

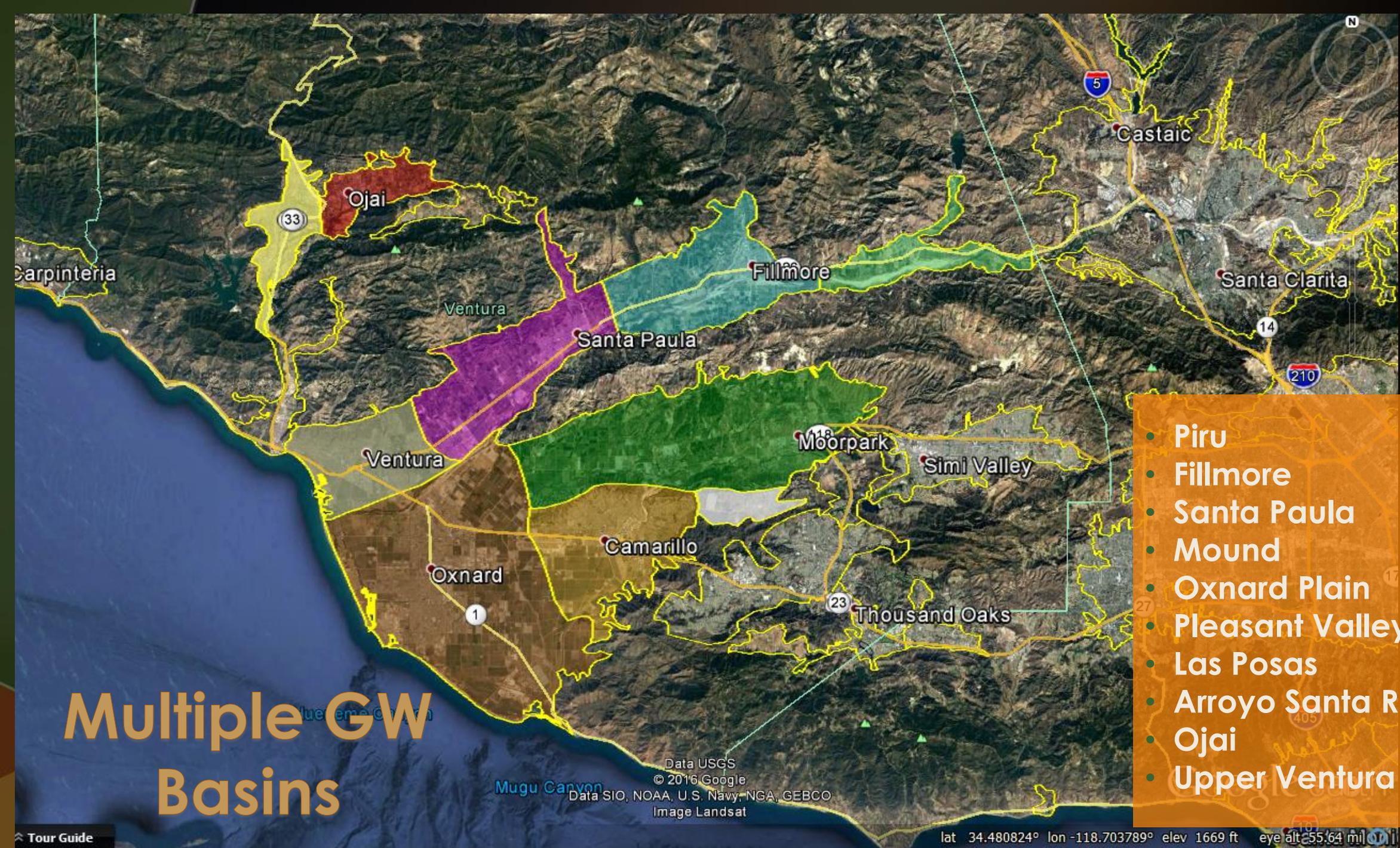
What's in the tank?

**Countdown to Sustainability:
A forum on Ventura County's
progress toward SGMA
implementation**

**Tony Morgan, PG, CHG
Deputy General Manager for Groundwater
& Water Resources
United Water Conservation District**

What's in the tank? - Outline

- ▶ GW conditions
- ▶ Water balance
- ▶ SGMA & Sustainable Yield
- ▶ Example: Oxnard Plain & Pleasant Valley basins
- ▶ What's next? - Options for the future

