a basin-wide average decline groundwater during consecutive years of drought.

AquAlliance Exhibit 7 provides several tables that list and calculate the average decline in depth of groundwater from 2010 to 2015 taken from Figure 3-22 and sorted into the stable, slight decline and declining sub-regions as shown on Figure 6-1 (page 6-12, pdf 421). The decrease in groundwater levels from 2010 to 2015 ranged from -9.2 feet for the stable region to -16.8 for the declining region, with a basin-wide average of -13.75 feet. Using this average decline and the cumulative loss in groundwater storage of -114,600 af calculated from data in Table 4D-2, a basin-wide average yield of 8,334 af/f is estimated. Using the 207,342 total acres for the Corning Subbasin, Section 3.1.1 (page 3-1, pdf 150), an average specific yield of approximately 4% is calculated for the shallow aquifer system.

If the acreage for the available groundwater is less than the full subbasin area, the specific yield increases to approximately 5.56% and 8.33% for 150,000 and 100,000 acres of available groundwater source area. Using the estimated basin-wide yield of 8,334 af/f, a calculation can be made for the basin-wide average decline in groundwater level that would occur during multiple CD/D water years, i.e., a drought, for both the Historical baseline and the 2070 scenario.

11. The sustainable management of groundwater as envisioned by SGMA likely requires that a temporary groundwater storage surplus be **maintained** to meet the needs of users during droughts and to protect the beneficial uses of streams, wildlife, and groundwater dependent ecosystem (WC 10721(w)). That is, subbasin management actions should provide for storing sufficient groundwater needed to counter the losses from a drought to protect and minimize drought impacts to all beneficial uses and users, and the Public Trust.

    If that is a goal of SGMA, shouldn't the depth of the MTs be set at a depth caused by declining groundwater levels for a reasonable number of continuous years of drought after adjusting for the temporary storage surplus created during normal, above normal, and wet years? Shouldn't a GSP use a method based on anticipated storage loss during a drought, rather than the arbitrary method of the Corning GSP that set the depths far below the recent historical maximum, which then results in several decades of continuous groundwater level declines and loss in storage before an undesirable result needs to be declared?

    The average annual Historical baseline change in groundwater storage for CD/D water years is -27,450 afy, AquAlliance Exhibit 2-1A (row 21, column E). Using the 8,334 af/f basin-wide yield and the Historic baseline change in annual storage, an average annual decline in groundwater level of -3.29 ft is calculated, AquAlliance Exhibit 7. For a drought of 3 consecutive CD/D water years, a cumulative storage loss of -82,350 af would be accompanied by a -9.9 ft decline in groundwater level. For 4 consecutive CD/D water years, the cumulative storage loss would be -109,800 af with a groundwater level decline of -13.2 ft. This estimated decline in groundwater level is consistent with the 2010 -2015 decline of 13.75 ft.

If the change in groundwater storage for CD/D water years with the 2070 scenario of -41,800 afy is used, the decline in groundwater would be approximately -5 feet per drought year. For 3 consecutive 2070 scenario CD/D drought years, the decline would be -15 feet, and for 4 consecutive years the decline would be -20 feet. The -20 feet is consistent with the Corning GSP setting the MT depth for the stable shallow aquifer zone at the [*m*]*inimum fall groundwater elevation since 2012 minus 20-foot buffer*, AquAlliance Exhibit 1. In other words, the MTs are apparently set to allow for 4 years of additional drought after groundwater levels decline to the lowest fall groundwater elevation since 2012. Declaration of an undesirable result wouldn't occur until after another 2 years of continuous drought under the GSP's 24-month exceedance requirement, or 6 years after the lowest historical groundwater level is reached. The decline to the lowest elevation since 2012 may take one or more years based on the elevation difference between the MOs and the 2012 low, AquAlliance Exhibit 1-2. Therefore, the MTs appear to be set to allow for 7 years of continuous drought at the 2070 scenario rate of storage loss. Setting the MT depths to trigger an undesirable result in the lowering of groundwater level at 7+ years of drought is a questionable management practice that will likely result in significant and unreasonable impacts to shallow domestic wells and interconnected surface waters.

12. A more appropriate method for determining the MT depth would be to use the estimated decline in groundwater levels from an extended period of drought, such as 3 years. The MTs depths would be set at the depth below the MOs that accommodates the decline in groundwater levels during this extended period of drought. From the discussion in Comment No. 11, the MTs for 2070 scenario should be set at no deeper than 15 feet below the MO elevations. The MT depth may need to be less to accommodate the 24 months of MT exceedance requirement.

    The GSP proposes that a declaration of an undesirable result can be made only after groundwater levels decline below the MT depth and remain there for 24 continuous months. If the MTs are set at 15 feet below the MOs, then a drought of 5 years could occur before an undesirable result would be declared with possibly an additional 10 feet of groundwater decline. This would result in 25 feet of groundwater level decline under the 2070 scenario and a total storage loss of approximately 200,000 af (25 years X 8,334 af/f = 208,350 af), which is not quite double the 114,600 af historical storage loss from 2010 to 2015, AquAlliance Exhibit 7. This suggests that perhaps **a more appropriate sustainable depth for the MTs should be set at 5 feet below the MOs** that allows only 1 year of drought storage loss with the assumption that an additional 2 years of drought can occur before an undesirable result is declared.

13. As discussed in Comment Nos. 6, 7 and 9, the 2070 scenario assumption that the Corning Subbasin has a sustainable yield of 171,800 afy is inappropriate because this volume of pumping results in significant and unreasonable loss to interconnected surface waters, which is a SGMA unreasonable result. The 2070 scenario CD/D water year pumping is estimated at 182,300 afy, which results in greater losses to stream flow than with the average annual 2070 production, AquAlliance Exhibit 2-1B (rows 44 and 47, columns C and E).

As discussed in Comment No. 9, the sustainable yield of the subbasin needs to be recalculated based on beneficial uses and surface water availability analyses so that none of the six SGMA undesirable results occur. Without the beneficial uses and water availability analyses, the GSP should assume that the future pumping volumes are no greater than the Historical baseline. The **sustainable yield pumping may need to be less to accommodate future climate changes**, see Comment No. 7. With a reduction in sustainable yield pumping volume, the annual loss in groundwater storage will likely be reduced. A reduction in CD/D water year storage losses would require recalculation of the proper depth for the MTs below the MOs, which would likely reduce the elevation difference between the MOs and MTs.

14. The Corning GSP identified salinity, nitrate, and arsenic as Contaminants of Concern (COC) for the subbasin, Section 3.2.6.3 (page 3-94, pdf 243). The plan also identified the locations of historical and current contaminant cleanup sites, Figures 3-37 through 3-40 and Table 3-8 (pages 3-86 through 3-90, pdf 235 through 239). The COC at the cleanup site include fuels, solvents, herbicides, fumigants, and pesticides, Table 3-8. The GSP states that *…local, state, and federal water quality standards applicable to the Subbasin need to be taken into consideration when setting water quality sustainable management criteria (SMC)*, and that *…existing water quality monitoring programs may be used by the GSA to help collect data during GSP implementation and establish consistency with other programs*, Section 6.8.2 (page 6-41, pdf 450).

    Despite the occurrence of multiple COCs in the subbasin, the GSP will track as a sustainable management criterion only one water quality COC, salinity, using Total Dissolved Solids (TDS) concentrations. To track salinity, the GSP will rely on a RMP groundwater quality monitoring well network of 15 wells, made up of 11 municipal wells in the City of Corning and Hamilton City, and 4 small water supply wells, Section 5.4.1.6, and Figure 5-8 (page 5-27 and 5-28, pdf 389 and 390). Tables 5-3 and 5-4 (pages 5-21 and 5-25, pdf 383 and 387) list public water supply wells and groundwater quality network wells, but the 15 RMP network water quality wells aren't clearly identified in these tables, except in Figure 5-8, which has only general well owner identifications. Therefore, the actual wells the GSP will use for the RMP water quality monitoring network aren't clearly identified by name and location. A table is needed that lists the RMP groundwater water quality wells names, well locations, well owners, screened intervals, well types, water quality monitoring frequency, all the COC that will be monitored at each well, the water quality standards for each COC, the monitoring and reporting frequency, and the monitoring and reporting agency.

    The SMC for groundwater quality requires that at least 25% of the 15 RMP network water quality monitoring wells, i.e., 3 wells, must exceed the salinity MT for 2 consecutive years *where it is established that the GSP implementation is the cause of the exceedance to trigger an undesirable resul*t, Table ES-1, and Section 6.8.4.1 (page ES-22, 6-45 and 6-46, pdf 42, 455 and 456). The justification for requiring water quality exceedance in multiple wells for multiple years isn't clear and seems to allow for the expansion of water quality degradation before the Corning GSAs will act to prevent an undesirable result. Taking action to protect water quality, especially for drinking water supplies, isn't something that is normally delayed until the problem gets widespread and pervasive. In addition, the requirement that someone must prove that the GSP implementation caused the exceedance isn't consistent with the SGMA requirement to protect water quality.

The definition of unreasonable result for water quality degradation includes the migration of contaminant plumes that impair water supplies, WC 10721(x)(4), even when the plumes aren't caused by the GSA's implementation of the GSP. The GSAs can't ignore the water quality impacts just because their past actions didn't cause the problem. The sustainability standard directs the GSAs to prevent the spread of the contaminant(s), regardless of who is to blame for the plume or water quality degradation. Actions by the GSAs shouldn't need to wait for long-term exceedance of a water quality standard at multiple wells across a large portion of the subbasin before actions are taken to mitigate the impact. In addition, groundwater management actions should prevent the migration of contaminant plumes into the Corning Subbasin from adjacent subbasins.

