
OVERVIEW OF SUSTAINABLE MANAGEMENT CRITERIA

GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT

Butte Advisory Board
December 14, 2020

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Butte County Water & Resource Conservation



GROUNDWATER SUSTAINABILITY PLANS

I. Administrative Information

- §354.4. General Information
- §354.6. Agency Information
- §354.8. Description of Plan Area
- §354.10. Notice & Communication

2. Basin Setting

- §354.14. Hydrogeologic Conceptual Model
- §354.16. Groundwater Conditions
- §354.18. Water Budget
- §354.20. Management Areas

3. Sustainable Management Criteria

- §354.24. Sustainability Goal
- §354.26. Undesirable Results
- §354.28. Minimum Thresholds
- §354.30. Measurable Objectives

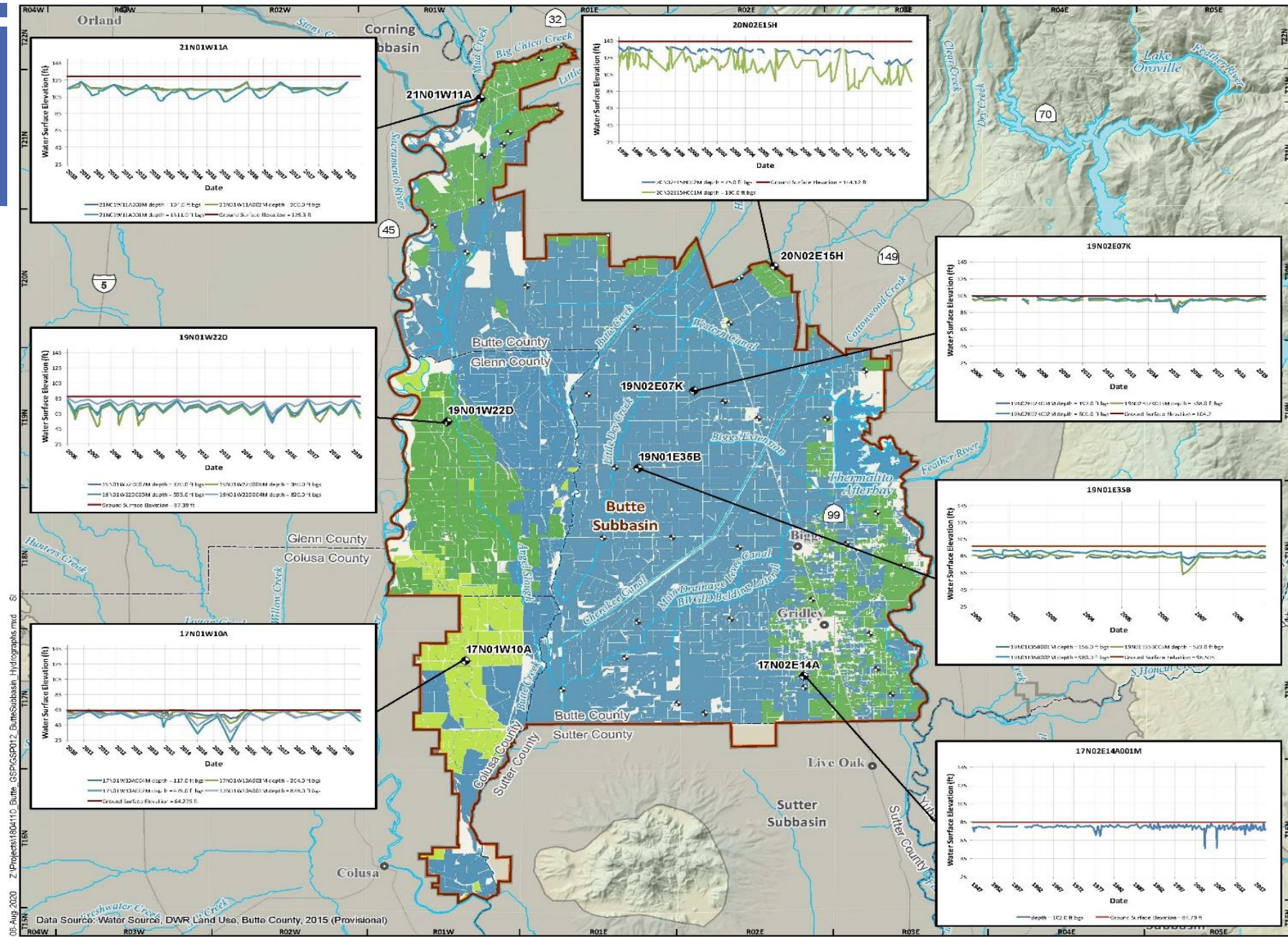
4. Monitoring Networks

- §354.34. Monitoring Network
- §354.36. Representative Monitoring
- §354.38. Assessment & Improvement
- §354.40. Reporting Monitoring Data to the Department

5. Projects and Management Actions

- §354.44. Projects & Management Actions

Figure 1-19 Representative Hydrographs



REPRESENTATIVE HYDROGRAPHS

- Well With Hydrograph
 - Other Active DWR Well
- Water Source**
- Surface Water
 - Mixed Surface Water and Groundwater
 - Groundwater
 - Reclaimed
 - Not irrigated / Data Not Collected
- All Other Features**
- Highway
 - Waterway
 - Lake
 - Butte Subbasin
 - Neighboring Subbasin



