

Water Table Based Management as the Groundwater Sustainability Plan (GSP) for the Owens Valley Groundwater Basin

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In September of 2014, Governor Edmund G. Brown, Jr., signed into law the **Sustainable Groundwater Management Act (SGMA)**.

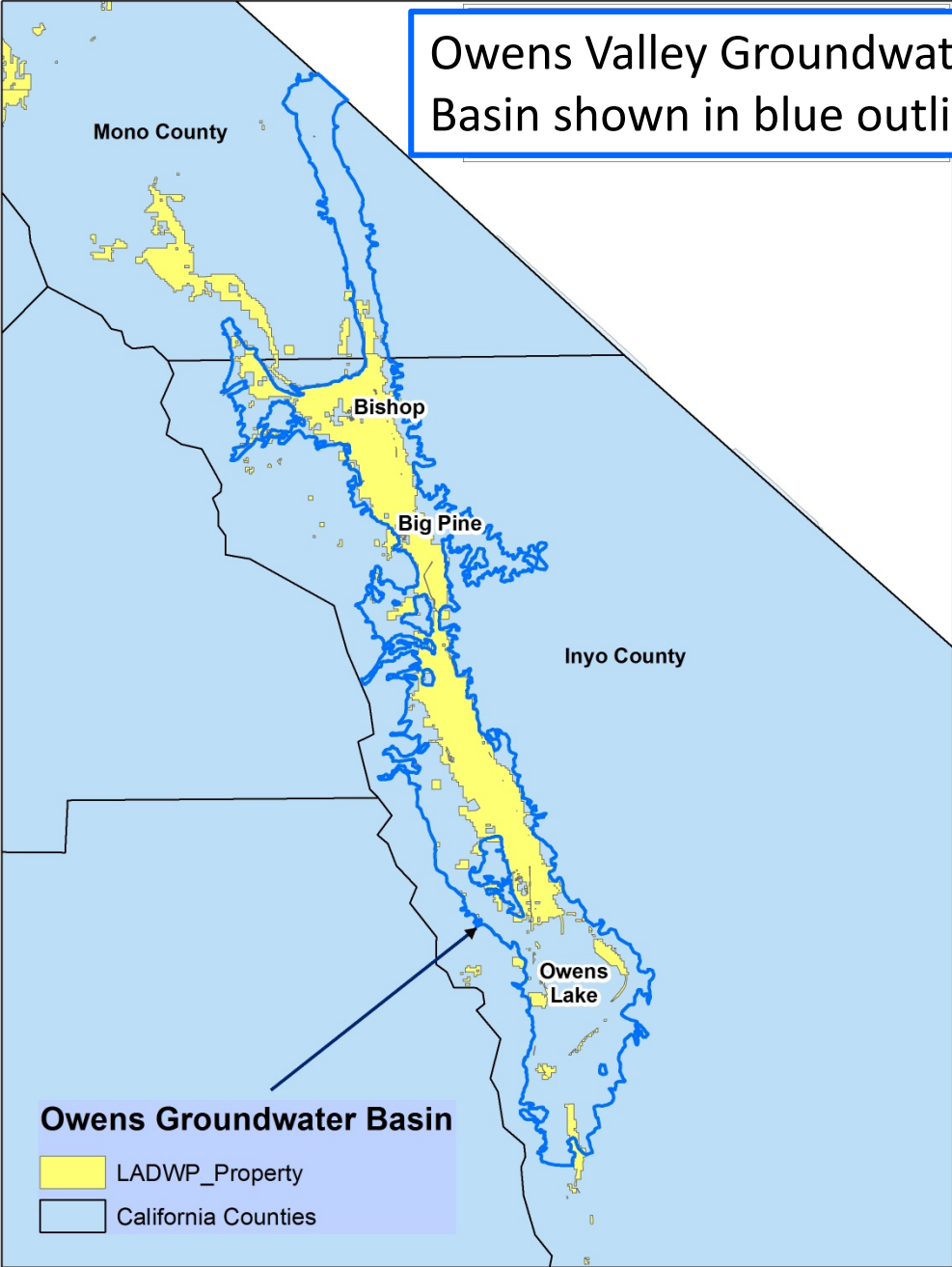
SGMA establishes a framework for sustainable and also local groundwater management. For the first time in California history, SGMA requires California to halt groundwater overdraft and bring basins into balanced levels of pumping and recharge.