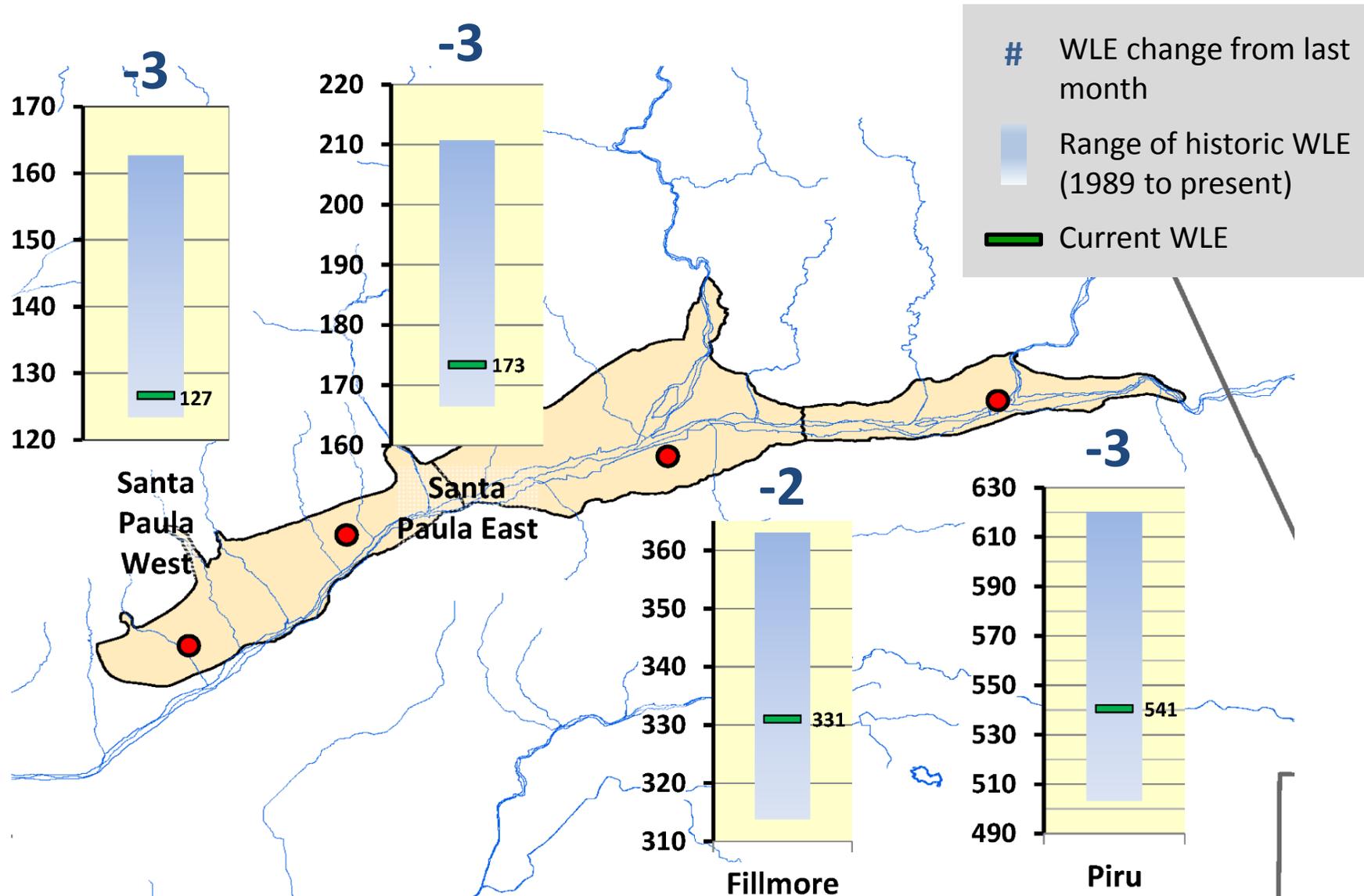


Multiple GW Basins

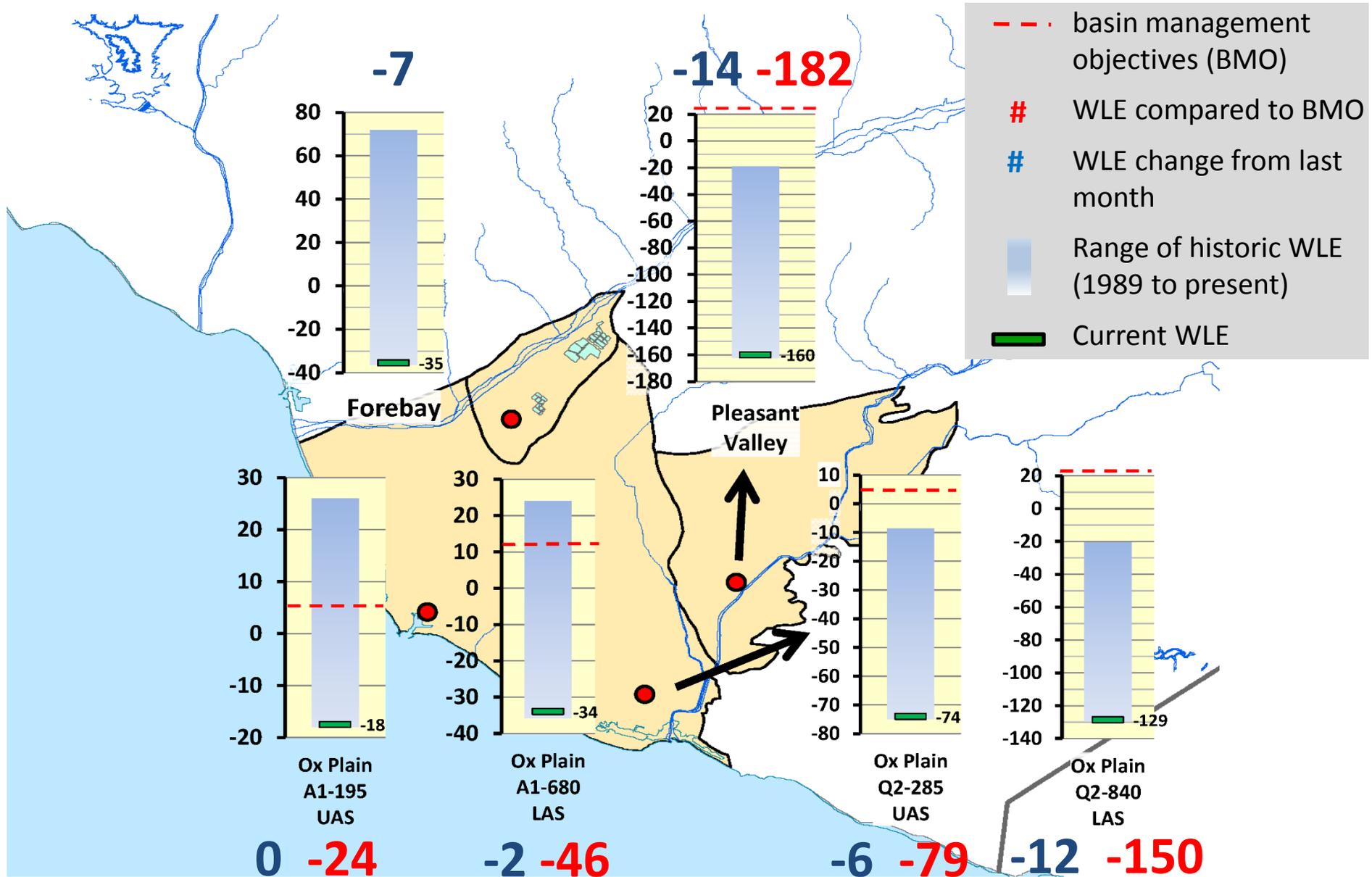
- Piru
- Fillmore
- Santa Paula
- Mound
- Oxnard Plain
- Pleasant Valley
- Las Posas
- Arroyo Santa Rosa
- Ojai
- Upper Ventura River

Data USGS
© 2016 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat

United Water Conservation District



United Water Conservation District



Water Balance

▶ Water In

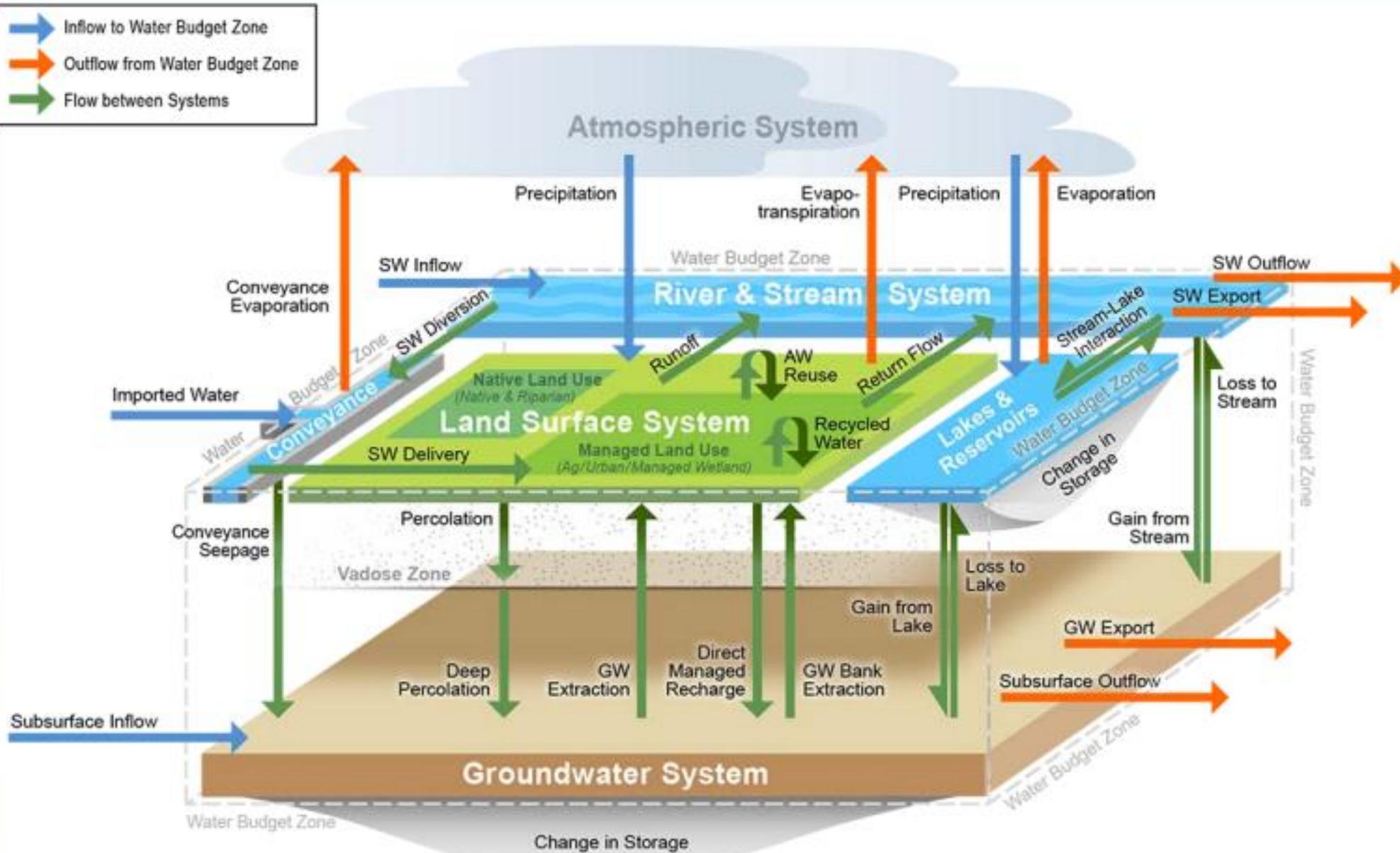
- Precipitation
- Stream infiltration
- Irrigation return flows
- Surface water deliveries
- Imported water
- Subsurface inflows between basins
- Subsurface inflows between aquifers
- Artificial recharge
- Seawater intrusion