BUTTE SUBBASIN GSP

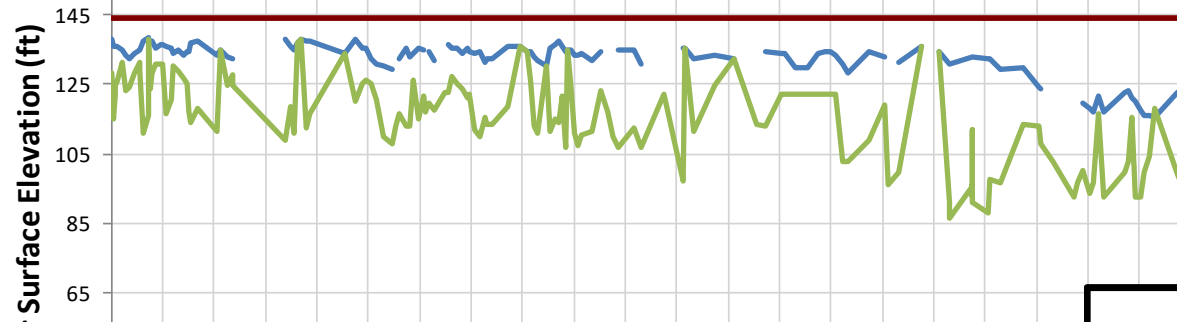


05-Aug-2020 Z:\Projects\1804\10_Butte_GSP\GSP012_DataSubbasin_Hydrographs.mxd 51

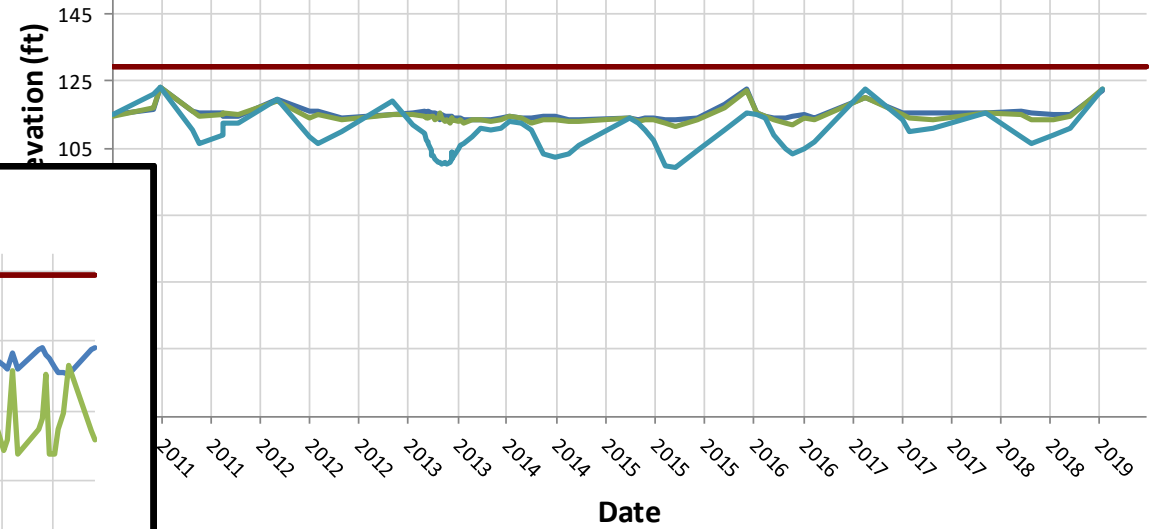
Data Source: Water Source, DWR Land Use, Butte County, 2015 (Provisional)

GROUNDWATER LEVELS

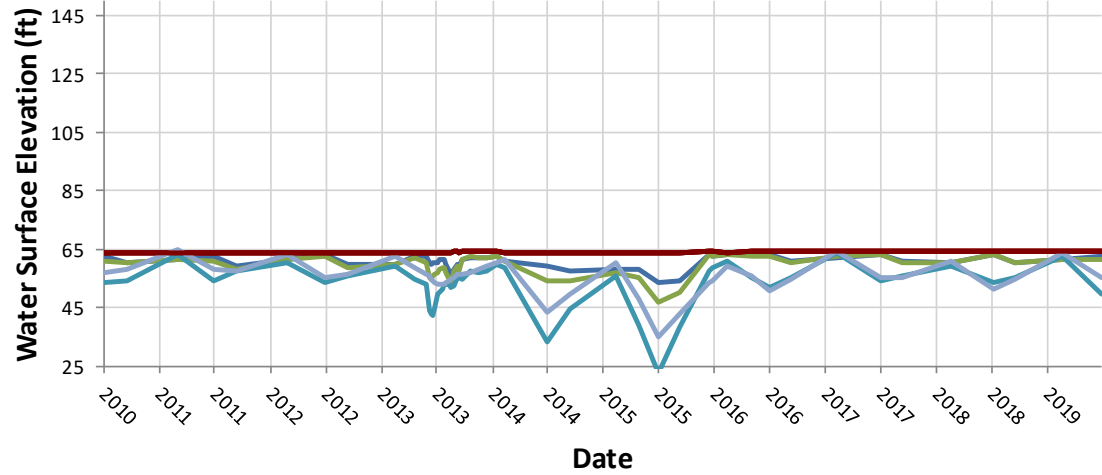
20N02E15H



21N01W11A

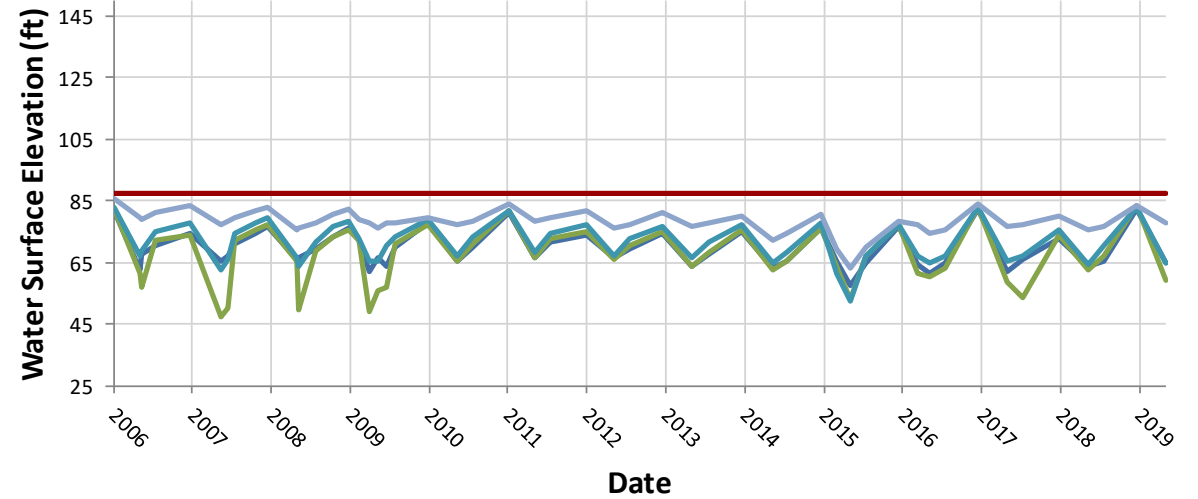


17N01W10A



- 17N01W10A004M depth = 117.0 ft bgs
- 17N01W10A003M depth = 204.0 ft bgs
- 17N01W10A002M depth = 475.0 ft bgs
- 17N01W10A001M depth = 828.0 ft bgs
- Ground Surface Elevation = 64.275 ft