To accomplish these goals, SGMA requires that a Groundwater Sustainability Plan (GSP) be developed and implemented for many groundwater basins in California. The state of California ranked the hundreds of basins into categories of high, medium and low priority.

The Owens Valley Groundwater Basin is ranked as MEDIUM priority. We have until 2022 to develop and adopt a GSP.

<http://www.water.ca.gov/groundwater/sgm/index.cfm>

Owens Valley Groundwater Basin shown in blue outline.



It may be argued that the County of Inyo and its Board of Supervisors, with the assistance of Inyo County Water Department, is fully capable of taking the lead in developing a Groundwater Sustainability Plan (GSP) for all areas of Inyo County. After several decades of dealing with the City of Los Angeles Department of Water and Power in Owens Valley, Inyo County should (or “does”) have the capability of leading the Groundwater Sustainability Agency (GSA) and coordinating with the other local agencies and water users in the Owens Valley Groundwater Basin to develop the GSP.

The County of Inyo approved Joint Powers Agreement (JPA) on August 1, 2017. The JPA creates a complicated new bureaucracy with multiple partners who apparently are not too thrilled about having to sit at this table. The purpose of the JPA is to serve as the Groundwater Sustainability Agency (GSA), and this entity is supposed to produce a Groundwater Sustainability Plan (GSP).

There is a lot of uncertainty with regard to the time it will take, etc., for the JPA to begin real work on producing a GSP.

Why does this matter? For the first time, the state of California has acknowledged that it should be the local people who should have the most say in how the ground water underneath them is managed.

What's at stake? Owens Valley's water future and the voice "locals" will have in it. The future of our water is the future of us: Our environment, economy, health, and persistence in the valley.

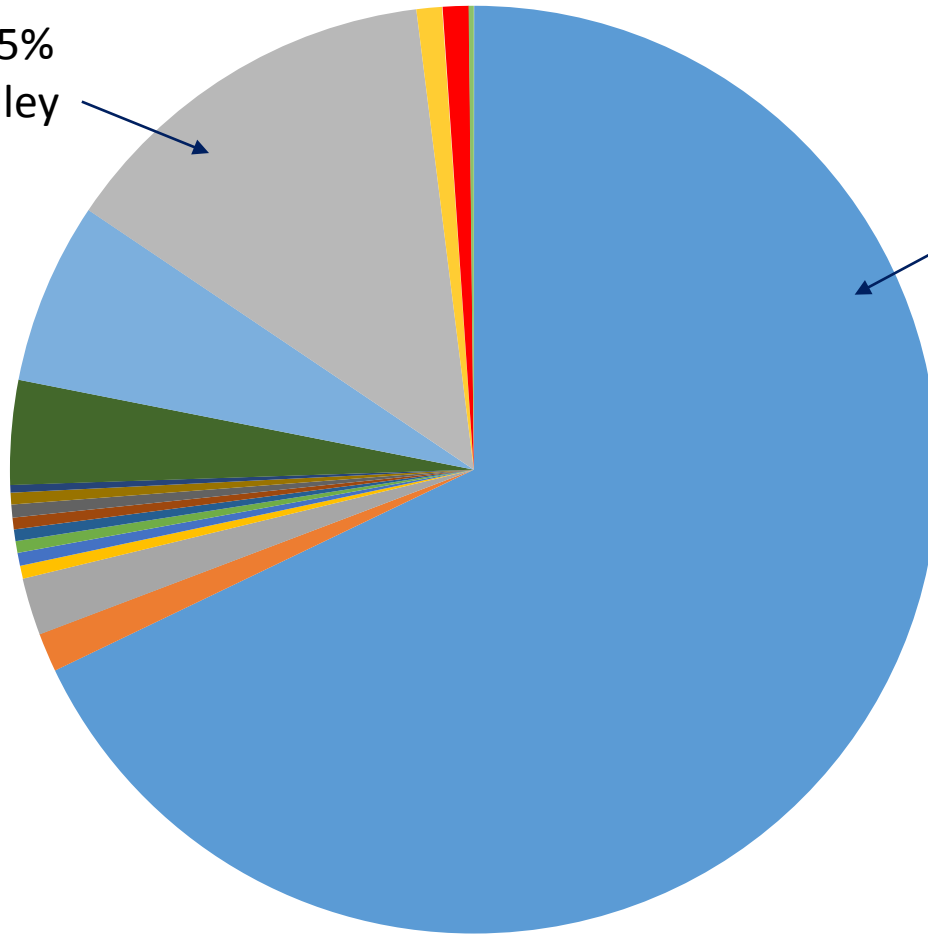
So, some thoughts about how best to proceed!