The GSP should describe future management actions that will be taken to prevent the spread of contaminants even before they exceed the water quality standards at one or more of the RMP network wells, and at the other water quality monitoring wells in the Corning Subbasin and adjacent subbasins. The GSP should also address how the Well Mitigation Program will assist domestic wells owners whose wells have become polluted. Assistance such as well head testing and treatment should be part of the Corning GSPs water quality mitigation program.

Although the Corning GSP calls for coordination in management of water quality with other governmental agencies, the plan doesn't indicate what are the MOs or MTs for all the potential contaminants of concern in the Corning Subbasin, or what GSP management actions will be taken whenever a water quality impact is identified by these coordinating agencies.

What is the role of the GSAs in protecting water quality for all beneficial uses and users? In particular, the protection of domestic water supply must be the primary concern for managing the subbasin, WC 106.3(a). SGMA empowers the GSAs with the authority to control pumping rates and locations throughout the subbasin to protect all beneficial uses and users of groundwater, an authority over groundwater resources that other regulatory agencies don't possess. This is likely the reasoning behind the recent Governor's Executive Order N-7-22.

The Corning GSP should provide a concise description of what projects and management actions the GSAs will be taking to prevent degradation of the subbasin water quality for all potential COCs, describe how the GSAs will remedy in a timely manner any water quality degradation that occurs, and develop a Well Mitigation Program that is fully funded and provides for meaningful assistance to impacted well owners with repair, treatment, and/or well replacement.

15. The Corning GSP sets the MO at zero feet *for inelastic subsidence solely due to lowered groundwater elevations throughout the subbasin, in addition to any measurement error*, Section 6.9.3 (page 6-55, pdf 464). If the InSAR dataset is used with its measurement error of 0.1 ft. (1.2 inches), then annual subsidence of 0.1 ft or less would not be considered measurable inelastic subsidence.

The MT rate for inelastic subsidence is 0.50 ft over 5 years, Table ES-1 and Sections 6.9.2 (pages 6-48, pdf 457). Although the Corning Subbasin has experienced little to no historical inelastic subsidence since the start of monitoring in 2004 (page 6-48, pdf 457), the MT was set *…to maintain consistency with neighboring subbasins,* Section 6.9.2.3 (pages 6-55 and 6-54, pdf 462 and 463). The neighboring subbasin to the south, Colusa Subbasin, has historically experienced inelastic subsidence and the MT for subsidence for that subbasin is also 0.5 feet over 5 years. Figure 6-11 shows the InSAR land subsidence data for the area at the southern border between the two subbasins surrounding Orland and Hamilton City (page 6-49, pdf 458). A north-south oriented area of subsidence ranging from -0.25 to -0.75 feet occurs just south of Orland. The Corning GSP indicates that groundwater pumping in the Colusa Subbasin near Orland has *…the potential to impact the ability of the Corning Subbasin GSAs to meet the subsidence minimum thresholds…* (page 6-54, pdf 463). Apparently, to be *consistent* with a neighboring subbasin that's experiencing ongoing subsidence, the Corning GSP will use the same MT, so that an undesirable result from subsidence doesn't have to be declared.

The Corning GSP doesn't offer a reasonable explanation for why an MT that allows northward expansion of the Colusa Subbasin subsidence is beneficial to the infrastructure and landowners in the Corning Subbasin. The GSP notes that there's been very little historical long-term subsidence in the Subbasin, and if this doesn't change in the future, then beneficial users and land uses should not be impacted by the subsidence minimum threshold, Section 6.9.2.4 (page 6-54, pdf 463).

While it is probably true that *if* the Corning Subbasin continues to have little or no inelastic subsidence, the MT value will have no effect. However, it might not be true if subsidence begins to occur, especially if it's migrating northward from the Colusa Subbasin, that the 0.50 ft over 5 years MT subsidence rate is a reasonable standard for an area that hasn't experienced inelastic subsidence. Unfortunately, subsidence is taking place in the subbasin. Using IDW interpolation of vertical displacement rates across agricultural lands within the Corning subbasin and raw InSAR subsidence rates (Q4 2023, not interpolated), **AquAlliance's map finds that there is widespread inelastic subsidence occurring in the Corning Subbasin**.[6] There is a significant area with subsidence taking place greater than 0.5 inch per year. Based on the InSAR data from 2015-2023, there are scattered areas with subsidence greater that 1-2 inches per year that likely exceed the current MT of half a foot per year over five years. These data are not disclosed in the Corning Subbasin GSPs released to date or the Annual Report for 2023 that was just submitted to DWR in April 2024.

Returning to the Corning GSP in setting the MT the same as the Colusa GSP, there seems to be a stance that if they are 'okay' with this amount of subsidence, then we should be 'okay' too. No actual assessment of the impacts of this level of subsidence on the infrastructure in the Corning Subbasin has been proposed in any version of the GSPs to date.

[6] AquAlliance 2024. *Subsidence in Agricultural Lands Within the Corning Subbasin*. Attached exhibit.

The Corning GSP takes the approach that:

> *The undesirable result for subsidence allows for no more than 0.5 foot of cumulative subsidence in the Subbasin during a 5-year period. This amount of subsidence is not likely to impact beneficial users and land uses such as highways, canals, and pipelines as it is about equal to the total subsidence in one portion of the Subbasin and no impacts to infrastructure have been reported to date. No other beneficial users or land uses are anticipated to be impacted by subsidence in the Subbasin.* Section 6.9.4.3 (page 6-57, pdf 466)

This technical standard of "not likely" to cause an impact to beneficial users and land uses needs some technical justification. The Corning GSP should be revised to provide specific information on the critical infrastructure in the Subbasin that includes: a description of the structures, the entities responsible for maintenance, how much subsidence these structures can tolerate without structural damage, the linkage and/or interdependence of these structures, the alternatives should a structure fail, the estimated costs for repairing structural damage, and the frequency of structural inspections, etc.

Lastly, but crucially, **the Plan fails to disclose the numerous sinkholes within and just outside the subbasin**. The sinkholes were widely discussed by local and state government from August 2021 forward, allowing time to insert this information in the draft, final, and revised GSPs.[7] [8] This serious omission adds to the conclusion that the Corning GSP and GSAs are not ready to take on the task of managing the subbasin.

In addition to evaluating critical infrastructure, the GSP should address how small areas of subsidence, such as sinkholes, will be managed. Sinkholes, peat decomposition, and natural settlement can all be triggered by declining groundwater levels. The GSP appears to require proof that settlement or subsidence is due only to groundwater pumping, Section 6.9 (page 6-47, pdf 456). The GSP doesn't explain how and by whom this determination will be made, in particular, when the subsidence doesn't cover a broad area and affects only a few private structures, like homes. The GSP seems to say that the landowner is responsible for demonstrating to the GSAs that the cause of any local settlement is groundwater decline due to pumping. Even if the landowner was able to prove the cause was declining groundwater levels, the GSP doesn't appear to propose any mitigation program to assist in making structural repairs.

D. Conclusion

For all the reasons discussed in our comments on the Corning Subbasin here, the Plan fails to meet SGMA's goal of water resource sustainability and protection of the water rights of all beneficial users and uses. In accordance with legal requirements to protect the Public Trust, the Plan also

[7] Massa, Rick August 16, 2021 e-mail to Lisa Hunter of Glenn County. "We have learned of orchardists that are experiencing sink holes in their orchards."

[8] "Ms. Hunter also stated that staff was made aware of sink holes developing in the Colusa and Corning subbasins, and that a site visit has been conducted with Department of Water Resources." Glenn Groundwater Authority December 14, 2021 minutes p. 2 (packet pdf p. 8).

fails. It also appears that the GSP will foist the responsibility to demonstrate damage from undesirable results on the unsuspecting public, creating an impossible burden for all but the large water districts with deep pockets. The Plan must be rejected by DWR and the SWRCB.

Respectfully submitted,

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AquAlliance Exhibit 1-1

Corning Subbasin RMP Wells[1]