▶ Water Out

- GW pumping
- Evapotranspiration
- Surface water outflow
- Subsurface outflows between basins
- Subsurface outflows between aquifers

Water In & Water out

Water Budget – Conceptual Diagram



(Khan, 2017)

§ 354.24. Sustainability Goal

- A single sustainability goal for the basin
- Achieved within 20 years of GSP implementation
- Maintained without causing undesirable results



Sustainability management criteria

Undesirable Results

Significant and Unreasonable



Lowering
GW Levels



Reduction
of Storage



Seawater
Intrusion



Degraded
Quality



Land
Subsidence



Surface Water
Depletion

Undesirable Results

- *“ Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions...”*
- *“The cause of GW conditions...that would lead to ...undesirable results...”*

Sustainability management criteria

Undesirable Results

Significant and Unreasonable



Lowering
GW Levels



Reduction
of Storage



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Quality



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Surface Water
Depletion

Undesirable Results – How to Quantify?

Minimum Threshold (MT) - if GW condition(s) exceeds minimum threshold – undesirable result

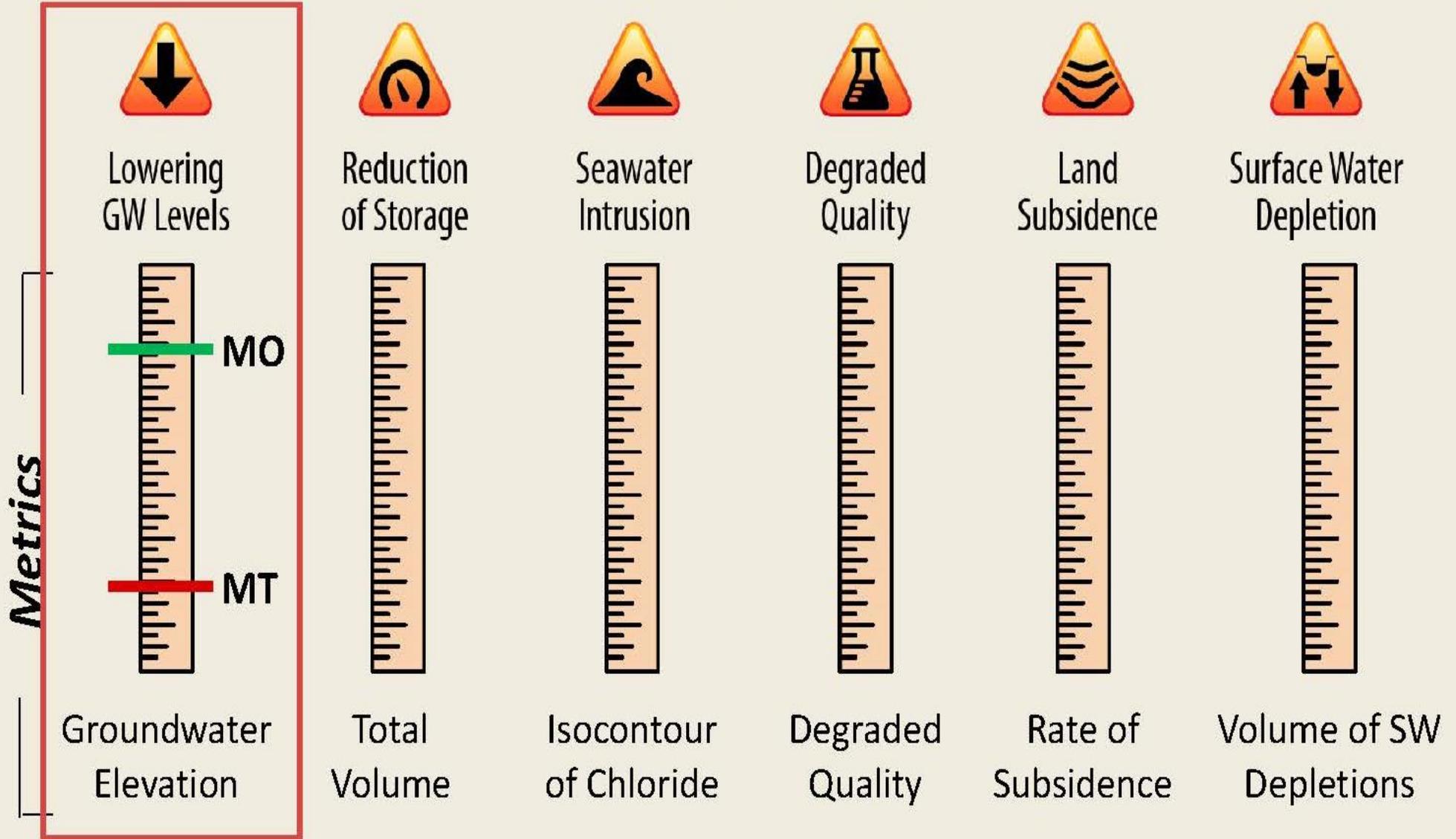
MT for each sustainability indicator – can be GW basin specific

