

Stanislaus County Water Advisory Committee
100 Day Action Plan

Element 1: Thresholds

Goal: Identify, develop and integrate county-wide groundwater basin management objectives (BMO's).

Objective: Thresholds are an important component of groundwater management because they establish quantifiable triggers that, when approached or exceeded, signal a threat or problem. Approaching or exceeding a threshold may trigger management actions needed to address identified threats or problems.

Scope: The geographic area of this element is county-wide though *special emphasis will be placed on the Northeast County Foothills Area.*

Strategy: Identify sustainable water level fluctuations in the aquifer system and define desirable minimum and maximum management levels. Evaluate long-term historical trends and forecasted use patterns (location; rate; construction) using USGS modeling tool.

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Element 2: Monitoring

Goal: Collect geohydrologic data from all available public and private sources in order to assess and monitor the response of the aquifer system(s) to known and quantifiable stresses.

Objective: Without sufficient monitoring, it is not possible to determine if groundwater problems exist or to forecast the potential for future problems that may require active management actions.

Scope: The geographic area of this element is county-wide though *special emphasis will be placed on the Northeast County Foothills Area.*

Strategy: Collect and compile water level data that is integrated within the state-wide CASGEM effort (in cooperation with local reporting entities such as the Turlock Groundwater Basin Association and the Stanislaus & Tuolumne Rivers Groundwater Basin Association). Collect and compile aggregated groundwater pumpage reports from all users within the county. Such data will allow for a direct assessment of aquifer water level response vs. pumping conditions.



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Element 3: Governance

Goal: Explore various governance structures that may be applicable to managing groundwater resources in identified areas of concern within Stanislaus County.

Objective: Governance of groundwater use is necessary to ensure that thresholds for water quality and quantity are not exceeded. In some situations, actions are needed to avert potential problems or to rectify existing problems, *such as lack of groundwater recharge*. Managing groundwater generally requires maintaining a balance between pumping, storage depletion, and recharge at the basin scale and over the long-term (spacial and temporal). Such a balance can effectively be achieved through conjunctive use, demand management (e.g., water conservation, reduced pumping), or a combination of both.

Scope: The geographic area of this element is county-wide though *special emphasis will be placed on the Northeast County Foothills Area*.

Strategy: Explore options for existing water suppliers to deliver surface water to the areas of concern in wet years when such water can be declared surplus. Identify location and mechanisms for artificial recharge programs. Develop wellfield optimization programs that include well rotation and coordinated scheduled operations.

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Element 4: Funding

Goal: Develop funding mechanisms to support local groundwater management efforts such as the administration and coordination of data collection, and assessment and reporting of aquifer conditions.

Objective: Successful groundwater management requires access to sufficient funding to pay for the development and implementation of groundwater management plans, water level monitoring networks, groundwater recharge facilities, ongoing operation and maintenance of infrastructure, as well as the oversight or enforcement, by local and regional management agencies.

Scope: The geographic area of this element is county-wide though *special emphasis will be placed on the Northeast County Foothills Area.*

Strategy: Explore local fee structures and/or special district assessments recognizing Proposition 218 constraints. In addition to local revenue sources, significant funding for conjunctive use projects, groundwater recharge facilities, and groundwater basin management activities can be made available through various existing State water bond measures and from State and Federal grant funding.

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Element 5: Enforcement

Goal: To ensure that adequate local governmental authority exists to enforce compliance with any identified groundwater management program elements.

Objective: Oversight and enforcement encourages groundwater pumpers to operate in a manner consistent with relevant regulations, plans, policies, and permits. To address violations of management plan provisions or regulatory requirements, federal, State, and local agencies provide oversight of pollution cleanup, and take enforcement actions of varying types and levels of stringency. Local and regional groundwater management entities may also need to take additional oversight actions when monitoring data demonstrate that thresholds are, or will likely be exceeded, within their jurisdictions.

