

# Groundwater Sustainability Plan for Big Valley Groundwater Basin Lassen and Modoc Counties

## Advisory Committee Meeting 8

March 3, 2021

**2008 Sustainability Indicator Analysis**

Lowering Reduction Seawater Degraded Land Surface Water  
GW Levels of Storage Intrusion Quality Subsidence Depletion

**Sustainability Goal**

Chronic lowering of groundwater levels  
Well 1  
Well 2  
Well 3

Reduction in groundwater storage  
Well 1  
Well 2  
Well 3

Degraded water quality  
Constituent 1  
Well 1  
Well 2  
Well 3

Subsidence  
Site 1  
Site 2  
Site 3

Deposition of interconnected surface water  
Well 1  
Well 2  
Well 3

or

Intermittent contamination based on measured values  
Constituent 2  
Well 1  
Well 2  
Well 3

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Source: UCANR Andrew Brown

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# GENERAL UPDATES AND SCHEDULE

**Tentative Schedule**

**2020**

1st Quarter 2nd Quarter 3rd Quarter 4th Quarter

**2021**

1st Quarter 2nd Quarter 3rd Quarter 4th Quarter

**2022**

1st Quarter 2nd Quarter

Communication and Engagement  
GSP Sections

1) Introduction to Big Valley GSP  
2) Agency Information  
3) Description of Plan Area  
4) Hydrogeologic Conceptual Model  
5) Groundwater Conditions  
6) Water Budget  
7) Sustainable Management Criteria  
8) Monitoring Networks  
9) Projects and Management Actions  
10) Implementation Plan  
11) Notice and Communications  
12) Interagency Agreements  
13) References

Report Compilation and Approval  
Monitoring Well Construction

**Schedule Key**

Minimal input from stakeholders  
Low input from stakeholders  
Moderate input from stakeholders  
High input from stakeholders  
Field Task Activities  
Final Draft Chapter or Deliverable  
BVAC Regular Meeting  
BVAC Potential Special Meeting

Public Review  
GSP Public Draft  
Approved Final GSP  
GSP Submitted to DWR

Updated: 12/1/2020

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## AGENDA

- **Subject #1: Ad Hoc Committee Reports, Sustainable Management Criteria, and Monitoring Networks**
  - Review of Sustainable Management Criteria and Monitoring Network Requirements
  - SMC ad hoc committee reports
    - Sustainability Goal and Projects
    - Groundwater Levels and Storage
    - Depletion of Interconnected Surface Water
    - Water Quality
    - Subsidence
  - Other ad hoc committee reports
    - Basin Boundary Modification
    - Mapping (committee did not meet)

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## SUBJECT #1: BACKGROUND

- 1 Introduction
- 2 Agency Information
- 3 Description of Plan Area
- 4 Hydrogeologic Conceptual Model
- 5 Groundwater Conditions
- 6 Water Budget
- 7 Sustainable Management Criteria
- 8 Monitoring Networks
- 9 Projects and Management Actions
- 10 Implementation Plan
- 11 Notice and Communications
- 12 Interagency Agreements
- 13 Reference List

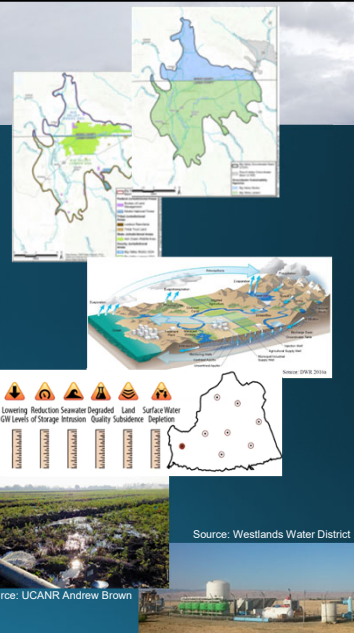
“Who?”

“What?”

“Where?”

“How?”