19N01W22D



- 19N01W22D007M depth = 120.0 ft bgs
- 19N01W22D006M depth = 380.0 ft bgs
- 19N01W22D005M depth = 555.0 ft bgs
- 19N01W22D004M depth = 820.0 ft bgs
- Ground Surface Elevation = 87.38 ft

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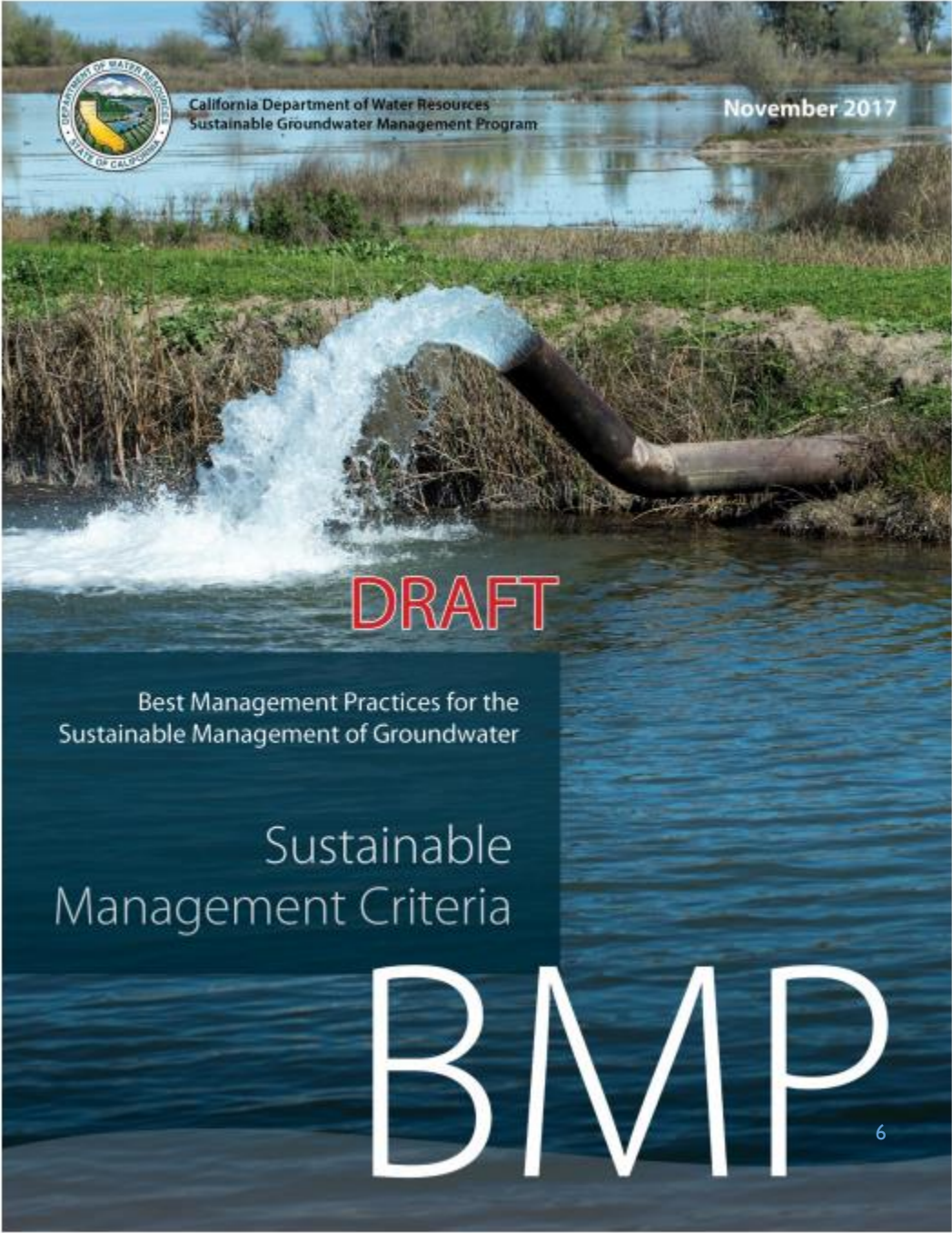
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- Content and examples from BMP on Sustainable Management Criteria
- https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf

SUSTAINABLE MANAGEMENT CRITERIA (SMC)

Includes

- Sustainability Goal (qualitative)
- Undesirable Results (quantitative)
- Minimum Thresholds (quantitative)
- Measurable Objectives (quantitative)

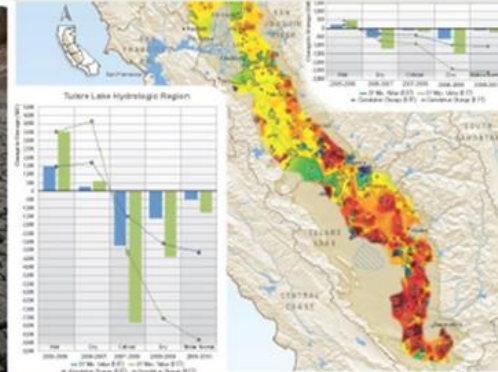
Defines what **SUSTAINABILITY**
is and looks like in the subbasin

What's considered "significant and unreasonable" is left for the local GSAs and stakeholders to decide.