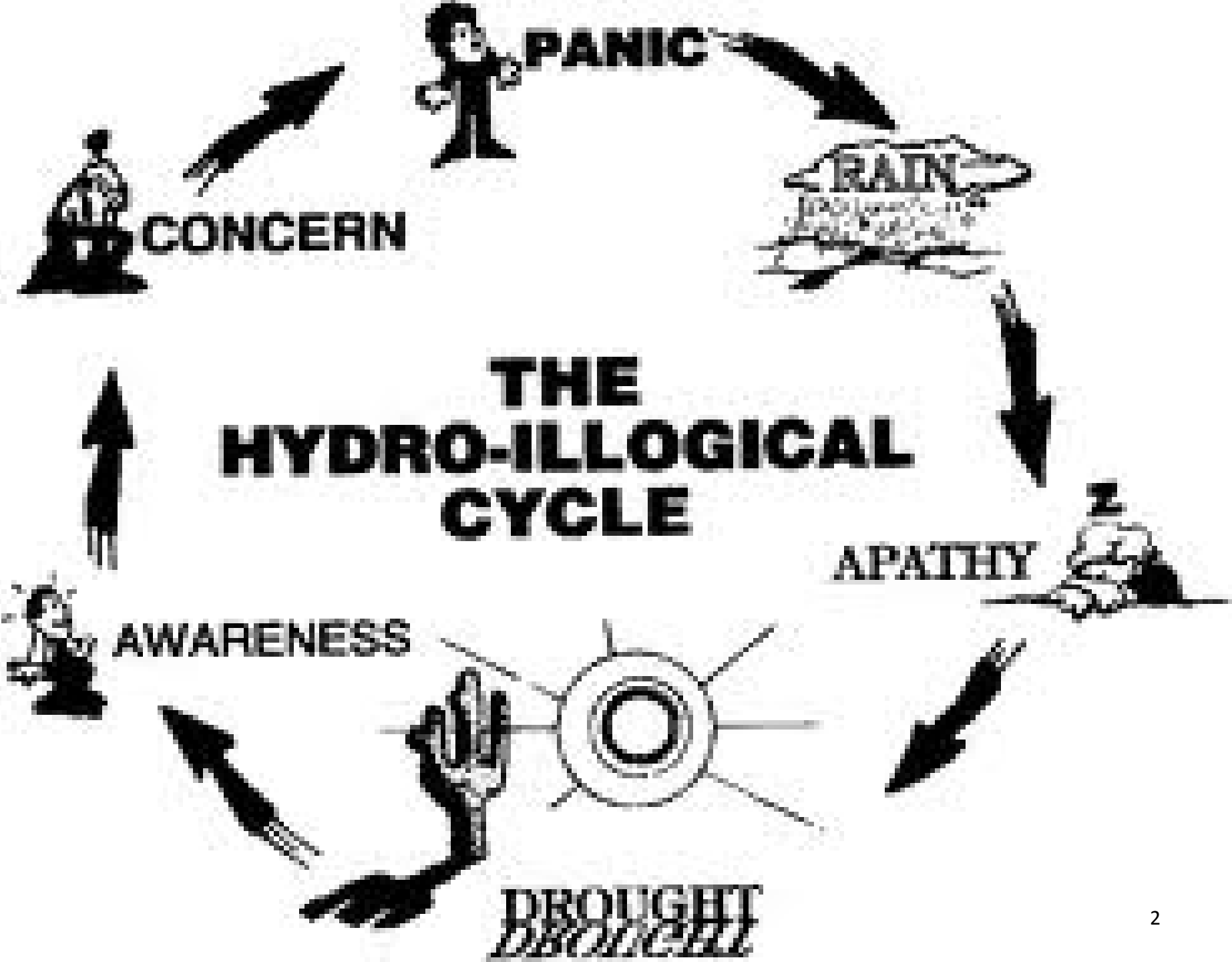
Scope: The geographic area of this element is county-wide though *special emphasis will be placed on the Northeast County Foothills Area.*

Strategy: Review and revise, as necessary, the existing Stanislaus County Groundwater Mining and Export Prevention Ordinance to address enforcement needs and concerns. Terms such as “Mining” and “Adverse Impacts”, among others, need to be defined in order to establish permit/ordinance review criterion.