“This plan is based on the best available information and science”



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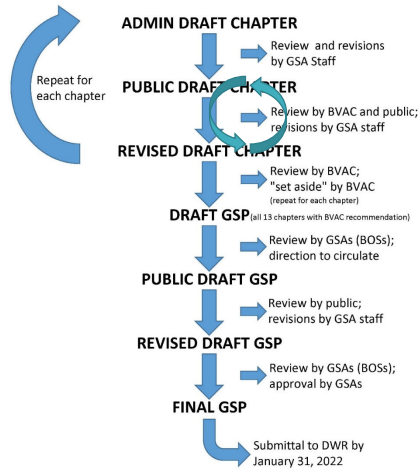
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## SUBJECT #1: BACKGROUND SMC DEVELOPMENT PROCESS

### SMC Development Process

- **Feb 3 BVAC Meeting:** Introduce SMC and Monitoring Network requirements and examples. GSAs listen to discussion and accept initial thoughts and input from BVAC and public. Ad hoc committees established.
- **February:** Ad hoc committees meet and provide thoughts and recommendations to GSA Staff. Consultant documents ad hoc meeting results.
- **March 3 BVAC meeting:** Present ad hoc meeting results and discuss recommendations. GSA staff and consultants listen to discussion and accept direction from BVAC and public.
- **March:** Consultants and GSA staff develop complete draft text for Chapters 7 and 8.
- **April 7 BVAC meeting:** GSAs present Revised Draft Chapter 7 and Public Draft Chapter 8. Introduce Projects and Management Actions (Chapter 9) requirements.

### GSP Development Process Chart



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## SUBJECT #1: BACKGROUND SUSTAINABLE MANAGEMENT CRITERIA

### Sustainability Goal

What does the GSP seek to achieve and/or protect?

### Undesirable Results

What is "significant and unreasonable" for each Sustainability Indicator based on the sustainability goal?

### Minimum Thresholds Measurable Objectives Interim Milestones

What are the measured values that will determine if the basin is sustainable?



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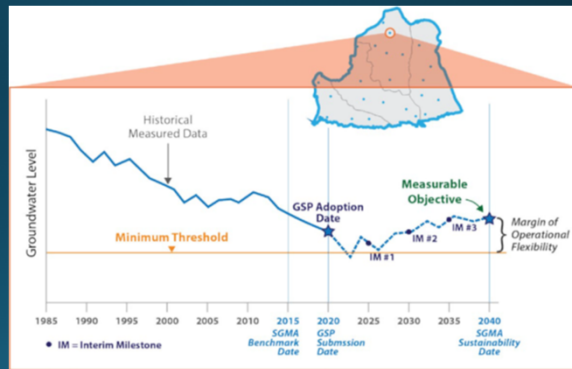
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## SUBJECT #1: BACKGROUND SUSTAINABLE MANAGEMENT CRITERIA

### Measuring Sustainability:

- **Minimum Threshold**
  - If measured values exceed this level, it could indicate an undesirable result.
  - A single MT exceedance doesn't necessarily mean the basin isn't sustainable.
- **Measurable Objective**
  - What value should we measure if the sustainability goal is being achieved?
- **Interim Milestones**
  - What values should we expect between 2022 and 2042 to indicate we are moving toward sustainability.
  - IMs are not required



Source: DWR 2017

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## SUBJECT #1: MEETING OUTCOMES

### What Does the GSA Staff and Consultants Need?

*"Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin. (GSP Regulations §354.26)"*

### For each Sustainability Criteria:

- What are the causes or potential causes of undesirable results?
- What numeric criteria should be used to determine an undesirable result (i.e. what is "significant and unreasonable")?
- What are the potential effects on beneficial uses and users, on land uses and property interests, and other potential effect that may occur or are occurring?
- What is the Monitoring Network?

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## SUBJECT #1: SUSTAINABILITY GOAL AND POTENTIAL PROJECTS AD HOC

- Recommended text for Sustainability Goal:

*"The sustainability goal for the Big Valley groundwater basin is to maintain a locally governed, economically feasible, sustainable groundwater basin and surrounding watershed for existing and future beneficial uses with a concentration on agriculture. Sustainable management will be right and equitable to all water users and will be conducted in context to the unique culture of the Big Valley basin, character of the community, quality of life of the Big Valley residents, and the vested right of agricultural pursuits through the continued use of ground and surface water."*

- Recommended text for Sustainability Goal narrative:

*"The above sustainability goal will be achieved through Groundwater recharge opportunities and infrastructure projects for water storage will be a crucial component of augmenting water supplies."*

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## SUBJECT #1: SUSTAINABILITY GOAL AND POTENTIAL PROJECTS AD HOC

- Project list:

- Timber management on federal lands
- Juniper and pine reduction
- Drainage recharge
- Winter recharge – pasture, reservoirs
- Pond and plug or recharge ponds
- Dam construction
- Reservoir expansion
- Injection wells (aquifer storage and recovery or ASR)
- Pumping from Pit River to Roberts Reservoir