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	RMP Network	State Well Number	Well Type	Groundwater Level Trend	Total Well Depth, Feet	Perforated Interval (feet bgs)	Reference Point Elevation (feet AMSL)	MO Depth, (feet)	MO Elevation, (feet AMSL)	MT Depth, (feet)	MT Elevation, (feet AMSL)	MO - MT, (feet)	2012 Minimum GW Depth, (feet)	2012 Minimum GW Elevation, (feet AMSL)	Difference MO and 2012 Min. Depth, Feet	Difference MT and 2012 Min. Elevation, Feet
1	Shallow	21N01W04N001M	Domestic	Stable	100	--	137.68	21.6	116.1	48.4	89.3	26.8	28.4	109.3	6.8	20.0
2	Shallow	22N01W19E003M	Irrigation	Stable	500	80 - 400	157.79	29.7	128.1	60.1	97.7	30.4	40.1	117.7	10.4	20.0
3	Shallow	22N01W29N003M	Observation	Stable	400	189 - 380	149.99	26.6	123.4	58.3	91.7	31.7	38.3	111.7	11.7	20.0
4	Shallow	22N02W01N003M	Observation	Stable	440	210 - 370	161.50	25.0	136.5	62.2	99.3	37.2	42.2	119.3	17.2	20.0
5	Shallow	22N02W15C004M	Observation	Stable	258	210 - 220	192.25	48.2	144.1	108.3	84.0	60.2	88.3	104.0	40.2	20.0
6	Shallow	23N02W16B001M	Irrigation	Stable	120	100 - 120	186.53	51.2	135.3	88.1	98.4	36.9	68.1	118.4	16.9	20.0
7	Shallow	23N02W28N004M	Observation	Stable	205	100 - 170	204.43	61.7	142.7	100.1	104.3	38.4	80.1	124.3	18.4	20.0
8	Shallow	23N02W34A003M	Irrigation	Stable	125	104 - 124	171.01	35.5	135.5	61.8	109.2	26.3	41.8	129.2	6.3	20.0
9	Shallow	23N02W34N001M	Industrial	Stable	100	70 - 100	185.92	40.0	145.9	74.1	111.8	34.1	54.1	131.8	14.1	20.0
10	Shallow	24N02W17A001M	Domestic	Stable	140	120 - 140	212.20	41.3	170.9	61.3	150.9	20.0	41.3	170.9	0.0	20.0
11	Shallow	24N02W20B001M	Domestic	Stable	120	100 - 120	223.43	50.0	173.4	73.1	150.3	23.1	53.1	170.3	3.1	20.0
12	Shallow	25N02W31G002M	Irrigation	Stable	115	93 - 113	223.80	32.4	191.4	54.5	169.3	22.1	34.5	189.3	2.1	20.0
13	Deep	22N01W29N002M	Observation	Stable	670	549 - 641	150.68	28.8	121.9	73.5	77.2	44.7	53.5	97.2	24.7	20.0
14	Deep	22N02W01N002M	Observation	Stable	730	700 - 710	161.31	26.6	134.7	86.8	74.5	60.2	66.8	94.5	40.2	20.0
15	Deep	22N02W15C002M	Observation	Stable	825	760 - 781	192.37	70.8	121.6	134.7	57.7	63.9	114.7	77.7	43.9	20.0
16	Deep	23N02W28N002M	Observation	Stable	580	550 - 570	204.37	70.5	133.9	104.4	100.0	33.9	84.4	120.0	13.9	20.0
17	Deep	25N03W36H001M	Irrigation	Stable	524	--	241.00	57.7	183.3	80.1	160.9	22.4	60.1	180.9	2.4	20.0
18	Shallow	22N02W18C003M	Observation	Slight Decline	188	165 - 175	225.54	77.1	148.4	93.9	131.6	16.8	78.3	147.3	1.1	15.7
19	Shallow	22N03W01R002M	Observation	Slight Decline	314	270 - 280	228.53	84.6	143.9	104.9	123.6	20.3	87.4	141.1	2.8	17.5
20	Shallow	22N03W05F002M	Irrigation	Slight Decline	218	188 - 218	298.89	94.4	204.5	121.0	177.9	26.6	100.8	198.1	6.4	20.2
21	Shallow	22N03W06B001M	Domestic	Slight Decline	210	195 - 210	309.90	45.8	264.1	71.9	238.0	26.1	59.9	250.0	14.1	12.0
22	Shallow	22N03W12Q003M	Domestic	Slight Decline	124	112 - 123	232.94	58.1	174.8	69.7	163.2	11.6	58.1	174.9	-0.1	11.6
23	Shallow	23N03W04H001M	Irrigation	Slight Decline	270	200 - 270	261.90	67.9	194.0	81.5	180.4	13.6	67.9	194.0	0.0	13.6
24	Shallow	23N03W13C006M	Observation	Slight Decline	182	95 - 135	215.59	70.0	145.6	92.5	123.1	22.5	77.1	138.5	7.1	15.4
25	Shallow	23N03W16H001M	Domestic	Slight Decline	150	144 - 150	278.08	84.7	193.4	103.8	174.3	19.1	86.5	191.6	1.8	17.3
26	Shallow	23N03W22Q001M	Irrigation	Slight Decline	380	--	235.97	83.3	152.7	106.1	129.9	22.8	88.4	147.6	5.1	17.7
27	Shallow	23N03W24A003M	Domestic	Slight Decline	199	180 - 199	207.44	70.0	137.4	88.8	118.6	18.8	74.0	133.4	4.0	14.8
28	Shallow	23N03W25M004M	Observation	Slight Decline	155	120 - 130	237.40	87.1	150.3	114.7	122.7	27.6	95.6	141.8	8.5	19.1
29	Shallow	24N02W29N003M	Observation	Slight Decline	388	200 - 290	213.76	55.7	158.1	90.6	123.2	34.9	75.5	138.3	19.8	15.1
30	Shallow	24N03W02R001M	Domestic	Slight Decline	270	--	257.95	69.4	188.6	85.4	172.6	16.1	71.2	186.8	1.8	14.2
31	Shallow	24N03W03R002M	Domestic	Slight Decline	132	112 - 132	279.46	72.2	207.3	86.7	192.8	14.5	72.3	207.2	0.1	14.5
32	Shallow	24N03W14B001M	Industrial	Slight Decline	140	130 - 140	294.05	98.8	195.3	118.6	175.5	19.9	98.8	195.2	0.1	19.8
33	Shallow	24N03W16A001M	Irrigation	Slight Decline	195	85 - 195	290.97	90.3	200.7	108.4	182.6	18.1	90.3	200.6	0.1	18.1
34	Shallow	24N03W24E001M	Domestic	Slight Decline	224	212 - 220	298.45	129.3	169.2	161.8	136.7	32.6	134.8	163.6	5.6	27.0
35	Shallow	24N03W26K001M	Irrigation	Slight Decline	245	103 - 175	283.46	92.4	191.1	110.9	172.6	18.5	92.4	191.0	0.1	18.5
36	Shallow	24N03W35P005M	Domestic	Slight Decline	120	100 - 120	251.46	59.5	192.0	71.4	180.1	11.9	59.5	192.0	0.0	11.9
37	Deep	22N02W18C001M	Observation	Slight Decline	1,062	841 - 1029	224.64	134.2	90.4	161.1	63.5	26.9	134.3	90.4	0.0	26.9
38	Deep	22N03W01R001M	Observation	Slight Decline	515	470 - 480	228.17	93.0	135.2	111.6	116.6	18.6	93.0	135.2	0.0	18.6
39	Deep	23N03W13C004M	Observation	Slight Decline	835	815 - 825	215.88	84.8	131.1	108.7	107.2	23.9	90.6	125.3	5.8	18.1
40	Deep	23N03W25M002M	Observation	Slight Decline	513	470 - 500	237.68	86.2	151.5	126.1	111.6	39.9	105.1	132.6	18.9	21.0
41	Deep	24N02W29N004M	Observation	Slight Decline	741	590 - 710	213.45	58.0	155.5	88.6	124.9	30.7	73.8	139.6	15.9	14.8

AquAlliance Exhibit 1-2

Corning Subbasin RMP Wells[1]

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	RMP Network	State Well Number	Well Type	Groundwater Level Trend	Total Well Depth, Feet	Perforated Interval (feet bgs)	Reference Point Elevation (feet AMSL)	MO Depth, (feet)	MO Elevation, (feet AMSL)	MT Depth, (feet)	MT Elevation, (feet AMSL)	MO - MT, (feet)	2012 Minimum GW Depth, (feet)	2012 Minimum GW Elevation, (feet AMSL)	Difference MO and 2012 Min. Depth, Feet	Difference MT and 2012 Min. Elevation, Feet
42	Shallow	24N03W17M001M	Domestic	Decline	108	**<u>100 - 108</u>**	316.48	100.2	216.3	**<u>126.0</u>**	190.5	25.8	105.0	211.5	4.8	21.0
43	Shallow	24N03W29Q001M	Observation	Decline	372	130 - 360	316.18	104.6	211.6	136.9	179.3	32.3	114.1	202.1	9.5	22.8
44	Shallow	24N04W14N002M	Domestic	Decline	180	--	375.52	128.1	247.4	153.7	221.8	25.6	128.1	247.4	0.0	25.6
45	Deep	23N03W07F001M	Irrigation	Decline	790	240 - 790	314.40	104.5	209.9	126.0	188.4	21.5	105.0	209.4	0.5	21.0
46	Deep	23N03W17R001M	Irrigation	Decline	720	360 - 720	302.50	94.8	207.7	115.2	187.3	20.4	96.0	206.5	1.2	19.2
47	Deep	23N04W13G001M	Irrigation	Decline	560	--	360.71	162.1	198.6	201.0	159.7	38.9	167.5	193.2	5.4	33.5
48	Deep	24N03W17M002M	Irrigation	Decline	505	315 - 495	316.80	120.0	196.8	144.0	172.8	24.0	120.0	196.8	0.0	24.0
49	Deep	24N03W29Q002M	Observation	Decline	575	490 - 550	315.76	103.2	212.6	140.9	174.9	37.7	117.4	198.3	14.3	23.5
50	Deep	24N04W33P001M	Irrigation	Decline	780	250 - 780	424.56	184.6	240.0	241.1	183.5	56.5	200.9	223.6	16.4	40.2
51	Deep	24N04W34K001M	Irrigation	Decline	750	310 - 750	421.50	197.6	223.9	237.1	184.4	39.5	197.6	223.9	0.0	39.5
52	Deep	24N04W34P001M	Irrigation	Decline	535	290 - 475	440.10	225.8	214.3	256.6	183.5	30.8	225.8	214.3	0.0	30.8
53	Deep	24N04W36G001M	Irrigation	Decline	750	320 - 750	362.20	147.8	214.4	179.0	183.2	31.2	149.2	213.0	1.4	29.8
54	Shallow	24N05W23L001M	Stock	--	235	--	530.90	185.1	345.8	218.9	312.0	33.8	--	--	--	--
55	Shallow	Glenn TSS Well	Observation	--	TBD	TBD	TBD	--	262.8	--	237.5	25.3	--	--	--	--
56	Deep	Glenn TSS Well	Observation	--	TBD	TBD	TBD	--	184.0	--	149.3	34.7	--	--	--	--
57	Shallow	Tehama CWT Well	Observation	--	TBD	TBD	TBD	--	199.6	--	181.8	17.8	--	--	--	--
58	Deep	Tehama CWT Well	Observation	--	TBD	TBD	TBD	--	186.1	--	160.3	25.8	--	--	--	--

1. Data taken from Tables 5-2. 5-7 and 6-2.
- Highlighted wells part of ICSW monitoring network, Table 5-7.
- Bolded and underrlined wells have MT depth below lower screen depth.