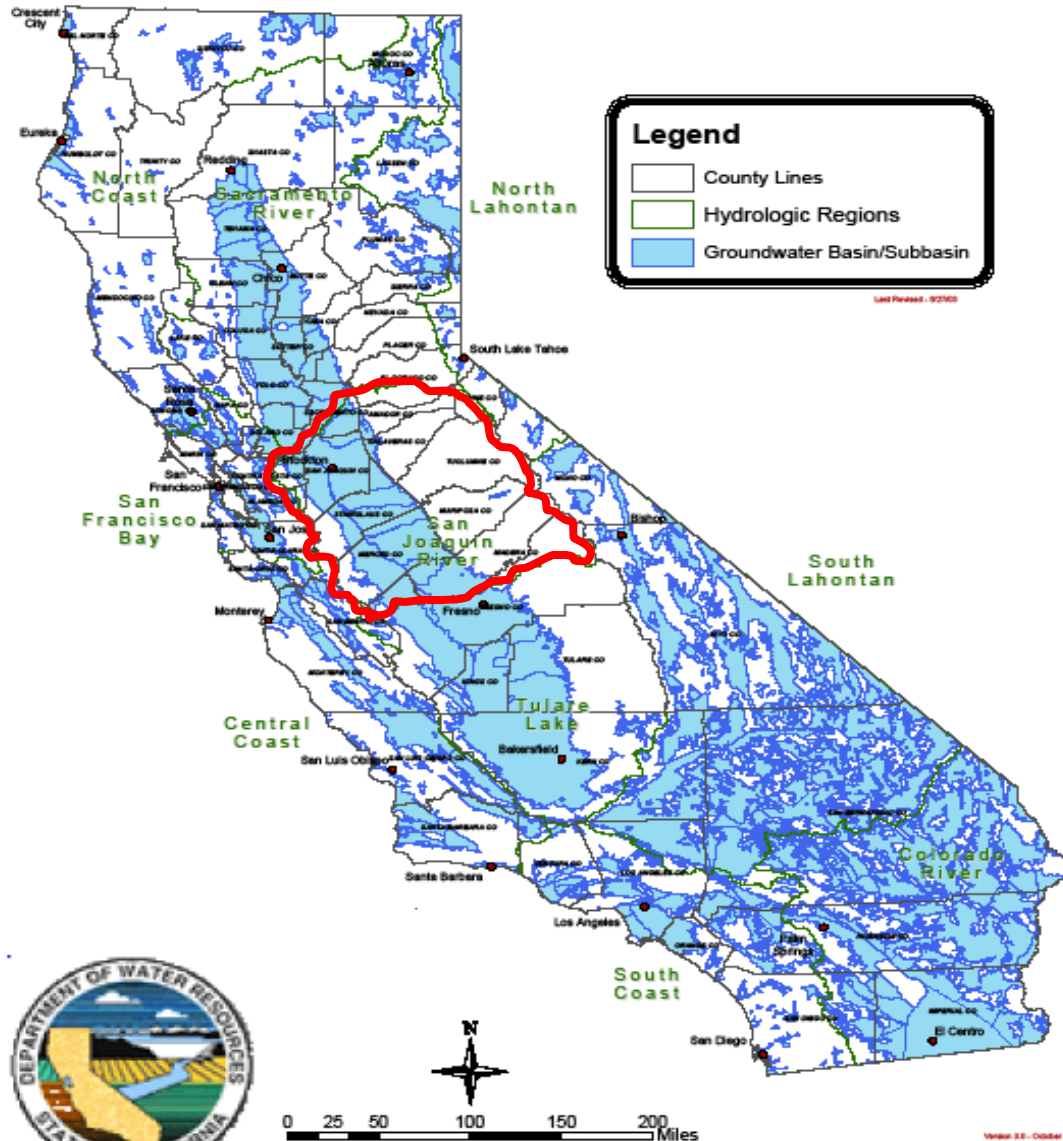
Stanislaus County Water Advisory Committee