Metric can be different for each sustainability indicator

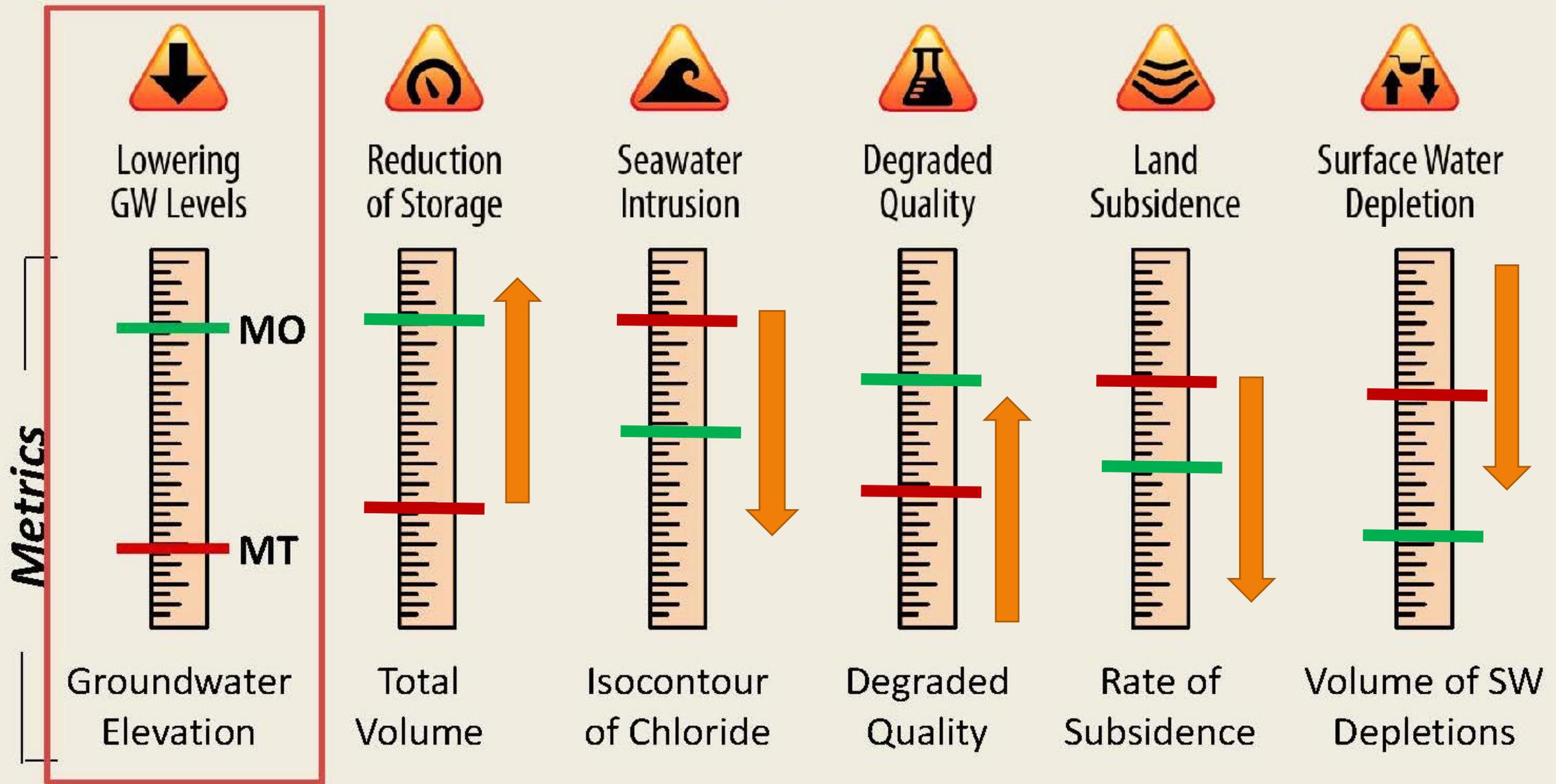
Sustainability management criteria

Management Objective

Minimum Threshold



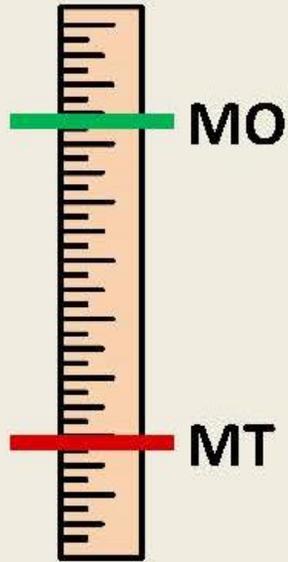
Sustainability management criteria



Sustainability management criteria



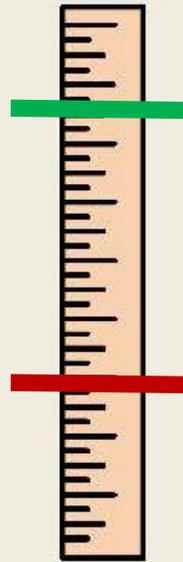
Lowering
GW Levels



Groundwater
Elevation



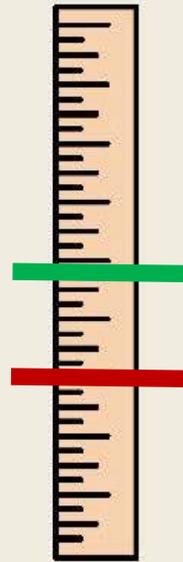
Reduction
of Storage



Groundwater
Elevation



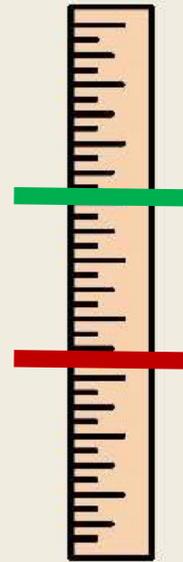
Seawater
Intrusion



Groundwater
Elevation



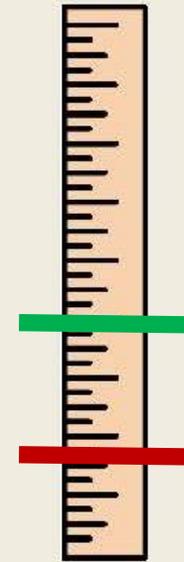
Degraded
Quality



Groundwater
Elevation



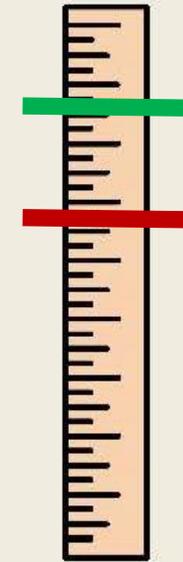
Land
Subsidence



Groundwater
Elevation



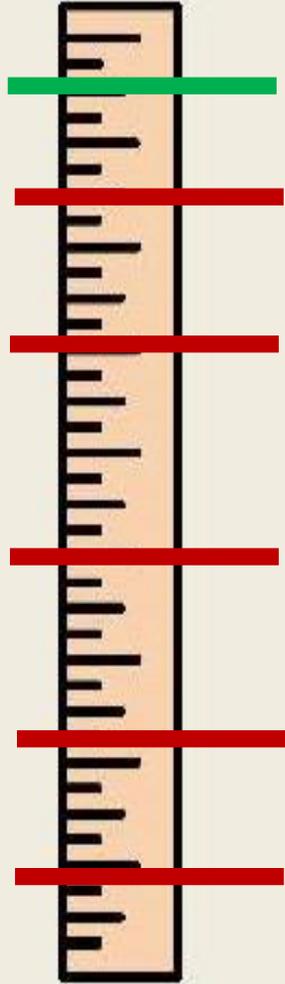
Surface Water
Depletion



Groundwater
Elevation

Metrics

Sustainability management criteria



Multi-Criteria MO

SW Depletion

Degraded Quality

Reduction of Storage

Sea Water Intrusion