	Average MO Depth, ft	Average MT Depth, ft	MO - MT, ft	(MO-MT) / (MO-2-12)	MO - 2012, ft	2012 - MT, ft
All Shallow	70.6	96.2	25.6	3.7	6.9	17.8
All Deep	107.9	143.0	35.0	3.2	10.8	24.3
Stable Shallow	38.6	70.9	32.3	2.6	12.3	20.0
Stable Deep	50.9	95.9	45.0	1.8	25.0	20.0
Slight Decline Shallow	78.4	99.1	20.6	5.0	4.1	16.5
Slight Decline Deep	91.2	119.2	28.0	3.4	8.1	19.9
Decline Shallow	111.0	138.9	27.9	5.9	4.8	23.1
Decline Deep	148.9	182.3	33.4	7.7	4.3	29.1
ICSW Shallow	54.1	88.3	34.2	2.2	15.9	18.3

Modified Corning Subbasin Historical vs 2070 Groundwater Budget

Modified Table 4D-1 Corning Subbasin Historical Groundwater Budget, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	A	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
1	Inflows	Deep Percolation to Groundwater	161,200	52%	116,350	-28%	176,100	13%	212,600	29%
2		Streambed Recharge	51,100	16%	46,400	-9%	56,150	11%	53,500	4%
3		Inflow from Colusa	17,700	6%	16,650	-6%	18,550	5%	18,600	5%
4		Inflow from Red Bluff	44,500	14%	43,950	-1%	45,550	2%	44,500	0%
5		Inflow from Butte	1,500	0.5%	1,350	-10%	1,400	-7%	1,800	21%
6		Inflow from Los Molinos	21,300	7%	21,200	0%	22,000	3%	20,800	-2%
7		Inflow from Vina	10,700	3%	21,200	98%	22,000	53%	20,800	46%
8		Inflow from Foothills	1,500	0.5%	1,100	-27%	1,650	14%	1,900	24%
9		Recharge to Groundwater from Black Butte Lake	2,600	1%	2,100	-19%	2,750	7%	3,000	15%
10		**Total Inflows**	**312,100**		**270,300**	**-13%**	**346,150**	**13%**	**377,500**	**19%**
11	Outflows	Urban and Domestic Pumping	3,600	1%	3,650	1%	3,850	7%	3,500	-3%
12		Agricultural Pumping	132,300	43%	141,400	7%	127,700	-3%	122,600	-8%
13		Outflow to Colusa	32,200	11%	32,350	0%	31,450	-2%	32,200	0%
14		Outflow to Red Bluff	12,300	4%	11,750	-4%	12,050	-2%	13,500	10%
15		Outflow to Butte	1,500	0.5%	1,550	3%	1,600	6%	1,300	-13%
16		Outflow to Los Molinos	12,900	4%	11,800	-9%	12,200	-6%	14,600	14%
17		Outflow to Vina	26,200	9%	25,000	-5%	25,650	-2%	28,200	8%
18		Groundwater Discharge to Streams	84,200	28%	70,250	-17%	83,900	0%	104,400	24%
19		**Total Outflows**	**305,200**	**-**	**297,750**	**-2%**	**298,400**	**-2%**	**320,300**	**5%**
20		**Total Groundwater Pumping**	**135,900**	**-**	**145,050**	**7%**	**131,550**	**-3%**	**126,100**	**-7%**
21	Storage	**Annual Change of Groundwater in Storage**	**6,900**	**-**	**-27,450**	**-498%**	**47,750**	**592%**	**57,200**	**729%**
22		**Cumulative Change of Groundwater in Storage from WY 1974 to WY 2015**	**290,300**	-	-	-	-	-	-	-
23		**Net Stream Gains (Discharge - Seepage)**	**33,100**	**-**	**23,850**	**-28%**	**27,750**	**-16%**	**50,900**	**54%**
24		**Net Stream Gains / GW Pumping**	**24%**	**-**	**16%**	**-**	**21%**	**-**	**40%**	**-**

Modified Table 4D-33. Corning Subbasin 2070 Annual Groundwater Budget Summary, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	B	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from 2070 Average	Average in Below Normal/Above Normal Years, AFY	% Change from 2070 Average	Average in Wet Years, AFY	% Change from 2070 Average
25	Inflows	Deep Percolation to Groundwater	140,300	45%	96,500	-31%	156,500	17%	184,000	28%
26		Streambed Recharge	66,100	21%	57,300	-13%	73,100	12%	71,800	8%
27		Inflow from Colusa	14,300	5%	12,800	-10%	14,850	4%	16,200	13%
28		Inflow from Red Bluff	49,800	16%	49,350	-1%	50,100	1%	50,400	1%
29		Inflow from Butte	800	0.3%	650	-19%	850	8%	1,000	24%
30		Inflow from Los Molinos	25,000	8%	24,900	0%	25,300	1%	24,800	-1%
31		Inflow from Vina	12,600	4%	24,900	98%	25,300	51%	24,800	48%
32		Inflow from Foothills	1,100	0.4%	850	-23%	1,100	0%	1,200	9%
33		Recharge to Groundwater from Black Butte Lake	2,100	1%	1,750	-17%	2,400	17%	2,300	8%
34		**Total Inflows**	**312,100**		**269,000**	**-14%**	**349,500**	**12%**	**376,500**	**21%**
35	Outflows	Urban and Domestic Pumping	4,900	2%	4,900	0%	4,900	0%	4,900	0%
36		Agricultural Pumping	167,300	54%	177,400	6%	164,950	-1%	156,500	-7%
37		Outflow to Colusa	37,400	12%	38,250	2%	38,150	2%	34,800	-7%
38		Outflow to Red Bluff	9,800	3%	9,350	-5%	9,600	-2%	10,600	8%
39		Outflow to Butte	2,500	1%	2,500	0%	2,500	0%	2,300	-8%
40		Outflow to Los Molinos	8,900	3%	8,400	-6%	8,650	-3%	9,800	10%
41		Outflow to Vina	20,100	6%	18,950	-6%	19,900	-1%	21,800	9%
42		Groundwater Discharge to Streams	61,500	20%	51,050	-17%	61,800	1%	75,500	23%
43		**Total Outflows**	**312,400**	**-**	**310,800**	**-1%**	**310,450**	**-1%**	**316,200**	**1%**
44		**Total Groundwater Pumping**	**172,200**	**-**	**182,300**	**6%**	**169,850**	**-1%**	**161,400**	**-6%**
45	Storage	**Annual Change of Groundwater in Storage**	**-300**	**-**	**-41,800**	**-13833%**	**39,050**	**13117%**	**60,300**	**20200%**
46		**Cumulative Change of Groundwater in Storage Projected to 2070**	**-19,700**	-	-	-	-	-	-	-
47		**Net Stream Gains (Discharge - Seepage)**	**-4,600**	**-**	**-6,250**	**-36%**	**-11,300**	**-146%**	**3,700**	**180%**
48		**Net Stream Gains / GW Pumping**	**-2.7%**	**-**	**-3.4%**	**-**	**-6.7%**	**-**	**2.3%**	**-**

** Percent contribution of component to average total inflow/outflow. Small discrepancies between inflow minus outflow and change in storage may occur due to rounding.*

AquAlliance Exhibit 2-1

Difference Between Corning Subbasin Historical and Projected 2070 Annual Groundwater Budget Summary, Annual Average By Water Year Type