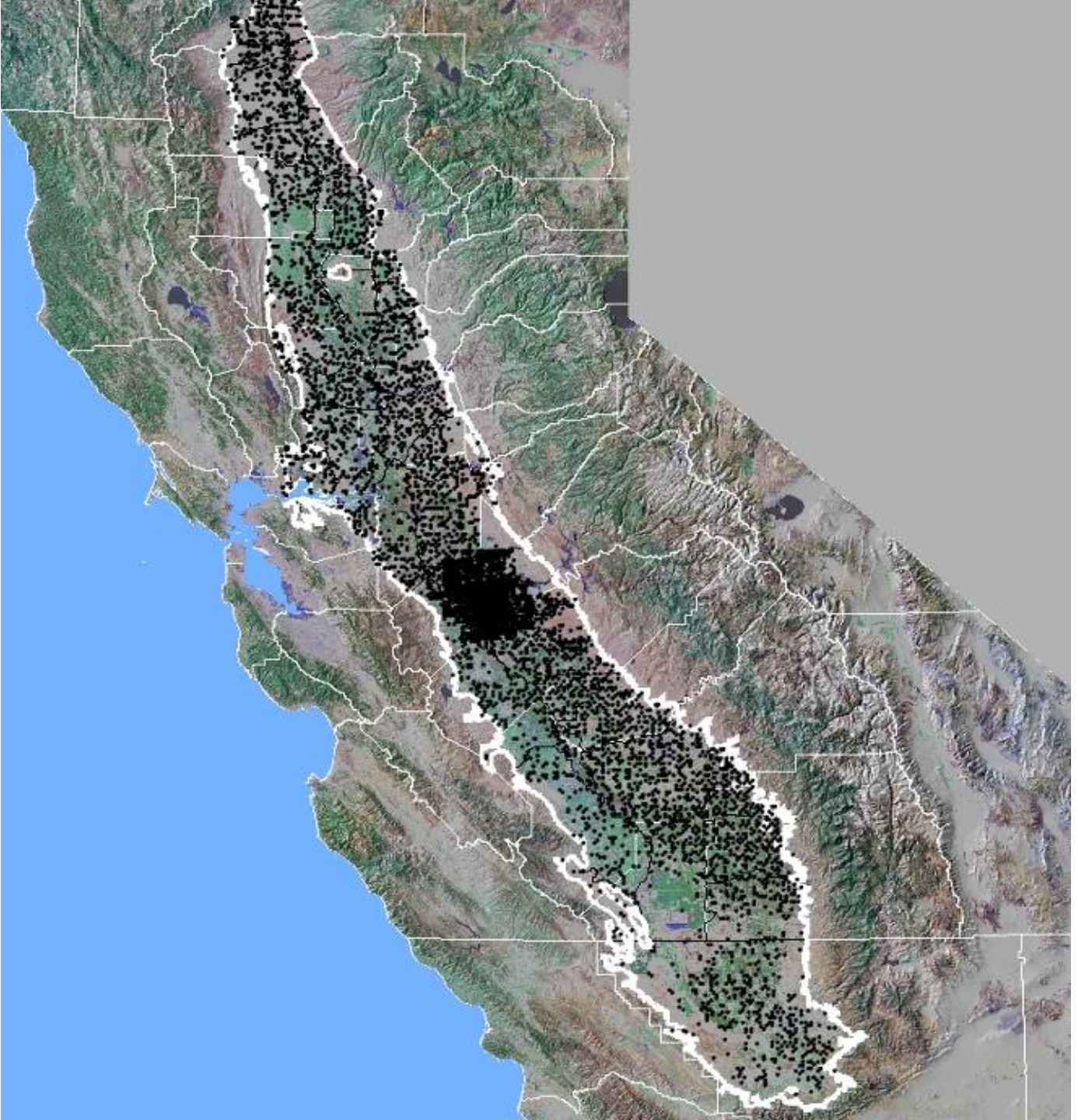
Framing the Issue

March 26, 2014



Groundwater Basins in California

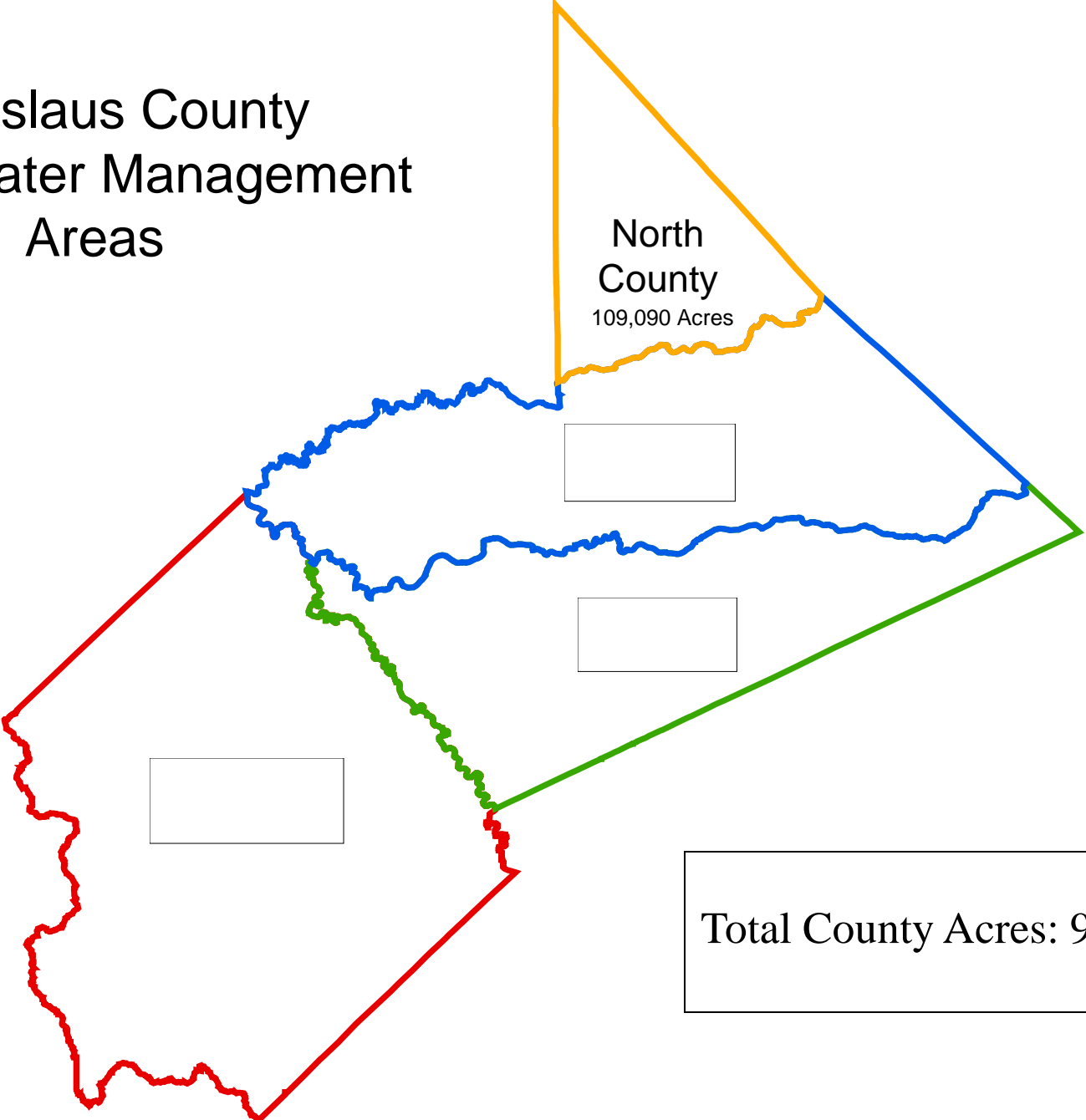




San Joaquin Hydrologic Region/Groundwater Subbasins



Stanislaus County Groundwater Management Areas