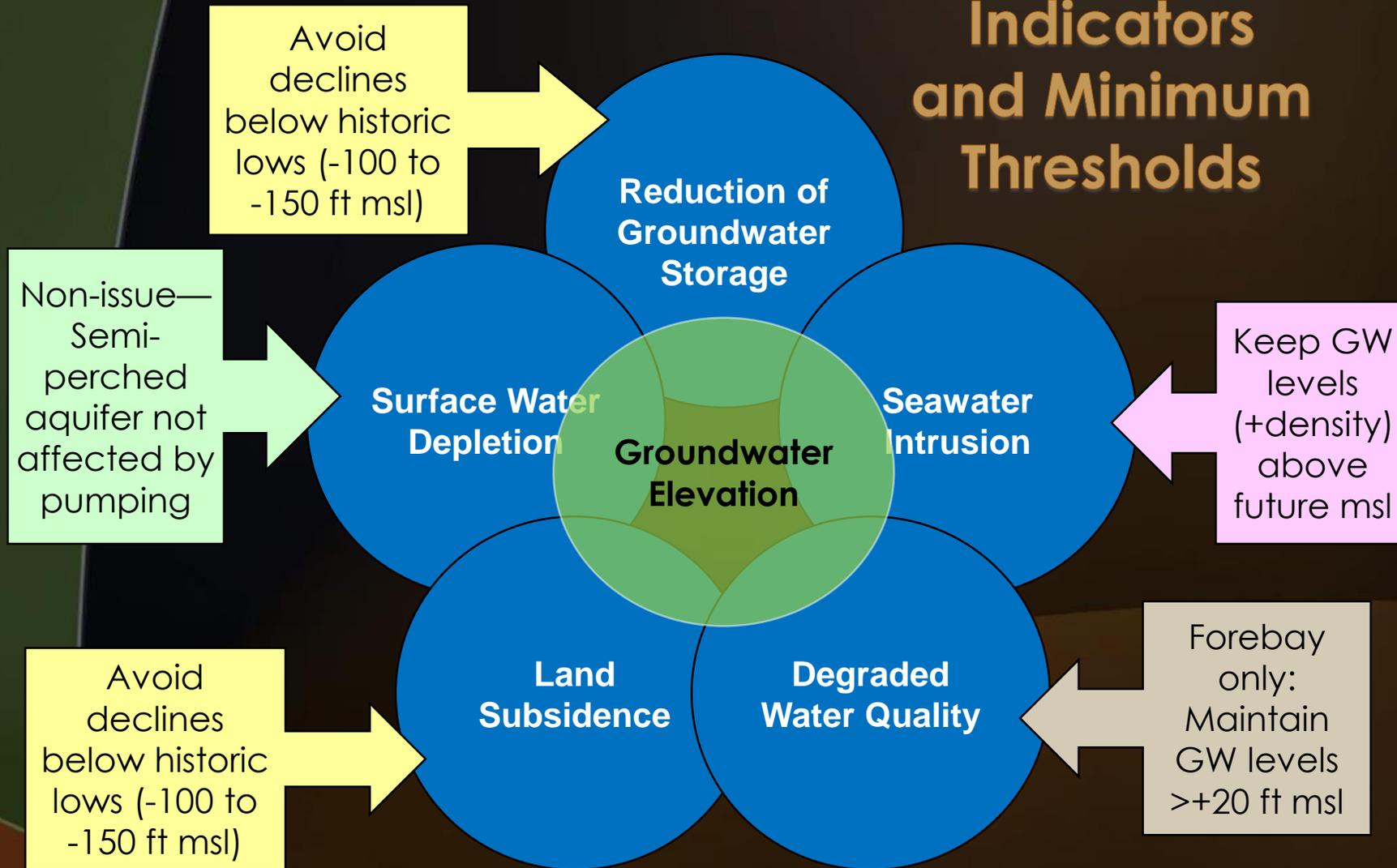
Subsidence

Groundwater
Elevation

Can be different
for each
groundwater basin
OR
management
area within a basin

Sustainability management criteria

Sustainability Indicators and Minimum Thresholds



ADDENDUM TO
PRELIMINARY EVALUATION OF IMPACTS OF
POTENTIAL GROUNDWATER SUSTAINABILITY
INDICATORS ON FUTURE GROUNDWATER
EXTRACTION RATES – OXNARD PLAIN AND
PLEASANT VALLEY GROUNDWATER BASINS

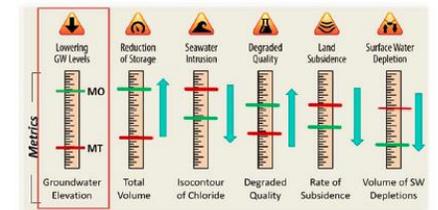
United Water Conservation District
Open-File Report 2017-02a

PREPARED BY
GROUNDWATER RESOURCES DEPARTMENT
NOVEMBER 7, 2017

THIS REPORT IS PRELIMINARY AND IS SUBJECT TO MODIFICATION BASED
UPON FUTURE ANALYSIS AND EVALUATION

PRELIMINARY EVALUATION OF IMPACTS OF
POTENTIAL GROUNDWATER SUSTAINABILITY
INDICATORS ON FUTURE GROUNDWATER
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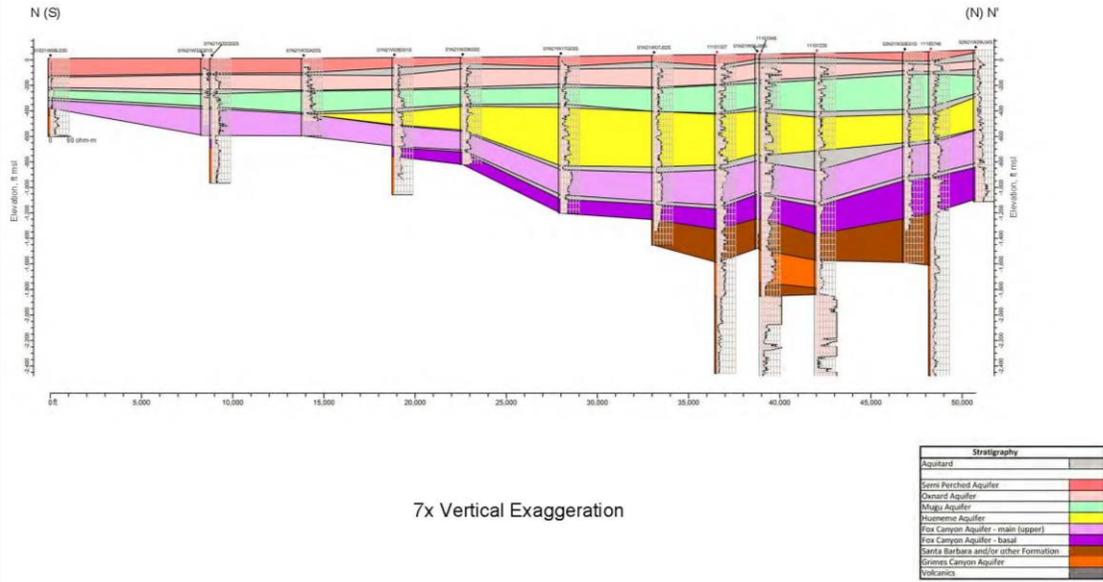
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GROUNDWATER
RESOURCES
DEPARTMENT