First, gather some information.... Consider what we know....

Who Pumps in OVGB? estimated proportion

Est. 10-15%
by Tri Valley
GMD

Est. 60-70%
by DWP



- | | | | | |
|------------------------------|------------------|------------------|------------------------|----------------------|
| ■ LADWP | ■ County of Inyo | ■ City of Bishop | ■ Big Pine CSD | ■ Eastern Sierra CSD |
| ■ Indian Creek-Westridge CSD | ■ Lone Pine CSD | ■ Keeler CSD | ■ Sierra Highlands CSD | ■ Sierra North CSD |
| ■ Starlite CSD | ■ all 4 tribes | ■ others | ■ County of Mono | ■ TVGMD |
| ■ Wheeler Crest CSD | ■ Crystal Geyser | ■ others | | |

Los Angeles Department of Water and Power (DWP) pumps more water from the Owens Valley Groundwater Basin than any other entity. DWP also captures a significant amount of runoff, which would naturally recharge the groundwater basin. Then, DWP exports runoff and pumped water out of the basin.

So, getting DWP to manage sustainably means the Owens Valley Groundwater Basin is managed sustainably.

- Who is in the best position to get DWP to manage sustainably? Inyo County, thanks to the Inyo/LA Water Agreement and its goals.
- Who is well-equipped to prepare a plan to manage the basin sustainably? Inyo County. They have a Water Department and this is their area of expertise.

Inyo County has already developed a concept for managing DWP pumping in order to achieve the goals of the Water Agreement and to replace the unacceptable ON/OFF pumping management currently in place. The approach is called, “Water Table Based Management” (WTBM).

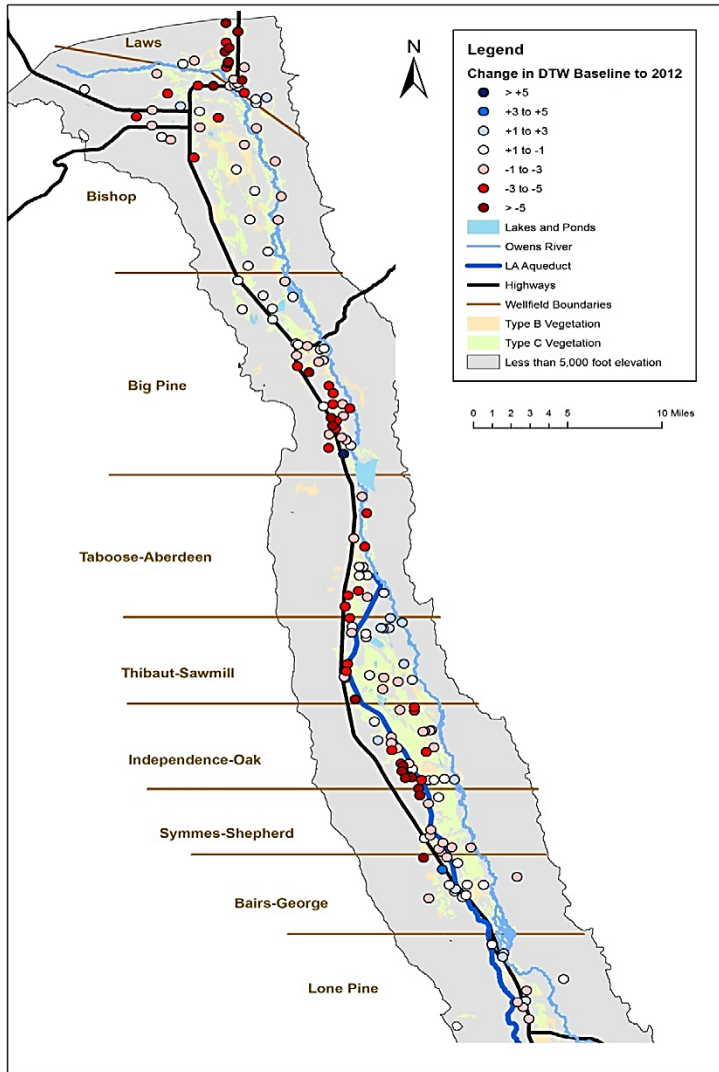


Figure 4.3. Water levels in 2012 relative to the 1985-87 baseline. Negative values denote water levels were below baseline.