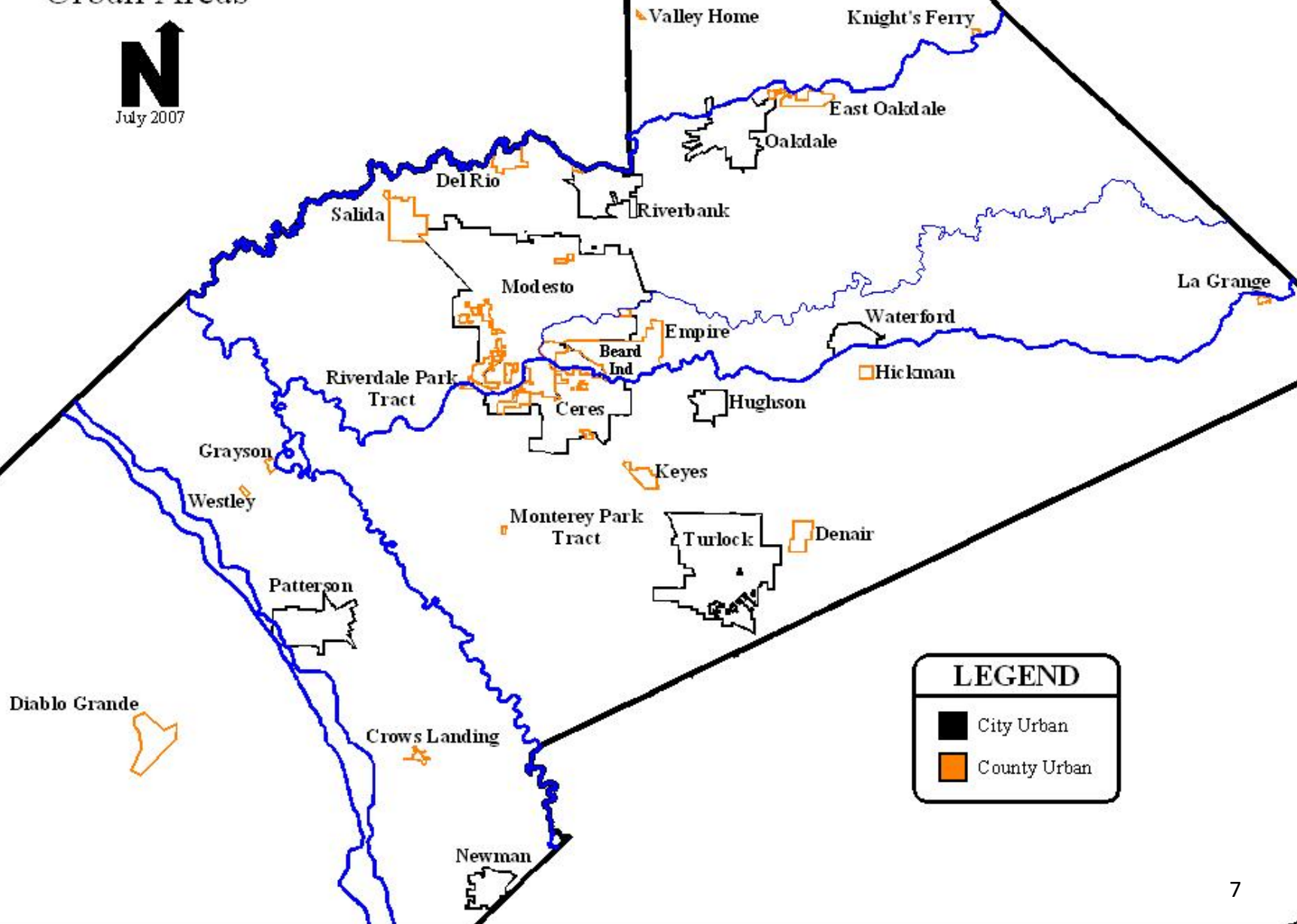


Stanislaus County

Urban Areas

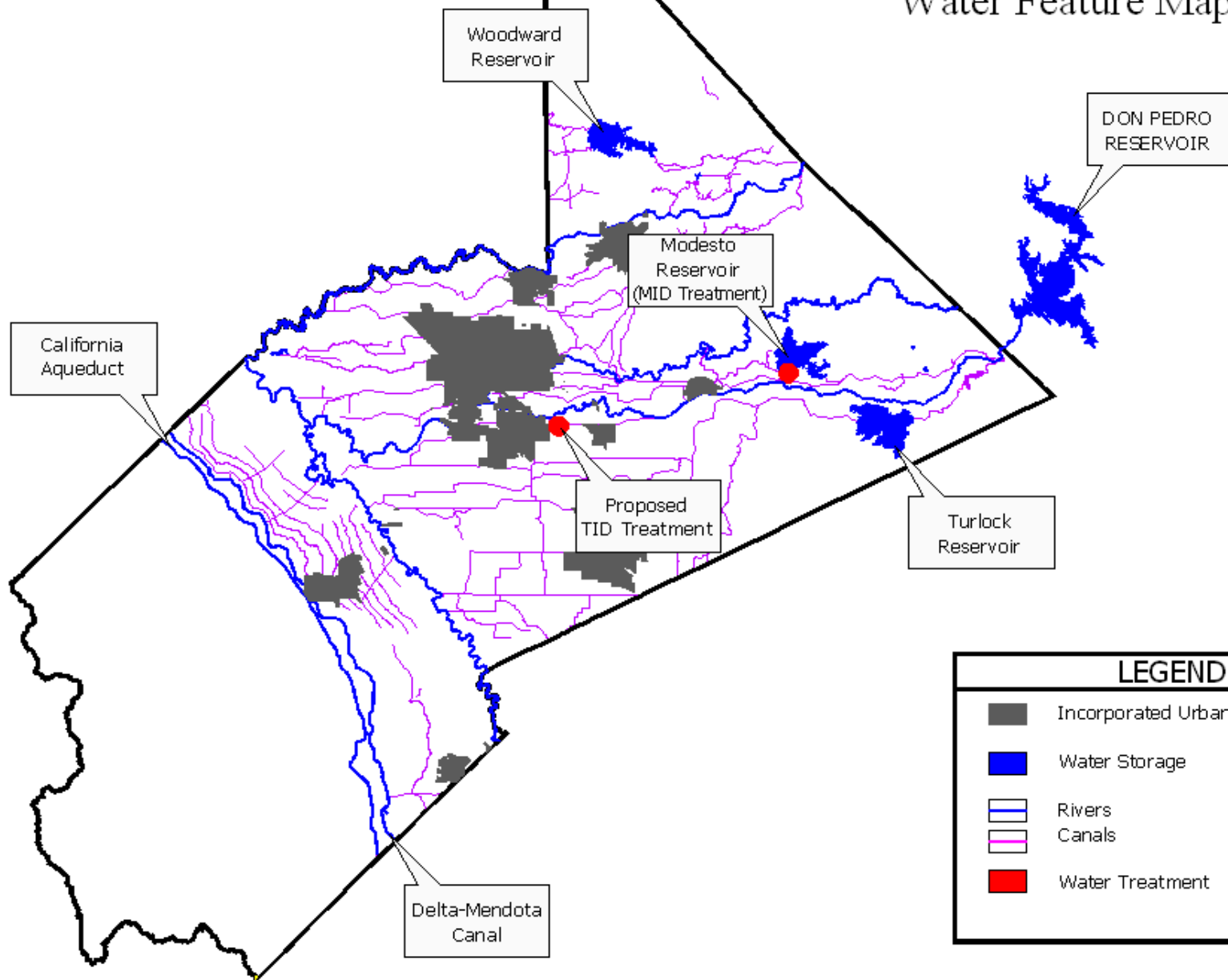







July 2007



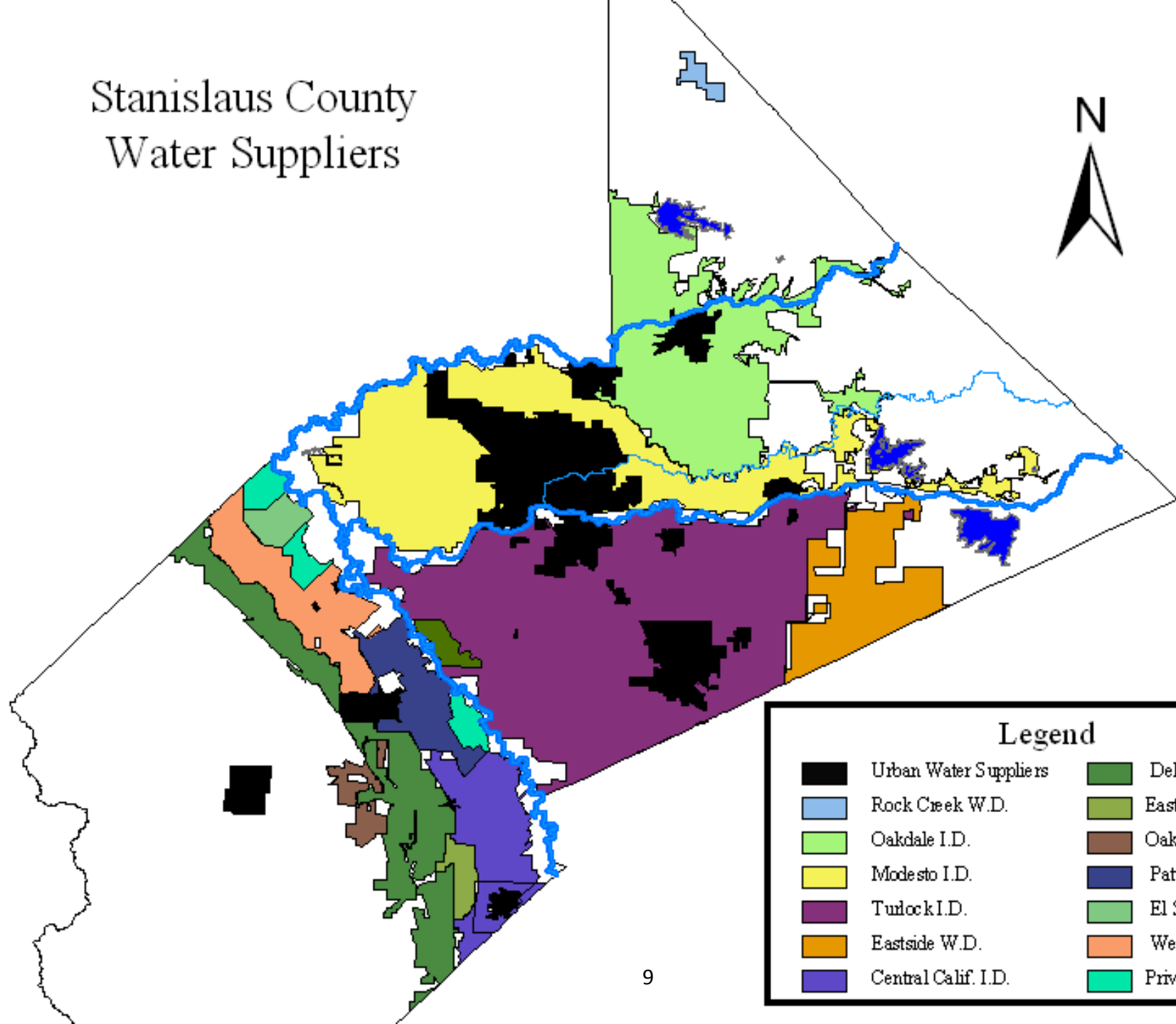
STANISLAUS COUNTY

Water Feature Map



LEGEND	
	Incorporated Urbanized Area
	Water Storage
	Rivers
	Canals
	Water Treatment

Stanislaus County Water Suppliers

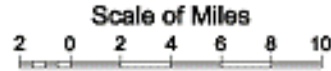


Black	Urban Water Suppliers	Dark Green	Del Puerto W.D.
Light Blue	Rock Creek W.D.	Light Green	Eastin W.D.
Light Green	Oakdale I.D.	Brown	Oak Flat W.D.
Yellow	Modesto I.D.	Dark Blue	Patterson I.D.
Purple	Turlock I.D.	Light Green	El Solys W.D.
Orange	Eastside W.D.	Light Orange	West Stanislaus I.D.
Dark Purple	Central Calif. I.D.	Cyan	Private W.D.