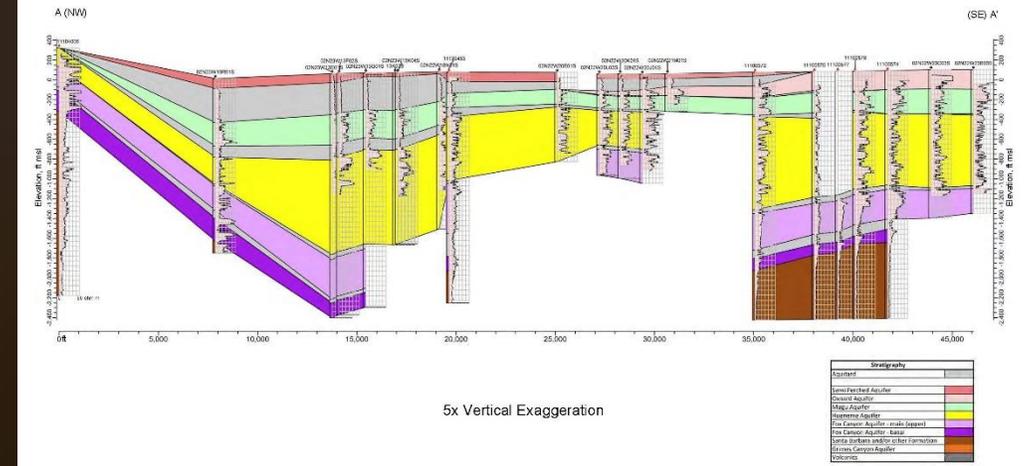
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CONSERVATION
DISTRICT

Hydrostratigraphic Model

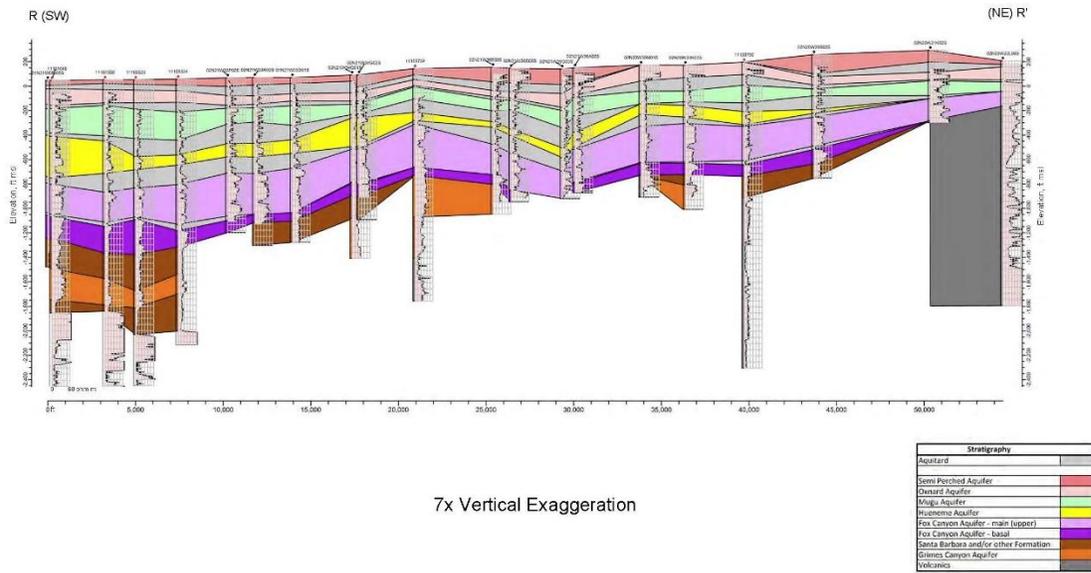
Cross-Section N-N'



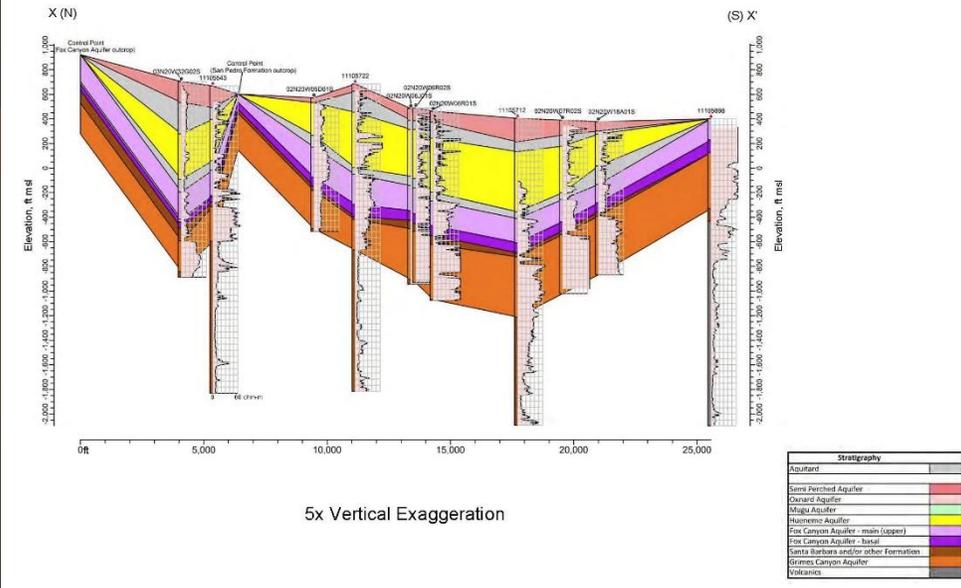
Cross-Section A-A'



Cross-Section R-R'



Cross-Section X-X'



Pumping Scenarios Considered (No New Water-Supply Projects)

Scenario	Description	Avg. GW Extractions (AF/yr)	Reduction in Pumping (%)
Base Case	No changes in 1985-2015 pumping rates	99,000	0
A	50% "haircut" in OP & PV (except Forebay)	61,700	38
B	75% reduction in LAS pumping in OP & PV (except Forebay)	60,600	39
C	100% reduction in SWIM area only (nowhere else)	89,300	10
D	No pumping in SWIM area, 70% reduction in LAS pumping in OP & PV	59,900	39
E	No pumping in SWIM area, 75% reduction in LAS pumping, 50% increase in UAS pumping	69,300	30
F	All pumping reduced (AG & M&I) by 50%	49,000	50

Effectiveness of Scenarios at Achieving Sustainable Yield

Scenario	Pumping Rate (AF/yr)	Reduction of Storage	Seawater Intrusion		Degraded Water Quality	Land Subsidence
			Port Hueneme	Mugu Lagoon		
Base Case	99,000	Partial	No	No	No	Partial
A	61,700	Yes	Partial	Partial	Yes	Yes
B	60,600	Yes	Yes	Partial	Yes	Yes
C	89,300	Partial	Partial	No	Partial	Partial
D	59,900	Yes	Yes	Yes	Yes	Yes
E	69,300	Yes	Yes	Yes	Yes	Yes
F	49,000	Yes	Yes	Yes	Yes	Yes

Total Economic Reduction (Income and Jobs) in Ventura County from 10,000 AF Curtailment of VFD Agricultural Water Supply

Economic Sector	Employment (Full & Part-Time Jobs)	Income (2015\$)
Farm Sectors	1,100	\$71,900,000
Non-Farm Sectors (Indirect & Induced)		
Supported by Crop Production	400	\$18,100,000
Supported by Crop Processing	10	\$1,100,000
Crop Processing Sector	5	\$700,000
Other Sectors	5	\$400,000
Total	1,500	\$91,100,000

Summary of Socioeconomic Impacts of Hypothetical Reduction of:
10,000 AFY of Agricultural Water Supply and 2,500 AFY of M&I Water Supply

Reduction of 10,000 AFY of Agricultural Water and 2,500 AFY of M&I Water

~4,000 reduced harvested acres

~2,400 acres of land area fallowed

~377,600 affected population of M&I users

~850,000 affected county residents

Property Taxes from Agricultural

M&I Water Costs

Jobs and Income from Ag Production

~\$857,000 in Annual County Taxes at Risk

~\$1 Million to \$2.25 Million Annual M&I Water Costs

~1,500 lost jobs
~\$91.1 million lost annual income

Supporting schools, libraries, parks, city budgets

Cost of alternative water supplies or M&I shortages

Direct and indirect economic activity in all sectors of county economy

Socioeconomic Impacts, Concentrated on Minority and Low Income Populations

~1/3 of Oxnard Plain urban residents already face 'unaffordable' water bills (as a % of income)

~99% of agricultural jobs held by minorities

~Public services supported by property taxes may disproportionately impact low-income populations

Key Findings

- **GSP-Lite is NOT the GSP / No new projects**
- In this case, GW elevation was a suitable “proxy” sustainability indicator
- Sustainable yield
 - “Haircut” approach => lower yields (~49,000 AFY)
 - “Zoned” approach => higher yields (~60,000-70,000 AFY)
- Location and depth of pumping has a big influence on yield

Key Findings

- **GW flow in Oxnard Plain & Pleasant Valley basins is complex**
- Water supply is dependent on conjunctive use projects (e.g., VFD, SFD, Conejo Ck)
- Reductions in water supply have large economic and socioeconomic impacts

What's Next?