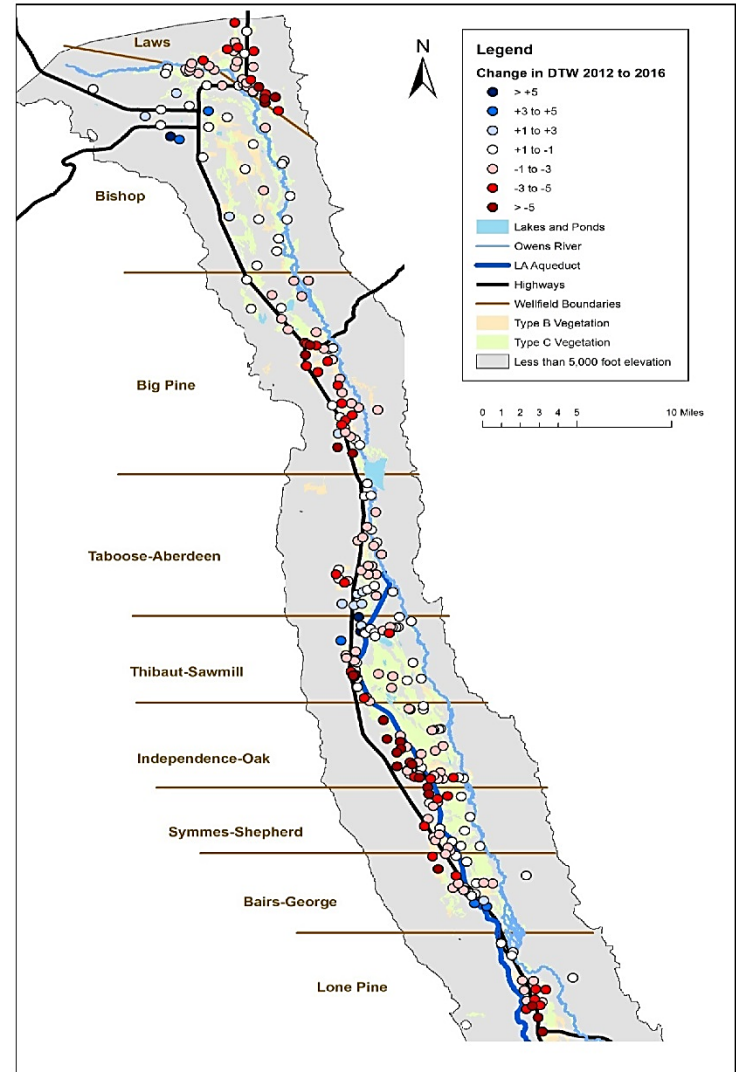


Figure 4.6. Change in water levels between April 2012 and April 2016 for most shallow monitoring wells in the Owens Valley. Negative values denote a decline in water level.

As shown in the previous slide, there are hundreds of wells for monitoring depth to groundwater in Owens Valley, so as a result, there are a lot of data. List of “Indicator” monitoring wells, according to ICWD April 2017, 47 total.

Wellfield	# Indicator Wells
Laws	9
Bishop	None?
Big Pine	8
Taboose Aberdeen	10
Thibaut Sawmill	3
Independence Oak	6
Symmes Shepherd	8
Bairs George	3
Lone Pine	None

Decades of data for these monitoring wells gives us numbers to work with. The numbers establish the relationship between groundwater depth and how it is affected by pumping and snowmelt runoff. Next slide summarizes the relationship:

Linear Multiple Regression Equation:

$$h_{t+1} = b + b_x h_t + b_y P + b_z R$$

Where:

h_{t+1} = is the projected groundwater level on April 1 of next year (in elevation, feet)

h_t = is the measured groundwater level elevation on April 1 of this year

P = is the wellfield pumping in acre-feet

R = is the estimated valley-wide runoff in acre-feet

Each b = is a calculated coefficient:

b is the constant (intercept)