SUSTAINABILITY INDICATORS



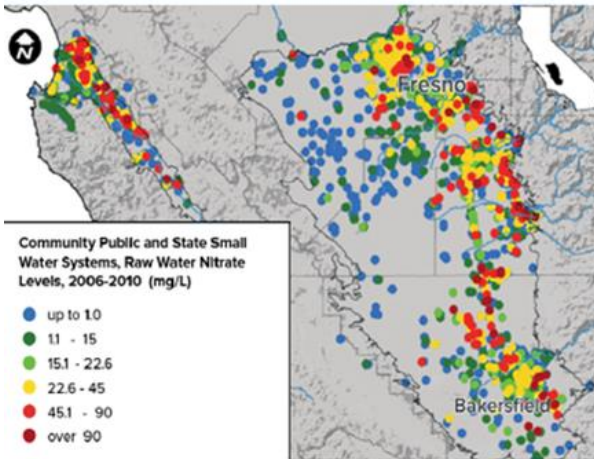
Lowering of GW Levels



Reduction
of GW Storage



Seawater Intrusion



Community Public and State Small Water Systems, Raw Water Nitrate Levels, 2006-2010 (mg/L)

- up to 1.0
- 1.1 - 15
- 15.1 - 22.6
- 22.6 - 45
- 45.1 - 90
- over 90



Water Quality Degradation



Land Subsidence



Depletion of
Interconnected Streams

SIGNIFICANT AND UNREASONABLE

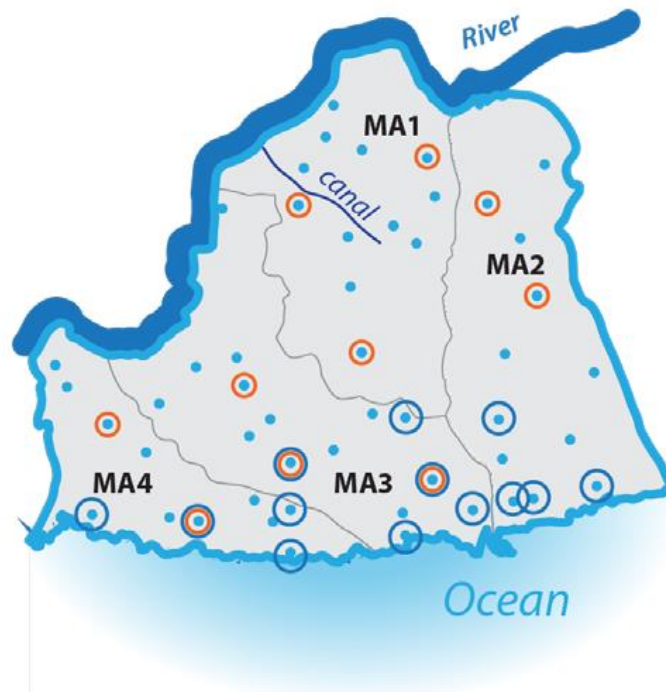
- Define what constitutes significant and unreasonable conditions



- For example
 - Basin wide loss of domestic well pumping capacity due to lowering of groundwater levels
 - Localized inelastic land subsidence near critical infrastructure (ie. canal)

REPRESENTATIVE MONITORING

- How do you know if the Significant and Unreasonable conditions are occurring?



MA = Management Area

• = Monitoring Site

○ = Representative Monitoring Site used for Seawater Intrusion

○ = Representative Monitoring Site used for Groundwater Level



Lowering
GW Levels



Reduction
of Storage



Seawater
Intrusion



Degraded
Quality



Land
Subsidence



Surface Water
Depletion

MINIMUM THRESHOLD (MT)







- Need to QUANTIFY what significant and unreasonable conditions are
- Compare measured condition to a standard (i.e. established Minimum Threshold)
- When the standard is exceeded → Undesirable Result

Must describe:

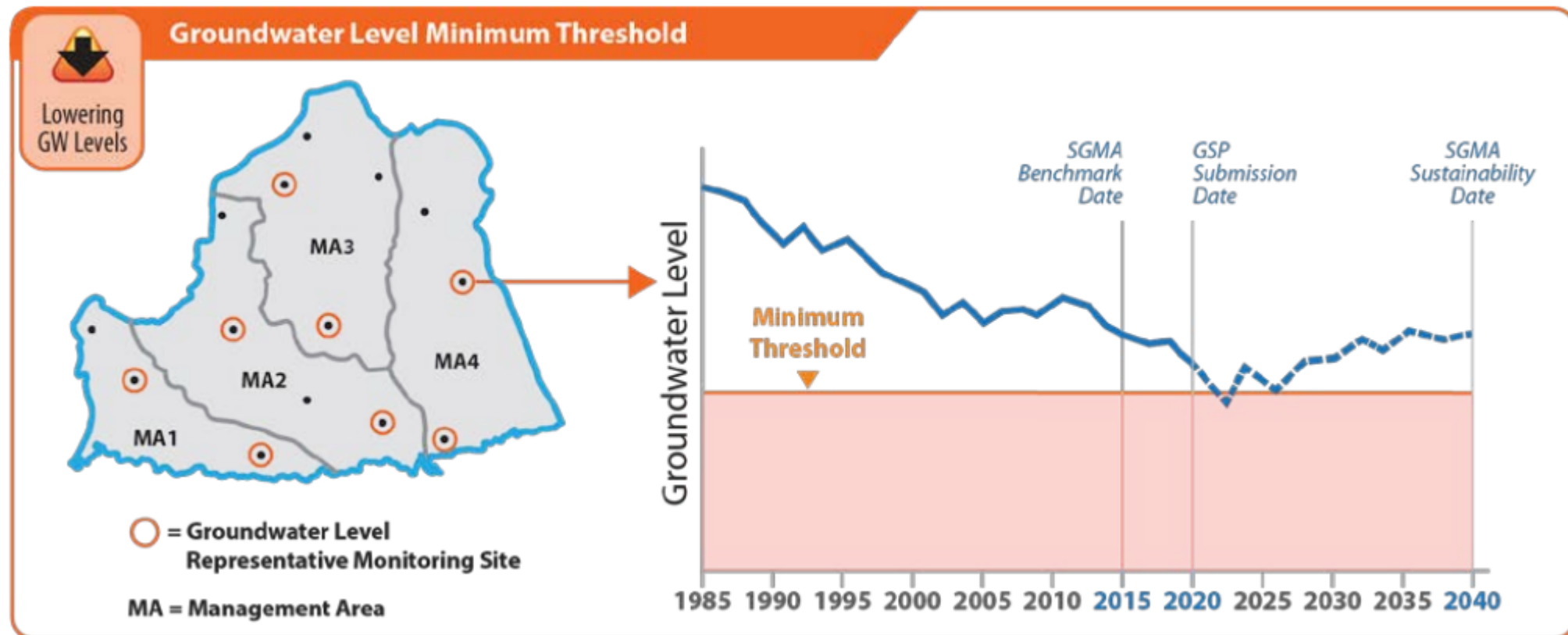
- Justification for the MT must be supported by information from basin setting, data, or modeling
- The relationship of MTs set for each sustainability indicator
- How MTs have been set to avoid interfering with another basin's ability to achieve sustainability goals
- How MT may affect interests of beneficial uses/users of groundwater
- How state/fed/local standards relate
- How each MT will be quantitatively measured

MINIMUM THRESHOLD

■ What do we measure?