- Conservation
- Maximize existing water supplies
- Explore new water supplies

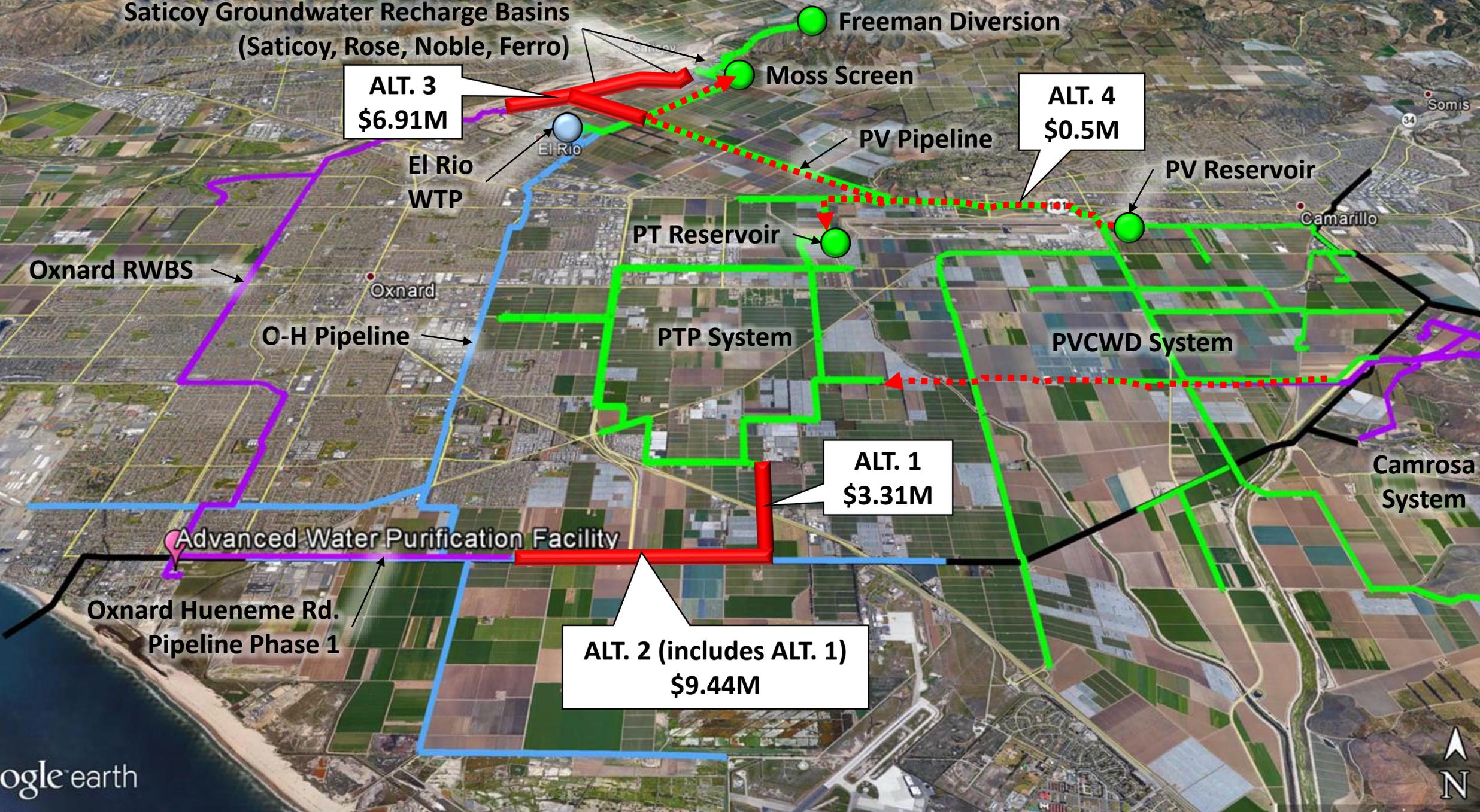


Water Supply Options

- Recycled Water
- Imported Water
- Ocean / Brackish Water Desalination



**Saticoy Groundwater Recharge Basins
(Saticoy, Rose, Noble, Ferro)**



**ALT. 3
\$6.91M**

**ALT. 4
\$0.5M**

**ALT. 1
\$3.31M**

**ALT. 2 (includes ALT. 1)
\$9.44M**

Imported Water

▶ State Water Project

- ✓ Ventura County SWP Table A Allocation – 20,000 AF
 - City of Ventura – 10,000 AF
 - Casitas Municipal Water District – 5,000 AF
 - UWCD – 5,000 AF (1,850 AF – Port Hueneme / 3,150 – Lake Piru)

▶ Article 21 Water

- ✓ Excess SWP water that can be bought by those with Table A allocation
 - UWCD purchased 10,000 AF this year

▶ Water Exchange Agreements (e.g., Castaic Lake WA, MWD)

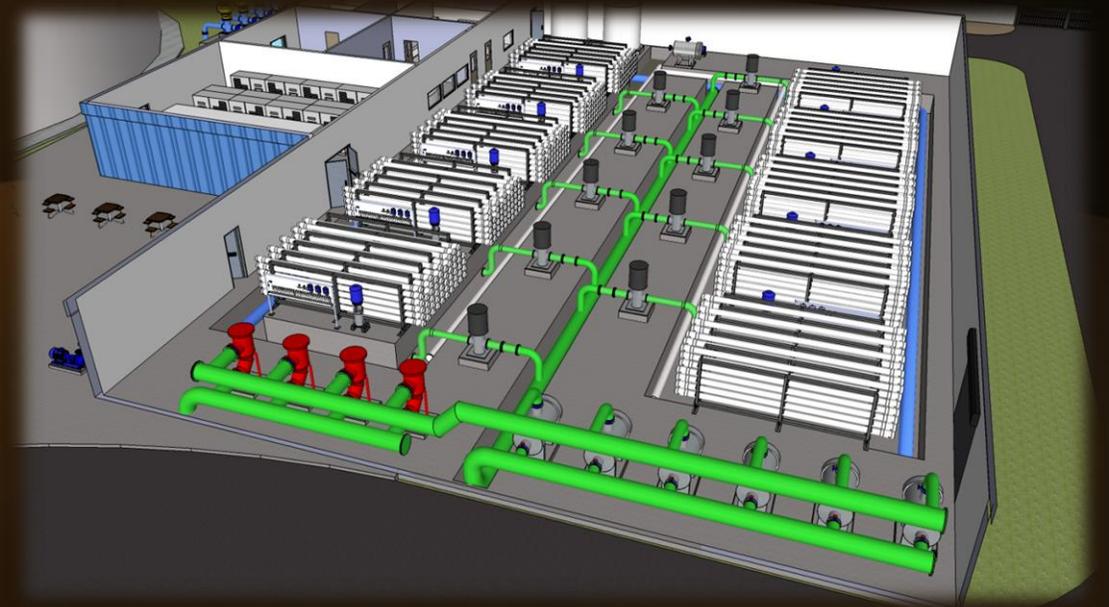
- ✓ Water deliveries in wet or typical years with repayment in dry years at discounted rate