	A	B	C	D	E	F	G	H	I	J
	C	**Component**	**Average Difference, AFY**	**% Change from Historical Average**	**Average in Critically Dry/Dry Years, AFY**	**% Change from Historical Average**	**Average in Below Normal/Above Normal Years, AFY**	**% Change from Historical Average**	**Average in Wet Years, AFY**	**% Change from Historical Average**
49	**Inflows**	Deep Percolation to Groundwater	-20,900	-13%	-19,850	-17%	-19,600	-11%	-28,600	-13%
50		Streambed Recharge	15,000	29%	10,900	23%	16,950	30%	18,300	34%
51		Inflow from Colusa	-3,400	-19%	-3,850	-23%	-3,700	-20%	-2,400	-13%
52		Inflow from Red Bluff	5,300	12%	5,400	12%	4,550	10%	5,900	13%
53		Inflow from Butte	-700	-47%	-700	-52%	-550	-39%	-800	-44%
54		Inflow from Los Molinos	3,700	17%	3,700	17%	3,300	15%	4,000	19%
55		Inflow from Vina	1,900	18%	3,700	17%	3,300	15%	4,000	19%
56		Inflow from Foothills	-400	-27%	-250	-23%	-550	-33%	-700	-37%
57		Recharge to Groundwater from Black Butte Lake	-500	-19%	-350	-17%	-350	-13%	-700	-23%
58		**Total Change in Inflows**	**0**	**0%**	**-1,300**	**-0.5%**	**3,350**	**1%**	**-1,000**	**-0.3%**
59	**Outflows**	Urban and Domestic Pumping	1,300	36%	1,250	34%	1,050	27%	1,400	40%
60		Agricultural Pumping	35,000	26%	36,000	25%	37,250	29%	33,900	28%
61		Outflow to Colusa	5,200	16%	5,900	18%	6,700	21%	2,600	8%
62		Outflow to Red Bluff	-2,500	-20%	-2,400	-20%	-2,450	-20%	-2,900	-21%
63		Outflow to Butte	1,000	67%	950	61%	900	56%	1,000	77%
64		Outflow to Los Molinos	-4,000	-31%	-3,400	-29%	-3,550	-29%	-4,800	-33%
65		Outflow to Vina	-6,100	-23%	-6,050	-24%	-5,750	-22%	-6,400	-23%
66		Groundwater Discharge to Streams	-22,700	-27%	-19,200	-27%	-22,100	-26%	-28,900	-28%
67		**Total Change in Outflows**	**7,200**	**2%**	**13,050**	**4%**	**12,050**	**4%**	**-4,100**	**-1%**
68		**Change In Groundwater Pumping**	**36,300**	**27%**	**37,250**	**26%**	**38,300**	**29%**	**35,300**	**28%**
69	**Storage**	**Annual Change of Groundwater in Storage**	**-7,200**	**-104%**	**-14,350**	**-52%**	**-8,700**	**-18%**	**3,100**	**5%**
70		**Net Change in Stream Gains**	**-37,700**	**-114%**	**-30,100**	**-126%**	**-39,050**	**-141%**	**-47,200**	**-93%**
71		**Net Change in Stream Gains / Change in GW Pumping**	**-104%**	**-**	**-81%**	**-**	**-102%**	**-**	**-134%**	**-**

** Percent contribution of component to average total inflow/outflow. Small discrepancies between inflow minus outflow and change in storage may occur due to rounding.*

Modified Corning Subbasin Current vs 2070 Groundwater Budget

Modified Table 4D-13 Corning Subbasin Current Groundwater Budget, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	A	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
1	Inflows	Deep Percolation to Groundwater	141,800	47%	97,650	-31%	157,450	16%	185,800	28%
2		Streambed Recharge	57,900	19%	51,200	-12%	63,400	11%	62,200	7%
3		Inflow from Colusa	14,500	5%	13,000	-10%	15,050	4%	16,200	11%
4		Inflow from Red Bluff	48,100	16%	47,550	-1%	48,250	0%	48,800	1%
5		Inflow from Butte	1,000	0.3%	850	-15%	900	-12%	1,100	11%
6		Inflow from Los Molinos	24,100	8%	24,100	0%	24,250	1%	24,100	0%
7		Inflow from Vina	12,300	4%	24,100	96%	24,250	50%	24,100	49%
8		Inflow from Foothills	1,600	0.5%	1,250	-22%	1,700	8%	2,000	24%
9		Recharge to Groundwater from Black Butte Lake	2,000	1%	1,700	-15%	2,300	18%	2,300	13%
10		**Total Inflows**	**303,300**		**261,400**	**-14%**	**337,550**	**13%**	**366,600**	**19%**
11	Outflows	Urban and Domestic Pumping	4,900	2%	4,900	0%	4,900	0%	4,900	0%
12		Agricultural Pumping	153,000	51%	163,400	7%	149,550	-2%	142,800	-7%
13		Outflow to Colusa	34,000	11%	34,950	3%	34,450	1%	31,700	-7%
14		Outflow to Red Bluff	10,300	3%	9,900	-4%	10,200	-1%	11,000	7%
15		Outflow to Butte	2,300	0.8%	2,350	2%	2,350	2%	2,100	-9%
16		Outflow to Los Molinos	9,600	3%	9,050	-6%	9,500	-1%	10,700	12%
17		Outflow to Vina	20,000	7%	19,050	-5%	19,800	-1%	21,500	8%
18		Groundwater Discharge to Streams	67,900	22%	56,900	-16%	68,400	1%	82,200	21%
19		**Total Outflows**	**302,000**		**300,500**	**-0.5%**	**299,150**	**-1%**	**306,900**	**2%**
20		**Total Groundwater Pumping**	**157,900**	**-**	**168,300**	**7%**	**154,450**	**-2%**	**147,700**	**-7%**
21	Storage	**Annual Change of Groundwater in Storage**	**1,300**	**-**	**-39,100**	**-3108%**	**38,400**	**2854%**	**59,700**	**4492%**
22		**Cumulative Change of Groundwater in Storage from WY 1974 to WY 2015**	**290,300**	-	-	-	-	-	-	-
23		**Net Stream Gains (Discharge - Seepage)**	**10,000**	**-**	**5,700**	**-43%**	**5,000**	**-50%**	**20,000**	**100%**
24		**Net Stream Gains / GW Pumping**	**6%**	**-**	**3%**	**-**	**3%**	**-**	**14%**	**-**

Modified Table 4D-33 Corning Subbasin 2070 Annual Groundwater Budget Summary, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	B	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from 2070 Average	Average in Below Normal/Above Normal Years, AFY	% Change from 2070 Average	Average in Wet Years, AFY	% Change from 2070 Average
25	Inflows	Deep Percolation to Groundwater	140,300	45%	96,500	-31%	156,500	17%	184,000	28%
26		Streambed Recharge	66,100	21%	57,300	-13%	73,100	12%	71,800	8%
27		Inflow from Colusa	14,300	5%	12,800	-10%	14,850	4%	16,200	13%
28		Inflow from Red Bluff	49,800	16%	49,350	-1%	50,100	1%	50,400	1%
29		Inflow from Butte	800	0.3%	650	-19%	850	8%	1,000	24%
30		Inflow from Los Molinos	25,000	8%	24,900	0%	25,300	1%	24,800	-1%
31		Inflow from Vina	12,600	4%	24,900	98%	25,300	51%	24,800	48%
32		Inflow from Foothills	1,100	0.4%	850	-23%	1,100	0%	1,200	9%
33		Recharge to Groundwater from Black Butte Lake	2,100	1%	1,750	-17%	2,400	17%	2,300	8%
34		**Total Inflows**	**312,100**		**269,000**	**-14%**	**349,500**	**12%**	**376,500**	**21%**
35	Outflows	Urban and Domestic Pumping	4,900	2%	4,900	0%	4,900	0%	4,900	0%
36		Agricultural Pumping	167,300	54%	177,400	6%	164,950	-1%	156,500	-7%
37		Outflow to Colusa	37,400	12%	38,250	2%	38,150	2%	34,800	-7%
38		Outflow to Red Bluff	9,800	3%	9,350	-5%	9,600	-2%	10,600	8%
39		Outflow to Butte	2,500	1%	2,500	0%	2,500	0%	2,300	-8%
40		Outflow to Los Molinos	8,900	3%	8,400	-6%	8,650	-3%	9,800	10%
41		Outflow to Vina	20,100	6%	18,950	-6%	19,900	-1%	21,800	9%
42		Groundwater Discharge to Streams	61,500	20%	51,050	-17%	61,800	1%	75,500	23%
43		**Total Outflows**	**312,400**		**310,800**	**-1%**	**310,450**	**-1%**	**316,200**	**1%**
44		**Total Groundwater Pumping**	**172,200**	**-**	**182,300**	**6%**	**169,850**	**-1%**	**161,400**	**-6%**
45	Storage	**Annual Change of Groundwater in Storage**	**-300**	**-**	**-41,800**	**-13833%**	**39,050**	**13117%**	**60,300**	**20200%**
46		**Cumulative Change of Groundwater in Storage Projected to 2070**	**-19,700**	-	-	-	-	-	-	-
47		**Net Stream Gains (Discharge - Seepage)**	**-4,600**	**-**	**-6,250**	**-36%**	**-11,300**	**-146%**	**3,700**	**180%**
48		**Net Stream Gains / GW Pumping**	**-2.7%**	**-**	**-3.4%**	**-**	**-6.7%**	**-**	**2.3%**	**-**

** Percent contribution of component to average total inflow/outflow. Small discrepancies between inflow minus outflow and change in storage may occur due to rounding.*

Modified Corning Subbasin Current vs 2070 Groundwater Budget

Modified Table 4D-13 Corning Subbasin Current Groundwater Budget, Annual Average by Water Year Type

Difference Between Corning Subbasin Current and Projected 2070 Annual Groundwater Budget Summary, Annual Average By Water Year Type