b_y is the pumping coefficient and is a negative number

b_z is the runoff coefficient and is a positive number

b_x is also a positive number

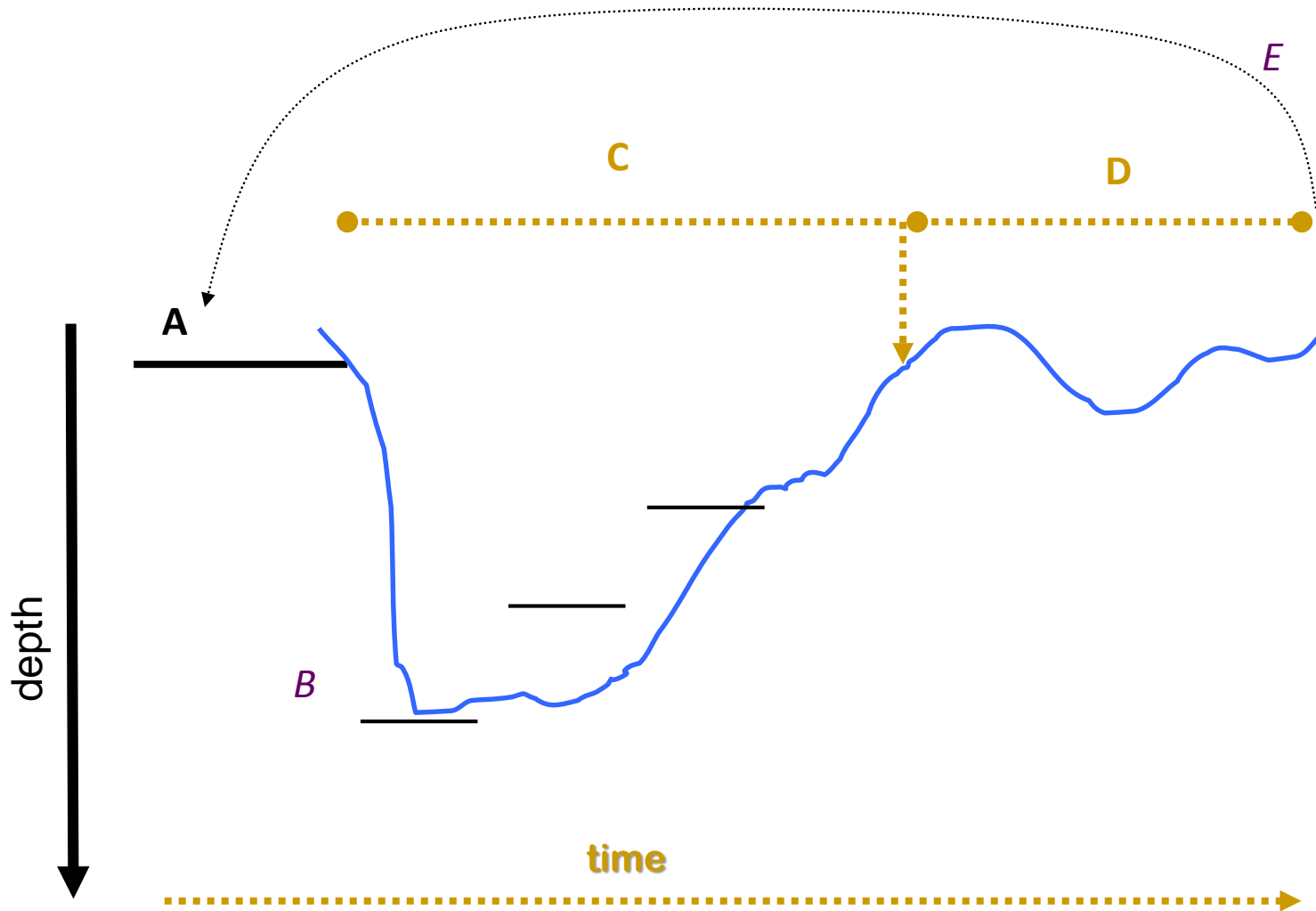
Goal of Inyo/LA Water Agreement (paraphrased) was to maintain groundwater dependent vegetation as it existed in mid 1980s.

What is needed to maintain groundwater dependent vegetation?
Groundwater!