Coastal Brackish Water Treatment Plant

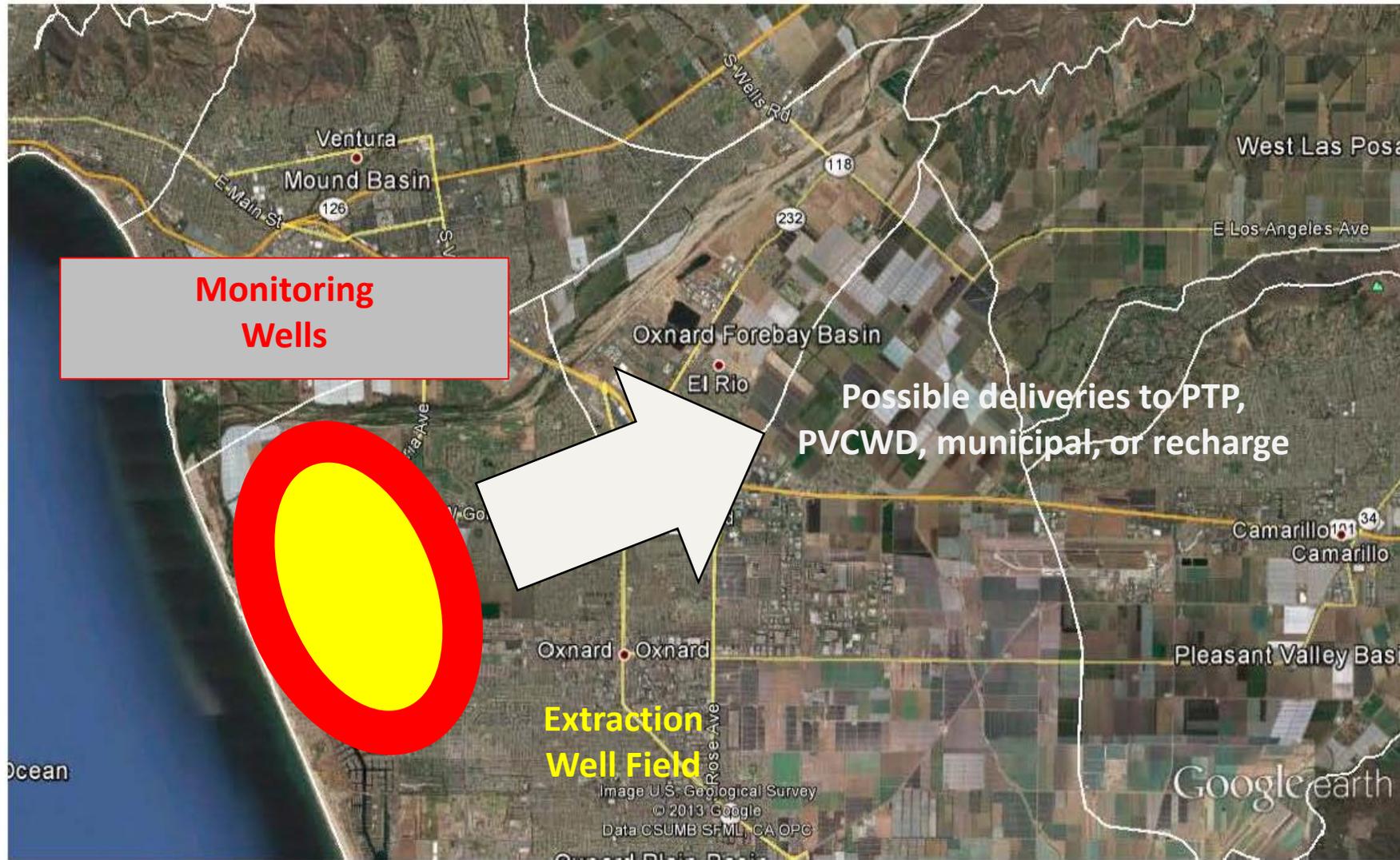


Site Layout
For 20,000
AFY Facility

Sand
Separators,
Cartridge
Filters, and RO
Trains for
20,000 AFY
Facility



Anacapa Project



- ✓ ??? AFY (still in concept phase)
- ✓ Extract GW from area with typically higher GW elevations
- ✓ Harvest GW before lost off-shore
- ✓ Simple construction – wells, pumps, & pipelines

Google earth

miles
km

10

8





**Sustainable
Yield**

**Allocation
System**

Water Market

**Infrastructure
Group ??**

**“...how big
is the
pie...”**

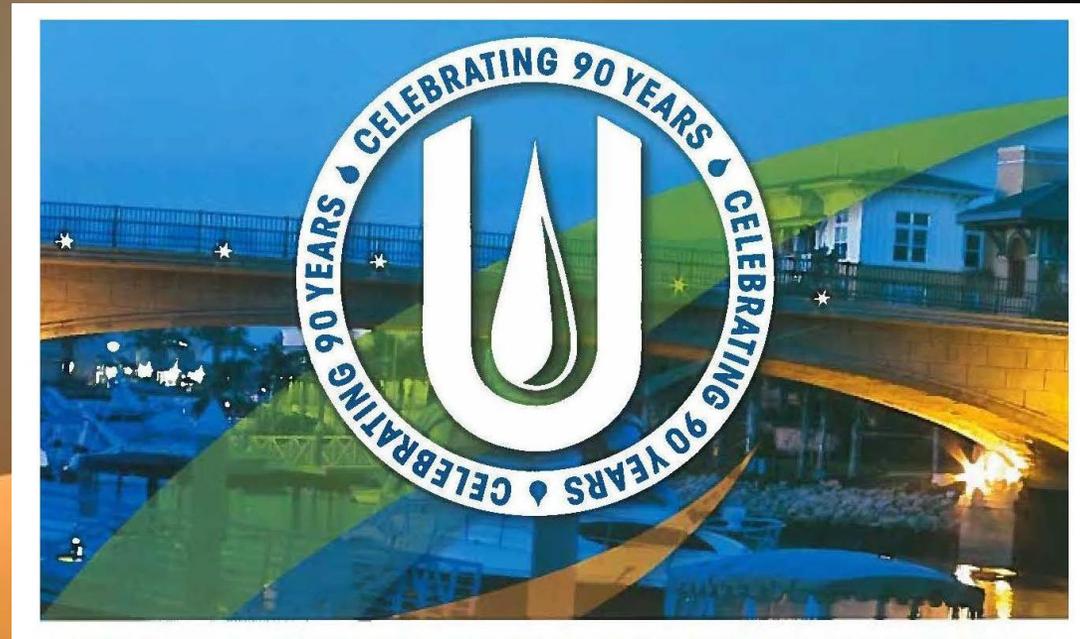
**“...how big is
my piece of
the pie...”**

**“...how can I
get more
pie...”**

**“...how can I
get different
flavors of
pie...”**

Thank you!

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