	A	B	C	D	E	F	G	H	I	J
	C	Component	Average Difference, AFY	% Change from Historical Average	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
49	Inflows	Deep Percolation to Groundwater	-1,500	-1%	-1,150	-1%	-950	-1%	-1,800	-1%
50		Streambed Recharge	8,200	14%	6,100	12%	9,700	15%	9,600	15%
51		Inflow from Colusa	-200	-1%	-200	-2%	-200	-1%	0	0%
52		Inflow from Red Bluff	1,700	4%	1,800	4%	1,850	4%	1,600	3%
53		Inflow from Butte	-200	-20%	-200	-24%	-50	-6%	-100	-9%
54		Inflow from Los Molinos	900	4%	800	3%	1,050	4%	700	3%
55		Inflow from Vina	300	2%	800	3%	1,050	4%	700	3%
56		Inflow from Foothills	-500	-31%	-400	-32%	-600	-35%	-800	-40%
57		Recharge to Groundwater from Black Butte Lake	100	5%	50	3%	100	4%	0	0%
58		**Total Change in Inflows**	**8,800**	**0%**	**7,600**	**2.9%**	**11,950**	**4%**	**9,900**	**2.7%**
59	Outflows	Urban and Domestic Pumping	0	0%	0	0%	0	0%	0	0%
60		Agricultural Pumping	14,300	9%	14,000	9%	15,400	10%	13,700	10%
61		Outflow to Colusa	3,400	10%	3,300	9%	3,700	11%	3,100	10%
62		Outflow to Red Bluff	-500	-5%	-550	-6%	-600	-6%	-400	-4%
63		Outflow to Butte	200	9%	150	6%	150	6%	200	10%
64		Outflow to Los Molinos	-700	-7%	-650	-7%	-850	-9%	-900	-8%
65		Outflow to Vina	100	1%	-100	-1%	100	1%	300	1%
66		Groundwater Discharge to Streams	-6,400	-9%	-5,850	-10%	-6,600	-10%	-6,700	-8%
67		**Total Change in Outflows**	**10,400**	**3%**	**10,300**	**3%**	**11,300**	**4%**	**9,300**	**3%**
68		**Change In Groundwater Pumping**	**14,300**	**9%**	**14,000**	**8%**	**15,400**	**10%**	**13,700**	**9%**
69	Storage	**Annual Change of Groundwater in Storage**	**-1,600**	**-123%**	**-2,700**	**-7%**	**650**	**2%**	**600**	**1%**
70		**Net Change in Stream Gains**	**-14,600**	**-146%**	**-11,950**	**-210%**	**-16,300**	**-326%**	**-16,300**	**-82%**
71		**Net Change in Stream Gains / Change in GW Pumping**	**-102%**	**-**	**-85%**	**-**	**-106%**	**-**	**-119%**	**-**

** Percent contribution of component to average total inflow/outflow. Small discrepancies between inflow minus outflow and change in storage may occur due to rounding.*

AquAlliance Exhibit 4-1

Corning Subbasin Changes in Net Stream Gains

Historical Baseline vs Projected 2070 Water Years

A

1974 to 2015 Annual Water Year Historical Baseline Surface Water Budget Components

	A	B	C	D	E	F	G	H	I
	River	**Average, AFY**	**% Contribution**	**Average in Critically Dry/Dry Years, AFY**	**% Change from Historical Average**	**Average in Below Normal/Above Normal Years, AFY**	**% Change from Historical Average**	**Average in Wet Years, AFY**	**% Change from Historical Average**
	Sacramento River - Table 4D-7								
1	Groundwater Discharge to Streams	88,700	1%	71,200	-20%	89,150	1%	113,000	27%
2	Streambed Recharge to Groundwater	7,300	<1%	13,600	86%	2,550	-65%	1,500	-79%
3	**Net Stream Gains (GW Discharge - SW Seepage)**	**81,400**	-	**57,600**	**-29%**	**86,600**	**6%**	**111,500**	**37%**
	Stony Creek and Black Butte Lake - Table 4D-9								
4	Groundwater Discharge to Streams	1,700	<1%	350	-79%	400	-76%	4,800	182%
5	Streambed Recharge to Groundwater	19,200	4%	19,550	2%	29,400	53%	10,600	-45%
6	Recharge to Groundwater from Black Butte Lake	17,800	4%	17,150	-4%	18,150	2%	18,500	4%
7	**Total Net Stream Gains (GW Discharge - SW Seepage)**	**-35,300**	-	**-36,350**	**-3%**	**-47,150**	**-34%**	**-24,300**	**31%**
8	**Stony Creek Net Stream Gains (GW Discharge - SW Seepage)**	**-17,500**	-	**-19,200**	**-10%**	**-29,000**	**-66%**	**-5,800**	**67%**
	Thomes Creek - Table 4D-11								
9	Groundwater Discharge to Streams	0	0%	0	0%	0	0%	0	0%
19	Streambed Recharge to Groundwater	27,000	11%	23,500	-13%	30,350	12%	29,300	9%
11	**Net Stream Gains (GW Discharge - SW Seepage)**	**-27,000**	-	**-23,500**	**13%**	**-30,350**	**-12%**	**-29,300**	**-9%**
	Total of Three Streams in Corning Subbasin - Table 4D-5								
12	Groundwater Discharge to Streams	90,400	1%	71,550	-21%	89,550	-1%	117,800	30%
13	Streambed Recharge to Groundwater[1]	53,500	0%	56,650	6%	62,300	16%	41,400	-23%
14	**Net Stream Gains (GW Discharge - SW Seepage)**	**36,900**	-	**14,900**	**-60%**	**27,250**	**-26%**	**76,400**	**107%**

B

Projected 2070 Annual Water Year Surface Water Budget Components

	A	B	C	D	E	F	G	H	I
	River	**Average, AFY**	**% Contribution**	**Average in Critically Dry/Dry Years, AFY**	**% Change from 2070 Average**	**Average in Below Normal/Above Normal Years, AFY**	**% Change from 2070 Average**	**Average in Wet Years, AFY**	**% Change from 2070 Average**
	Sacramento River - Table 4D-37								
15	Groundwater Discharge to Streams	49,300	<1%	38,900	-21%	48,450	-2%	64,500	31%
16	Streambed Recharge to Groundwater	31,000	<1%	44,000	42%	26,450	-15%	16,600	-46%
17	**Net Stream Gains (GW Discharge - SW Seepage)**	**18,300**	-	**-5,100**	**-128%**	**22,000**	**20%**	**47,900**	**162%**
	Stony Creek and Black Butte Lake - Table 4D-39								
18	Groundwater Discharge to Streams	600	<1%	650	8%	500	-17%	600	0%
19	Streambed Recharge to Groundwater	36,500	8%	25,300	-31%	49,600	36%	41,700	14%
20	Recharge to Groundwater from Black Butte Lake	17,100	4%	16,550	-3%	17,550	3%	17,600	3%
21	**Total Net Stream Gains (GW Discharge - SW Seepage)**	**-53,000**	-	**-41,200**	**22%**	**-66,650**	**-26%**	**-58,700**	**-11%**
22	**Stony Creek Net Stream Gains (GW Discharge - SW Seepage)**	**-35,900**	-	**-24,650**	**31%**	**-49,100**	**-37%**	**-41,100**	**-14%**
	Thomes Creek- Table 4D-41								
23	Groundwater Discharge to Streams	0	0%	0	0%	0	0%	0	0%
24	Streambed Recharge to Groundwater	32,300	11%	25,250	-22%	35,550	10%	38,700	20%
25	**Net Stream Gains (GW Discharge - SW Seepage)**	**-32,300**	-	**-25,250**	**22%**	**-35,550**	**-10%**	**-38,700**	**-20%**
	Total of Three Streams in Corning Subbasin[2]								
26	Groundwater Discharge to Streams	49,900	-	39,550	-21%	48,950	-2%	65,100	30%
27	Streambed Recharge to Groundwater[1]	99,800	-	85,800	-14%	79,550	-20%	72,900	-27%
28	**Net Stream Gains (GW Discharge - SW Seepage)**	**-49,900**	-	**-46,250**	**7%**	**-30,600**	**39%**	**-7,800**	**84%**

Percentages rounded off.

AquAlliance Exhibit 4-2

Corning Subbasin Changes in Net Stream Gains

Historical Baseline vs Projected 2070 Water Years

C

Difference Between Historical and 2070 Projected Annual Water Year Surface Water Budget Components

	A	B	C	D	E	F	G	H	I
	River	**Average, AFY**	**% Change from Historical Average**	**Average in Critically Dry/Dry Years, AFY**	**% Change from Average Difference**	**Average in Below Normal/Above Normal Years, AFY**	**% Change from Average Difference**	**Average in Wet Years, AFY**	**% Change from Average Difference**
	Change in Sacramento River								
29	Groundwater Discharge to Streams	-39,400	-144%	-32,300	18%	-40,700	-3%	-48,500	-23%
30	Streambed Recharge to Groundwater	23,700	225%	30,400	28%	23,900	1%	15,100	-36%
31	**Net Stream Gains (GW Discharge - SW Seepage)**	**-63,100**	**-178%**	**-62,700**	**1%**	**-64,600**	**-2%**	**-63,600**	**-1%**
	Change in Stony Creek and Black Butte Lake								
32	Groundwater Discharge to Streams	600	-65%	650	8%	500	-17%	600	0%
33	Streambed Recharge to Groundwater	17,300	-10%	5,750	-67%	20,200	17%	31,100	80%
34	Recharge to Groundwater from Black Butte Lake	-700	-104%	-600	14%	-600	14%	-900	-29%
35	**Total Net Stream Gains (GW Discharge - SW Seepage)**	**-16,000**	**55%**	**-4,850**	**70%**	**-19,500**	**-22%**	**-34,400**	**-115%**
36	**Stony Creek Net Stream Gains (GW Discharge - SW Seepage)**	**-18,400**	**-5%**	**-5,450**	**70%**	**-20,100**	**-9%**	**-35,300**	**-92%**
	Change in Thomes Creek								
37	Groundwater Discharge to Streams	0	0%	0	0%	0	0%	0	0%
38	Streambed Recharge to Groundwater	5,300	-80%	1,750	-67%	5,200	-2%	9,400	77%
39	**Net Stream Gains (GW Discharge - SW Seepage)**	**-5,300**	**80%**	**-1,750**	**67%**	**-5,200**	**2%**	**-9,400**	**-77%**
	Change in Total for Three Streams in Corning Subbasin[2]								
40	Groundwater Discharge to Streams	-40,500	-145%	-32,000	21%	-40,600	0.2%	-52,700	-30%
41	Streambed Recharge to Groundwater[1]	46,300	-13%	29,150	-37%	17,250	-63%	31,500	-32%
42	**Net Stream Gains (GW Discharge - SW Seepage)**	**-86,800**	**-335%**	**-61,150**	**30%**	**-57,850**	**33%**	**-84,200**	**3%**

Percentages rounded off.