Sustainability Indicators	 Lowering GW Levels	 Reduction of Storage	 Seawater Intrusion	 Degraded Quality	 Land Subsidence	 Surface Water Depletion
Metric(s) Defined in GSP Regulations	<ul style="list-style-type: none"> Groundwater Elevation 	<ul style="list-style-type: none"> Total Volume 	<div style="text-align: center; font-size: 2em; font-weight: bold;">X</div> <ul style="list-style-type: none"> Chloride concentration isocontour 	<ul style="list-style-type: none"> Migration of Plumes Number of supply wells Volume Location of isocontour 	<ul style="list-style-type: none"> Rate and Extent of Land Subsidence 	<ul style="list-style-type: none"> Volume or rate of surface water depletion

MINIMUM THRESHOLD



UNDESIRABLE RESULTS (UR)

- Under what conditions is an Undesirable Result triggered?
- Quantified by Minimum Threshold (MT) exceedances:
 - Must specify the criteria/circumstances of MT exceedances that results in an UR
- Describe three components:
 1. Criteria defining when and where MT exceedances cause URs
Ex. UR occurs when three of eight representative monitoring wells have periodic minimum threshold exceedances over a several year period
 2. The cause (factors leading to UR)
 3. Describe the effects of the UR on beneficial uses and users of groundwater