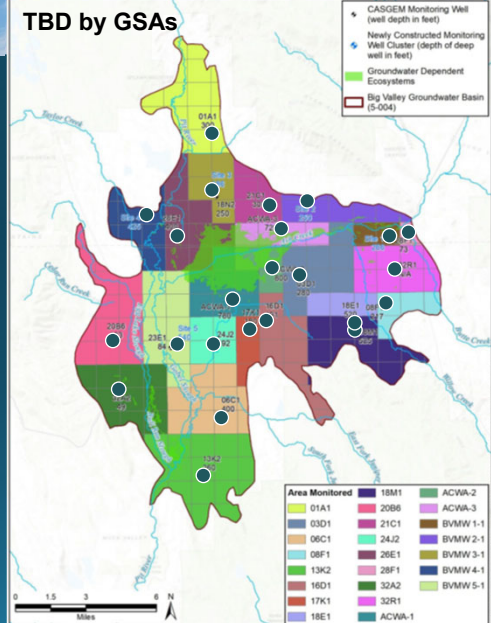
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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

### • Chronic Lowering of Groundwater Levels and Storage Potential Monitoring Network

- CASGEM wells
- Newly constructed well clusters
- Additional wells?
  - Lassen-Modoc Flood Control and Water Conservation District wells?
  - Data gaps to be filled?



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## SUBJECT #1: SUSTAINABILITY GOAL AND POTENTIAL PROJECTS AD HOC

- Recommend 12 wells (map on next slides)
  - Need to be verified and confirmed for their suitability
  - Establish long term (10 year) monitoring commitments from owners
- Selected based on:
  - Geographic dispersal
  - Groundwater levels
  - Surface water/groundwater interactions (some wells, not all)
  - Data availability
  - Dedicated monitoring (no pumps when possible)
  - Depth variation
  - Representation of basin as whole
- Measurable Objective: 2015 Baseline (Fall)
- Minimum Threshold: 150 feet below 2015 Baseline

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## SUBJECT #1: SUSTAINABILITY GOAL AND POTENTIAL PROJECTS AD HOC

- Interim milestones
  - Annual decreases of more than 3x the annual trend from 2000-2018 water levels or decreases more than 5 feet in a given year
  - If 1/3 of wells meet the above criteria for 5 consecutive years
  - Actions:
    - Recharge projects
    - Further analysis
      - long-term drought?
      - additional irrigated acreage?
      - data errors?
- Shallow well mitigation program?
  - Level must be below 2015 baseline
  - Subject to availability of state funding
  - Substandard (e.g. hand dug) wells or wells no longer viable would not qualify and should be decommissioned
  - Consider "good neighbor" practices already demonstrated in the basin
- Overall focus on importance of agriculture

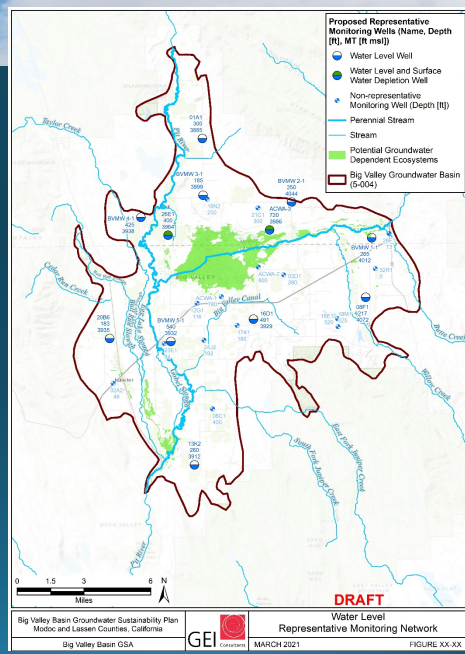
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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

### • Wells:

- BVMW 1-1 Adin Airport
- BVMW 2-1 Roads 87 & 87A
- BVMW 3-1 Roads 87 and 90
- BVMW 4-1 Lookout Cemetery
- BVMW 5-1 Bieber
- 13K2
- 01A1
- 08F1
- 16D1
- 20B6
- 26E1 (SW/GW)
- ACWA-3 (SW/GW)



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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