1. The sum of the streambed recharge for all three streams exclude the recharge from Black Butte Lake based on the sums given in the GPS table.

2. Total for subbasin streams calculated by summing values in Tables 4D-37, 4D-39, and 4D-41.

Modified Table 4D-3. Corning Subbasin Historical Land Surface Budget, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	A	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
1	Inflows	Precipitation	391,800	65%	282,000	-28%	427,350	9%	516,700	32%
2		Applied Groundwater	135,900	22%	144,900	7%	131,550	-3%	126,100	-7%
3		Applied SurfaceWater	79,000	13%	75,900	-4%	80,500	2%	83,200	5%
4		**Total Inflows**	**606,700**	-	**502,800**	-17%	**639,400**	5%	**726,000**	20%
5	Outflows	Deep Percolation to Groundwater	157,000	26%	112,250	-29%	171,700	9%	208,000	32%
6		Evapotranspiration	292,200	48%	280,850	-4%	297,750	2%	303,000	4%
7		Overland Flow	136,000	22%	72,350	-47%	151,550	11%	212,700	56%
8		Return Flow to Streams	19,900	3%	18,900	-5%	20,750	4%	21,000	6%
9		**Total Outflows**	**605,100**	-	**484,350**	-20%	**641,750**	6%	**744,700**	23%
10	Storage	**Change in Soil and Unsaturated Zone Storage**	**1,600**	-	**18,450**	**1053%**	**-2,350**	**-247%**	**-18,700**	**-1269%**
11		**Ratio of Deep Percolation to Total Inflows**	**25.9%**	-	**22%**	-	**27%**	-	**29%**	-

Modified Table 4D-35. Corning Subbasin Projected 2070 Land Surface Budget, Annual Average by Water Year Type

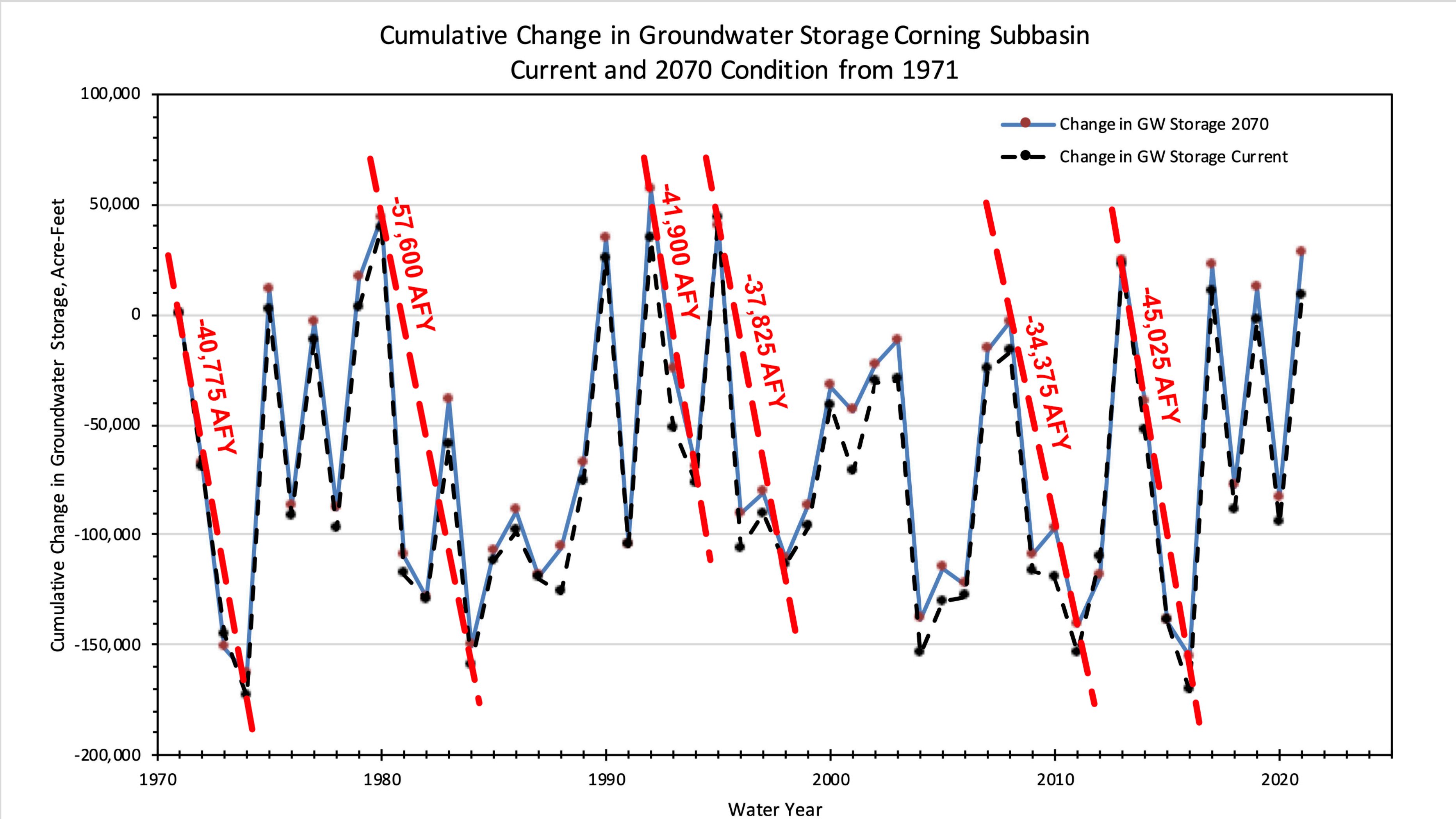
	A	B	C	D	E	F	G	H	I	J
	B	Component	Average, AFY	% Contribution*	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
12	Inflows	Precipitation	413,700	65%	290,250	-30%	460,400	11%	536,600	30%
13		Applied Groundwater	172,100	27%	182,150	6%	169,850	-1%	161,400	-6%
14		Applied SurfaceWater	46,400	7%	46,350	0%	46,200	0%	46,700	1%
15		**Total Inflows**	**632,200**	-	**518,750**	-18%	**676,450**	7%	**744,700**	18%
16	Outflows	Deep Percolation to Groundwater	137,800	22%	93,950	-32%	154,000	12%	181,400	32%
17		Evapotranspiration	319,800	51%	309,200	-3%	322,550	1%	331,300	4%
18		Overland Flow	158,500	25%	81,400	-49%	188,200	19%	235,000	48%
19		Return Flow to Streams	15,400	2%	15,450	0%	15,000	-3%	15,700	2%
20		**Total Outflows**	**631,500**	-	**500,000**	-21%	**679,750**	8%	**763,400**	21%
21	Storage	**Change in Soil and Unsaturated Zone Storage**	**700**	-	**18,750**	**2579%**	**-3,300**	**-571%**	**-18,700**	**-2771%**
22		**Ratio of Deep Percolation to Total Inflows**	**21.8%**	-	**18%**	-	**23%**	-	**24%**	-

Difference Between Corning Subbasin Historical and Projected 2070 Land Surface Budget, Annual Average by Water Year Type

	A	B	C	D	E	F	G	H	I	J
	C	Component	Average, AFY	% Change from Historical Average	Average in Critically Dry/Dry Years, AFY	% Change from Historical Average	Average in Below Normal/Above Normal Years, AFY	% Change from Historical Average	Average in Wet Years, AFY	% Change from Historical Average
23	Inflows	Precipitation	21,900	5.6%	8,250	2.9%	33,050	7.7%	19,900	3.9%
24		Applied Groundwater	36,200	26.6%	37,250	25.7%	38,300	29.1%	35,300	28.0%
25		Applied SurfaceWater	-32,600	-41.3%	-29,550	-38.9%	-34,300	-42.6%	-36,500	-43.9%
26		**Change in Total Inflows**	**25,500**	4.2%	**15,950**	3.2%	**37,050**	5.8%	**18,700**	2.6%
27	Outflows	Deep Percolation to Groundwater	-19,200	-12.2%	-18,300	-16.3%	-17,700	-10.3%	-26,600	-12.8%
28		Evapotranspiration	27,600	9.4%	28,350	10.1%	24,800	8.3%	28,300	9.3%
28		Overland Flow	22,500	16.5%	9,050	12.5%	36,650	24.2%	22,300	10.5%
30		Return Flow to Streams	-4,500	-22.6%	-3,450	-18.3%	-5,750	-27.7%	-5,300	-25.2%
31		**Change in Total Outflows**	**26,400**	**4.4%**	**15,650**	**3.2%**	**38,000**	**5.9%**	**18,700**	**2.5%**
32	Storage	**Change in Soil and Unsaturated Zone Storage**	**-900**	**-56.3%**	**300**	**1.6%**	**-950**	**40.4%**	**0**	**0%**
33		**Change in Deep Perc. to Change in Inflows**	**-75%**	-	**-115%**	-	**-48%**	-	**-142%**	-

* Percent contribution of component to average total inflow/outflow. Small discrepancies between inflow minus outflow and change in storage may occur due to rounding.