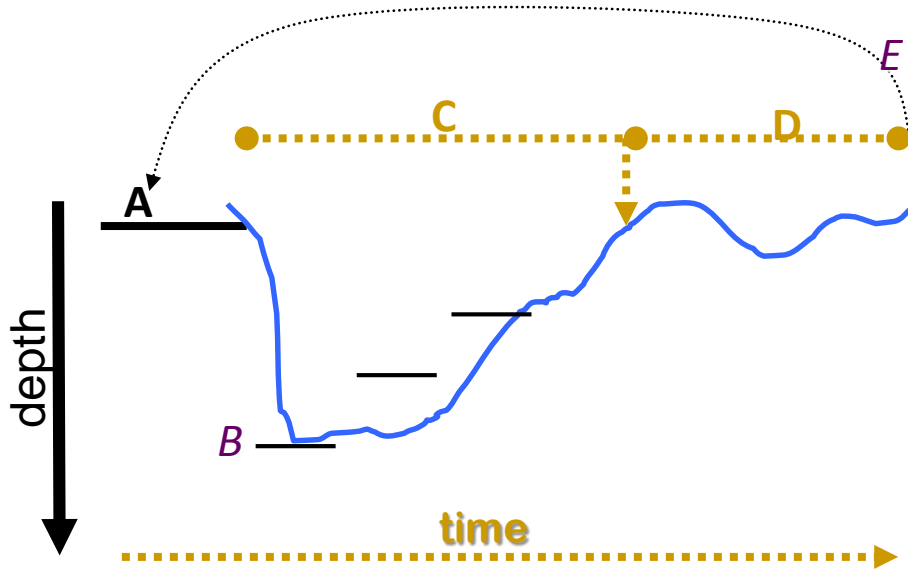
Model for management under the Water Agreement is that the water table may drop below the root zone of gw dependent plants, but it would need to return (rise) periodically to replenish soil moisture and provide for the plant community.

Examination of available data on wet and dry weather cycles shows that one year of below-normal snowpack is common, but a stretch of THREE consecutive years was also common in the record. Perhaps the vegetation of Owens Valley may be able to tolerate three years of pumping-imposed drought and not lose cover, species, and community integrity.

Put together this info, and the result is a model for WTBM.....



Basic “ruler and clock” Water Table Based Management diagram. Blue line is a possible water table response.



WTBM Rules:

A is the management target groundwater depth. It is site-specific.

B is a groundwater depth informed by the regression model: It is the depth from which the water table would recover to A in 3 years (under normal runoff conditions). If good to go, only pump the amount in year 1 from which the water table may recover in 3 years.

C is time: 3 years.

D is a recovery period. Before pumping resumes, no pumping should occur until water table recovers (it may take more than 3 years) and vegetation conditions are monitored and determined to be acceptable.

E is “adaptive management.” For example, as time goes by, take what’s learned by applying this approach and either adjust A or C.

- If a plan such as Water Table Based Management (WTBM) is developed as the primary component of the Groundwater Sustainability Plan (GSP), would this satisfy the state's requirements under SGMA? Absolutely.
- Would WTBM help Inyo County also achieve the goals of the Water Agreement? Very likely yes. We would need to try it for at least a decade to know, so might as well get started.
- Who/what would benefit if WTBM is applied in the Owens Valley Groundwater Basin? All the residents and people who use and rely on water in the Owens Valley. Sustainable groundwater management keeps water available – it's there for drought periods and future use. The OV needs control of and access to groundwater for domestic use, irrigating for farming and ranching, and for recreation and wildlife. Water maintains healthy ecosystems, economic livelihood, and keeps the dust down! Water is the valley's future.
- What do we have to lose? Nothing: we should gain water and a healthier valley over time.
- Will DWP object? WTBM does not prevent pumping. It simply manages the key variable that can be managed: the pumping amount over a given time period.

How do we get to sustainable management sooner rather than later?

- Ask Inyo County to draft a conceptual plan/GSP for applying WTBM.
- Ask the County Supervisors to ensure GSA/JPA meetings are open to the public. Ask that elected officials (Supervisors) sit on the GSA, because Supervisors are directly accountable to all residents of, thus water users of, Inyo County.
- Insist that the GSA/JPA openly welcomes a support team of pro-Owens Valley advisors for doing the GSA work. Invite representation from the CSDs, tribes, scientists, agricultural community, environmental interests, and anyone local with an interest who is willing to commit; that is, get the best advice available.
- Consider hiring new and motivated people to lead the effort. Consider a facilitator if needed.
- Acquire the necessary funding to continue to work on the plan to completion. Begin with existing ICWD funds. Apply for state funding. Seek other grants.
- Be transparent. Keep the community informed. Seek public input. Make sure the locals get behind the plan.