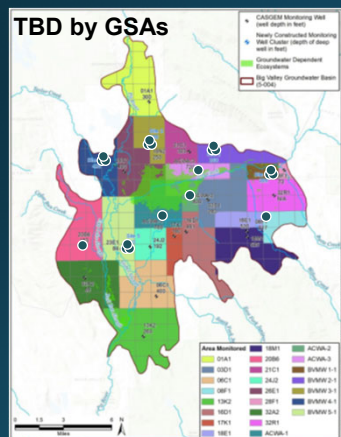
Direction to GSA staff and consultants

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## SUBJECT #1: SURFACE WATER DEPLETIONS AD HOC

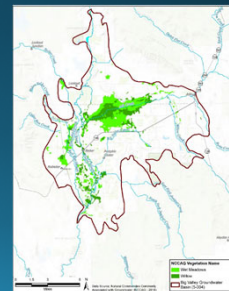
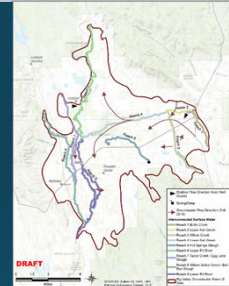
- Surface Water Depletions  
Potential Monitoring Network



Water Levels considering

Interconnected Surface Water

Groundwater Dependent Ecosystems



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## SUBJECT #1: SURFACE WATER DEPLETIONS AD HOC

- Comfortable with wells selected in water level ad hoc
- No current data to suggest negative surface water/groundwater relationship
- Levels (minimum threshold and measureable objective) suggested in water level ad hoc
  - Annual decreases of more than 3x the annual trend from 2000-2018 water levels or decreases more than 5 feet in a given year
- Additional data collection ongoing
  - Surface water gages
  - Groundwater level transducer

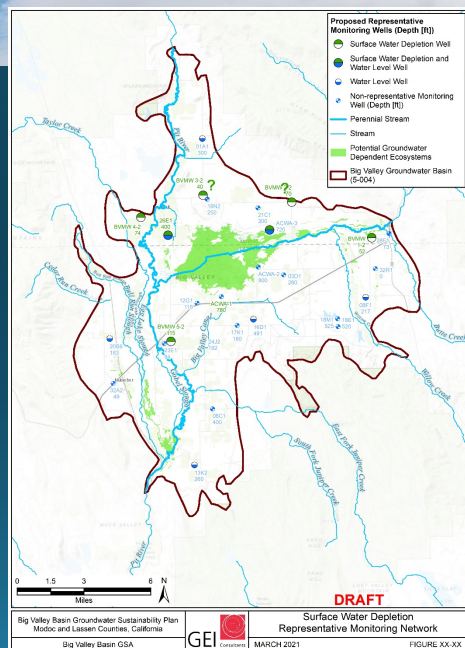
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## SUBJECT #1: SURFACE WATER DEPLETIONS AD HOC

### • Wells:

- BVMW 1-2 Adin Airport
- BVMW 2-2 Roads 87 & 87A ??
- BVMW 3-2 Roads 87 and 90 ??
- BVMW 4-2 Lookout Cemetery
- BVMW 5-2 Bieber
- 26E1 (SW/GW)
- ACWA-3 (SW/GW)



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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

Direction to GSA staff and consultants

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## SUBJECT #1: WATER QUALITY AD HOC

- Water Quality Potential Monitoring Network

Which Constituents?

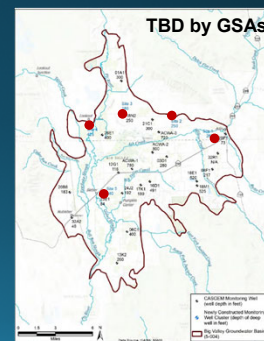
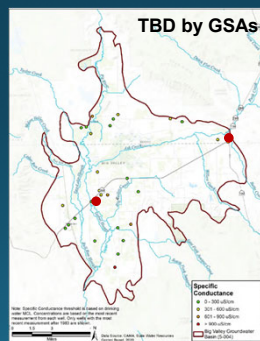
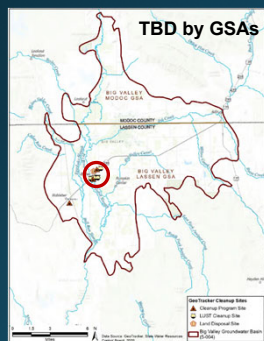
Regulated Sites?

+

Division of Drinking Water?

+

GSA Monitoring?