AquAlliance Exhibit 6



Data taken from Table 4D-14 and 4D-34

-45,025 AFY 2070 Projected Average Annual Loss in Groundwater Storage, acre-feet per year

Groundwater Budget Annual Average by Water Year Type			
	Historical, AFY	Current, AFY	2070, AFY
Average	6,900	-1,300	-300
Critically Dry / Dry	-27,450	-39,100	-41,800
Below Normal / Above Normal	47,750	38,400	39,050
Wet	57,200	59,700	60,300

Estimate of Groundwater Decline During Drought Years from Historical Change in Storage
Figure 3-22 Groundwater Change Fall 2010 to Fall 2015
Change in Groundwater Levels 2010 to 2015 by Trend Regions Figure 6-1

	Regions			
Declining	**Slight Decline**	**Stable**		
-23.9	-23.1	-1.9		
-23.5	-20.5	-13.5		
-26.3	-17.0	-8.3		
-7.7	-19.2	-4.0		
-29.1	-24.2	-6.25		
-13.8	-19.6	-12.7		
-10.9	-18.4	-16.94		
-8.3	-17.7	-15.75		
-7.7	-12.6	-9.72		
	-6.5	-16.07		
	-10.1	-16.33		
	-14.0	-3.45		
	-14.7	-4.56		
	-13.7	-9.13		
	-15.0	-7.54		
	-16.27	-0.68		
	-16.43			
	-16.56			
	-13.12			
	-12.12			
-151.2	-320.8	-146.8	-618.815	Sum of Decline, feet
9	20	16	45	Number of Wells
-16.8	**-16.0**	**-9.2**	**-13.75**	Average decline, feet

Change in Storage 2010 to 2015 from Table 4D-2

Water Year	**Change in Storage, AFY**
2010	40,300
2011	62,700
2012	-39,200
2013	-40,600
2014	-91,900
2015	-45,900
Total	**-114,600**

-13.75	Average decline, feet
8,334	**Acre-Feet per Foot of Decline**
207,342	Total Acres of Corning Subbasin
4.02%	**Average Specific Yield**
150,000	Reduced Area of Water Yield
5.56%	**Average Specific Yield**
100,000	Reduced Area of Water Yield
8.33%	**Average Specific Yield**

Change in Storage 2070 CD/DWater Years

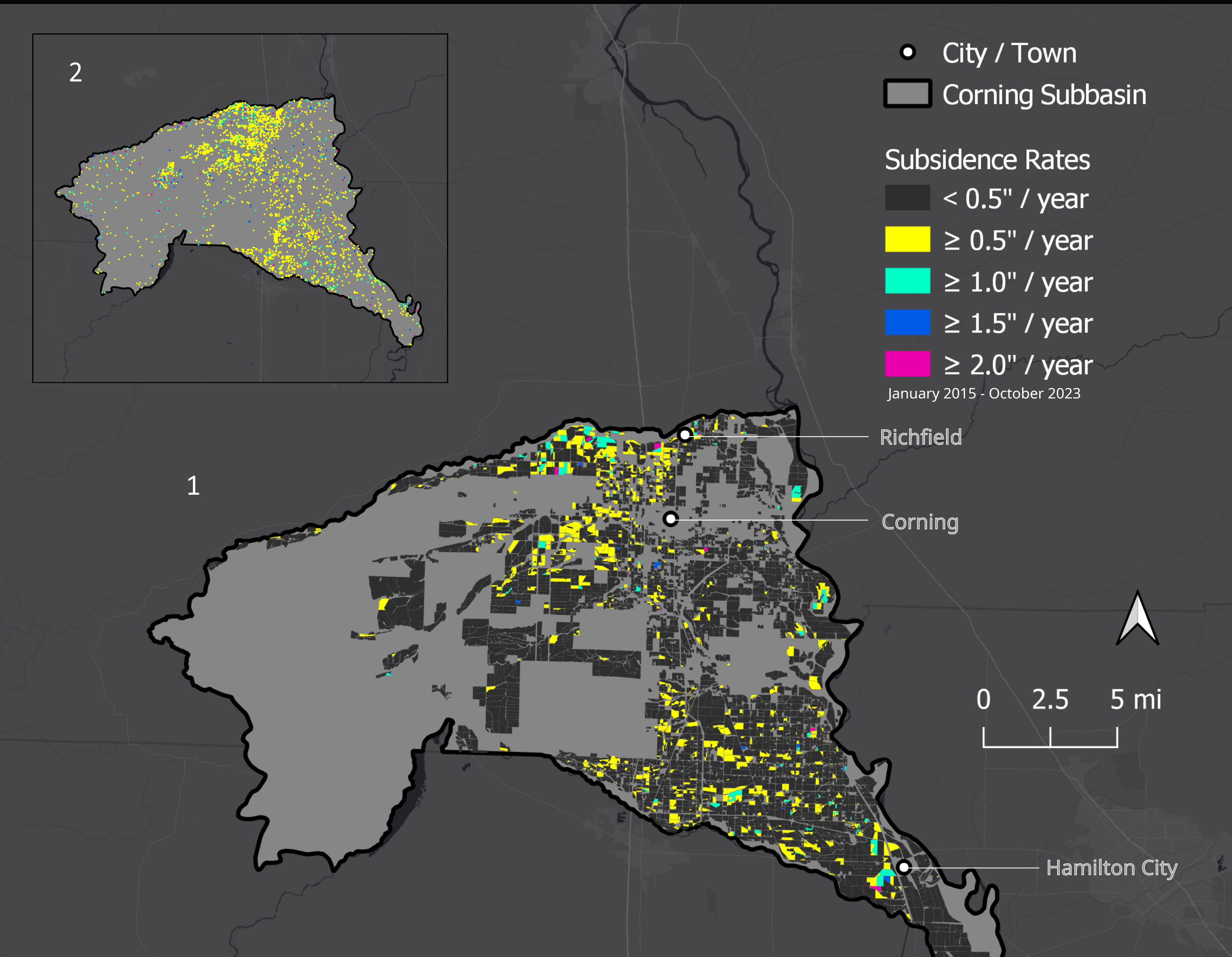
-41,800	AFY - Table 4D-33
-5.02	Feet decline per drought years
3	Average years of drought
-125,400	Total Storage loss in 3 years
-15.0	**3 years of drought average decline**
4	Average years of drought
-167,200	Total Storage loss in 4 years
-20.1	**4 years of drought average decline**

Change in Storage Historical CD/D Water Years

-27,450	AFY - Table 4D-1
-3.29	Feet decline per drought years
3	Average years of drought
-82,350	Total Storage loss in 3 years
-9.9	**3 years of drought average decline**
4	Average yrs of drought
-109,800	Total Storage loss in 4 years
-13.2	**4 years of drought average decline**

Subsidence in Agricultural Lands Within the Corning Subbasin

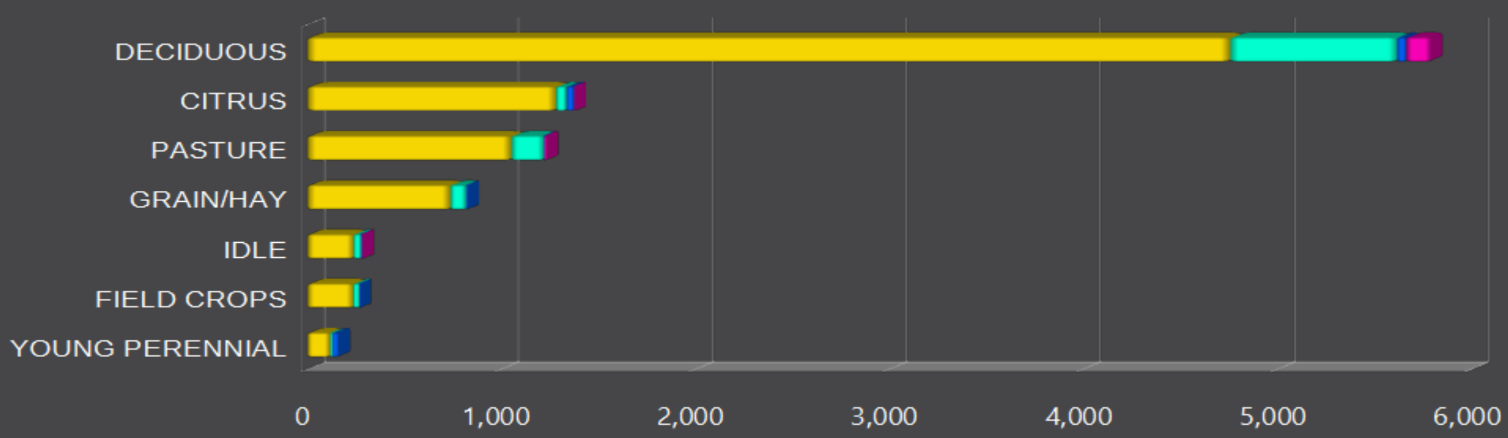
5-021.51



Data:
https://data.ca.gov/dataset/tre-altamira-insar-subsidence-data, https://data.cnra.ca.gov/dataset/i15-crop-mapping-2022-provisional, https://croplandcros.scinet.usda.gov, https://data.cnra.ca.gov/dataset/i08-b118-ca-groundwaterbasins

Methods:
1. IDW interpolation of vertical displacement rates across agricultural lands within the Corning subbasin
2. Raw InSAR subsidence rates (Q4 2023, not interpolated)

Subsiding Acreage by Land Use



7. **Corning Sub-basin GSA Committee Member Reports and Comments**

Members of the CSGSA Committee are encouraged to share information, reports, comments, and suggest future agenda items. Action cannot be taken on matters brought up under this item.

8. **Next Meeting**

The next regular meeting is scheduled for April 25, 2024 at 2:00 p.m.

9. **Adjourn**

The meeting will be adjourned.