Lowering
GW Levels



Surface Water
Depletion



Degraded
Quality



Land
Subsidence



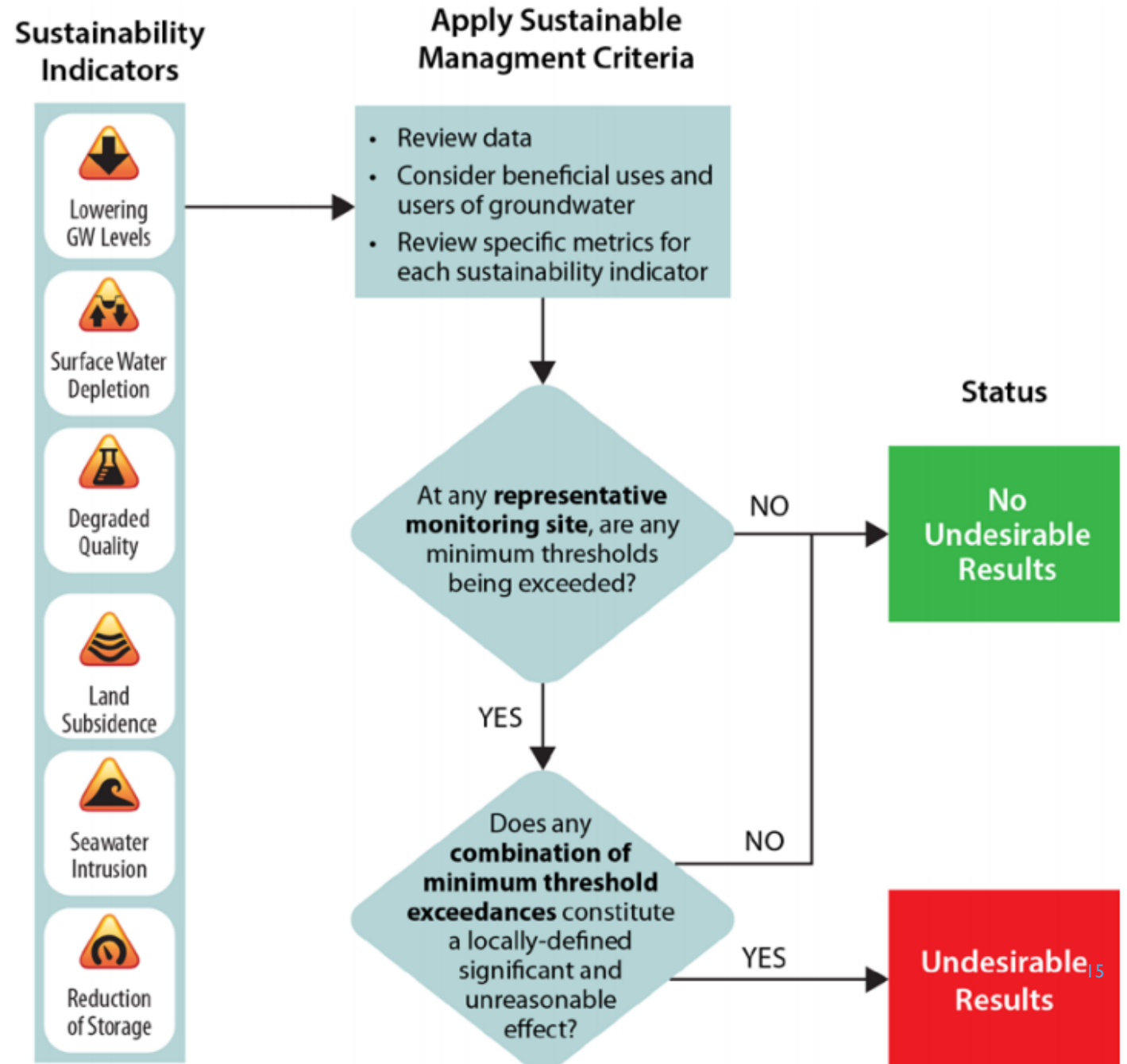
Seawater
Intrusion



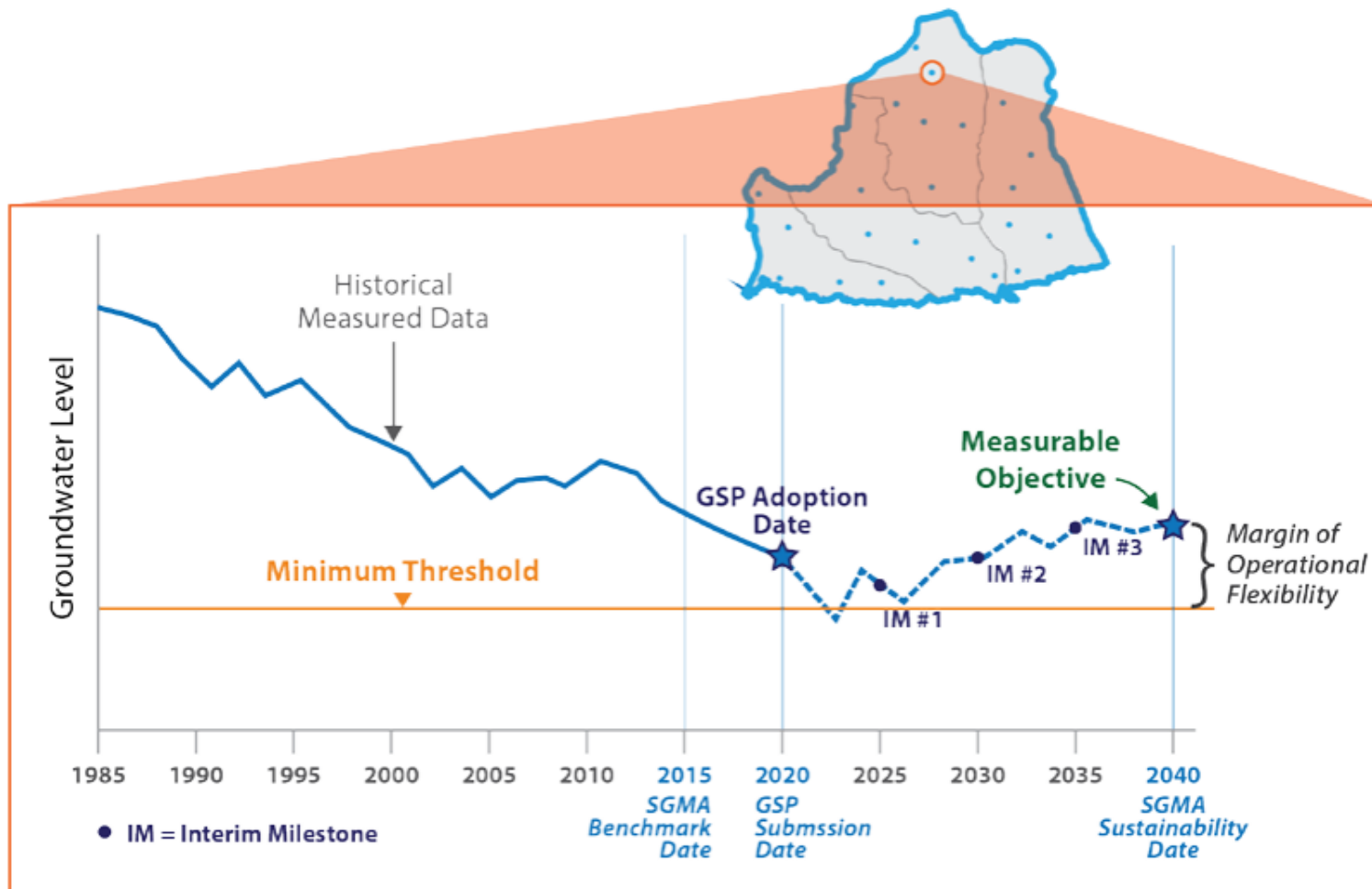
¹⁴
Reduction
of Storage

UNDESIRABLE RESULTS FLOW CHART

Sustainability is demonstrated by the avoidance of Undesirable Results for the six sustainability indicators