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## SUBJECT #1: WATER QUALITY AD HOC

- General good water quality
- Wells that show elevated levels are naturally occurring
- Recommend only Electrical Conductivity (EC) as threshold constituent
  - Drinking water secondary maximum contaminant level
    - 900 uS/cm (recommended)
    - 1,600 uS/cm (upper limit)
  - Agricultural suitability threshold
    - 700 uS/cm (Food and Agriculture Organization of the United Nations)
- Monitor 3 of the newly constructed wells
  - Install EC transducers
  - BVMW 1-1 Adin Airport
  - BVMW 4-1 Lookout Cemetery
  - BVMW 5-1 Bieber
- Two public water systems
  - These report every few years
  - Better to set thresholds using transducers so that anomalous data points don't become problematic
  - Data should be evaluated at 5-year updates
- Other programs
  - SWRCB Regulated sites
    - Leaking underground tank sites (primarily in Bieber)
    - Landfill
  - Counties have very little WQ role

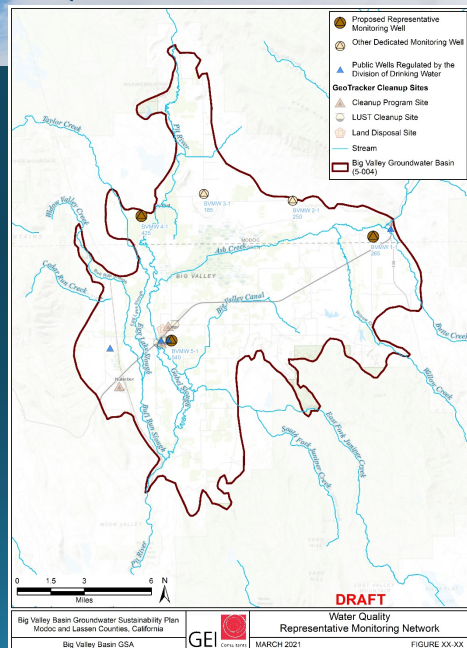
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## SUBJECT #1: WATER QUALITY AD HOC

### • Wells:

- BVMW 1-1 Adin Airport
- BVMW 4-1 Lookout Cemetery
- BVMW 5-1 Bieber
- Public wells
- Cleanup sites



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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

Direction to GSA staff and consultants

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## SUBJECT #1: SUBSIDENCE AD HOC

- Subsidence Potential Monitoring Network

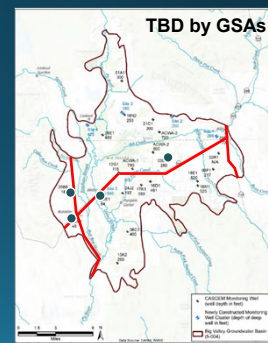
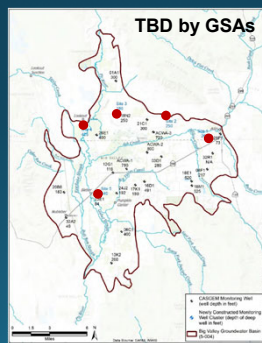
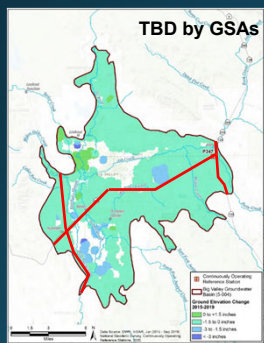
InSAR?

+

Benchmark  
Surveys?

+

Water Levels?



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## SUBJECT #1: SUBSIDENCE AD HOC

- 3x the natural rate shown on state's satellite imagery could be considered as minimum threshold
- 0-1.5 inches seems to be the natural subsidence for 4 years
- Investigate areas with over 3 inches to make sure not related to grading (e.g. agricultural leveling)
- Watch for visual evidence of infrastructure damage
  - Roads buckling
  - Irrigation canals cracking
  - etc

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## SUBJECT #1: GROUNDWATER LEVELS AND STORAGE AD HOC

Direction to GSA staff and consultants

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## **SUBJECT #1: BASIN BOUNDARY AD HOC**

- Recommend section in Chapter 3 to detail the 2016 application and the underlying premise of a planned future BB modification request

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## **SUBJECT #1: MAPPING AD HOC**

- Did not meet

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## **SUBJECT #3: CH 8 MONITORING NETWORKS**

Questions and Clarifications?

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## **SUBJECT #3: CH 8 MONITORING NETWORKS**

Comments and Discussion

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## QUESTIONS OR COMMENTS FOR ITEMS NOT ON THE AGENDA



- GSA Staff and Consultants will be available after the meeting to talk, answer questions, and hear your concerns.

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