MEASURABLE OBJECTIVE & INTERIM MILESTONES

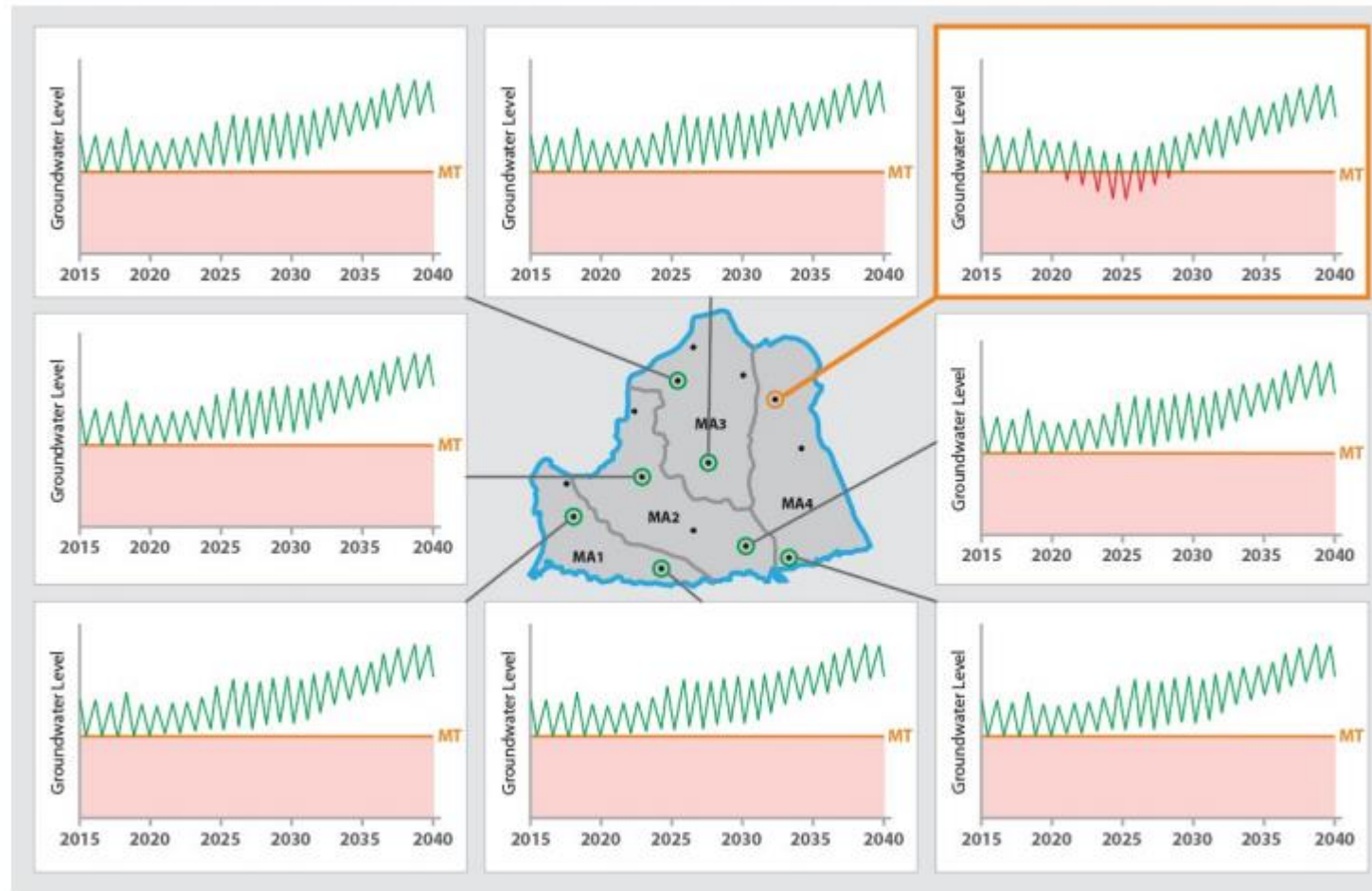


EXAMPLE: SUSTAINABLE MANAGEMENT

Scenario 1 – Minimum Threshold Exceedances without an Undesirable Result

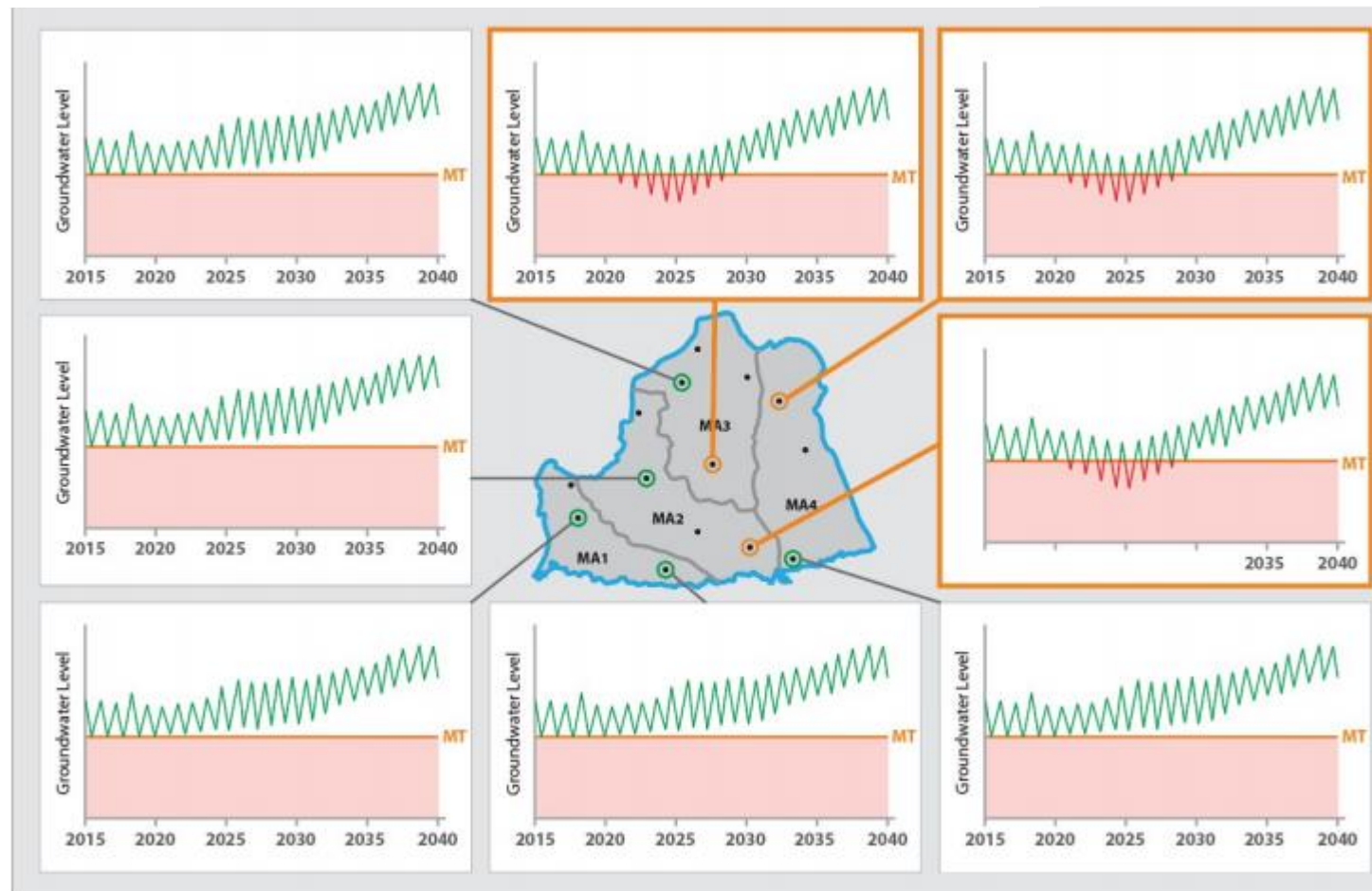
Ex. GSA defined criteria:

Minimum threshold exceedances at three or more representative monitoring sites constitutes an Undesirable Result



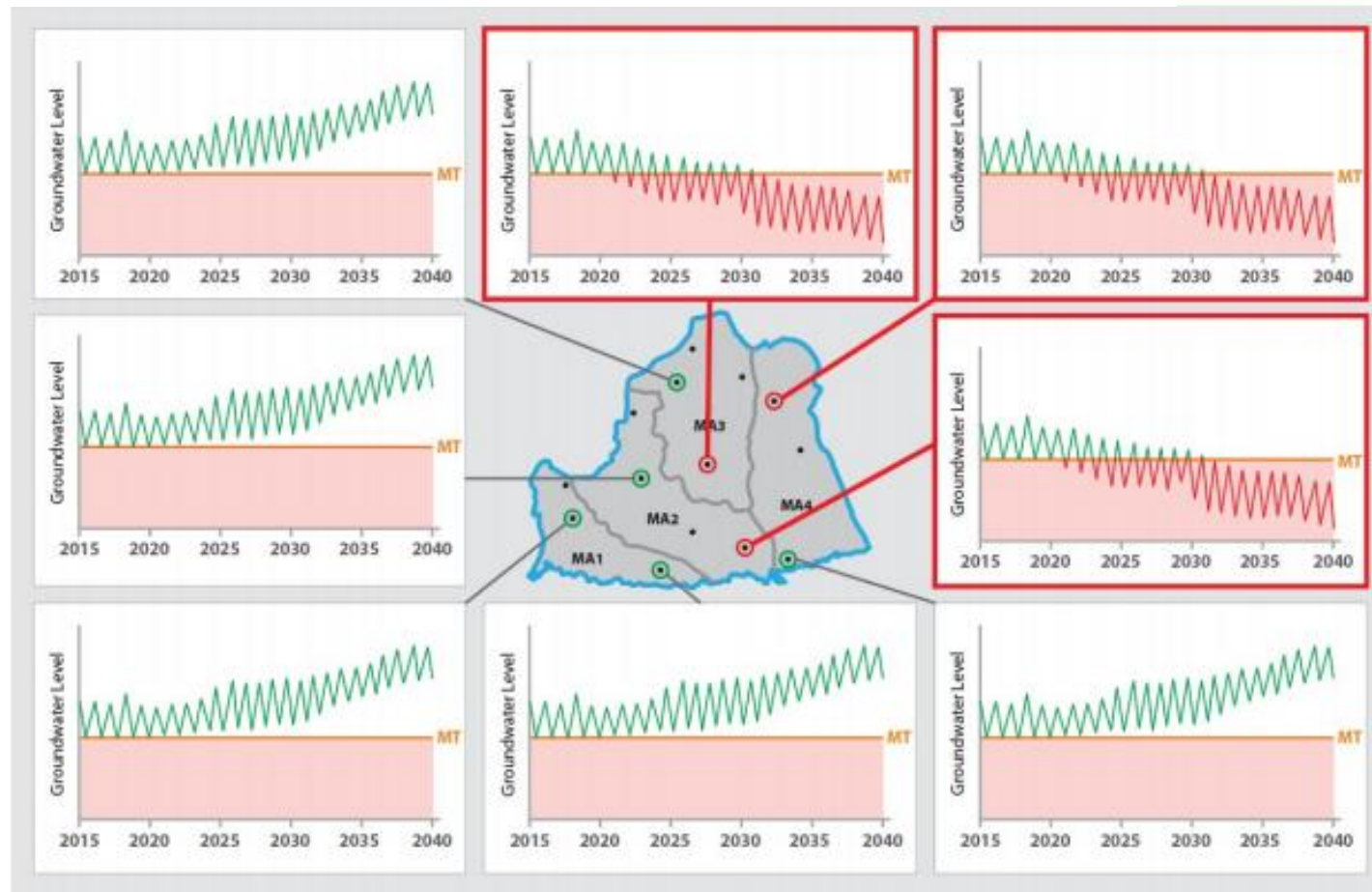
EXAMPLE: SUSTAINABLE MANAGEMENT

Scenario 2 – Minimum Threshold Exceedances with Undesirable Results Eliminated Within 20 Years



EXAMPLE: **NOT** SUSTAINABLE MANAGEMENT

Scenario 3 – Minimum Threshold Exceedances with Undesirable Results Not Eliminated Within 20 Years



SUSTAINABILITY DEFINED

Sustainability is **demonstrated** by the avoidance of Undesirables Results for the six sustainability indicators



Lowering
GW Levels



Surface Water
Depletion



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Land
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Seawater
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Reduction
of Storage

SUSTAINABILITY GOAL

- Sums it all up in a statement
- Description of
 - objective for management of the basin
 - measures that will be taken to manage the basin (projects and management actions)
 - how those measures will lead to sustainability

If No Undesirable Results Occurring Then Basin operating within its Sustainable Yield And Sustainability Goal is being Achieved

RECAP

- Sustainable groundwater management is defined as the management and use of groundwater that can be maintained without causing an Undesirable Result.
Undesirable results as defined in SGMA are:
 - Persistent lowering of groundwater levels
 - Significant and unreasonable reductions in groundwater storage
 - Significant and unreasonable saltwater intrusion
 - Significant and unreasonable degradation of water quality
 - Significant and unreasonable land subsidence
 - Surface water depletion having significant and unreasonable effects on beneficial uses
- What is considered “significant and unreasonable” is left for the local GSAs and stakeholders to decide.



Lowering
GW Levels



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FOR REFERENCE

As described in SGMA, sustainable conditions within a basin are achieved when GSAs meet their sustainability goal and demonstrate the basin is being operated within its sustainable yield. Sustainable yield can only be reached if the basin is not experiencing undesirable results. The GSP Regulations focus the development of GSPs on locally defined, quantitative criteria, including undesirable results, minimum thresholds, and measurable objectives. Undesirable results must be eliminated through the implementation of projects and management actions, and progress toward their elimination will be demonstrated with empirical data (e.g., measurements of groundwater levels or subsidence). Quantitative sustainable management criteria allow GSAs to clearly demonstrate sustainability and allow the public and the Department to readily assess progress.

If No Undesirable Results Occurring **Then** Basin operating within its Sustainable Yield **And** Sustainability Goal is being Achieved



QUESTIONS/DISCUSSION



Extra Slides...

SUSTAINABLE YIELD

- Defined: Amount of water that can be withdrawn annually without causing undesirable results.
- Referenced in SGMA as part of the estimated basinwide water budget and as the outcome of avoiding undesirable results
- NOT incorporated directly into SMC...pumping within the SY is NOT an indication the basin is being managed sustainably
- **Sustainability is demonstrated by the avoidance of Undesirables Results for the six sustainability indicators**