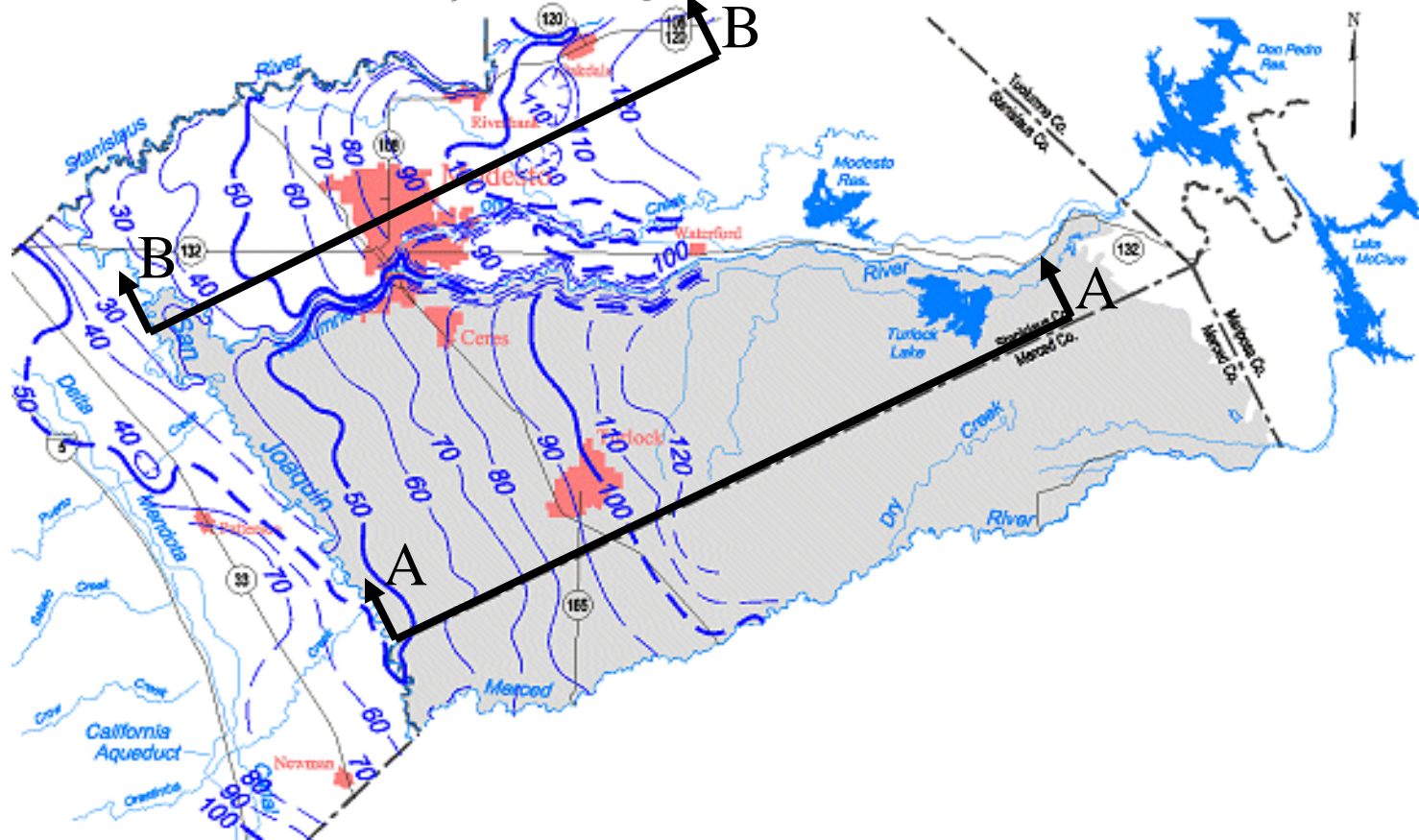
Groundwater Level Monitoring

Stanislaus County Groundwater

Spring 1958, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer



Disclaimer: Base map created from current USGS 1:24,000 and 1:100,000 maps. Some base map features may not have been present (i.e. roads, canals, reservoirs) for the water year shown.

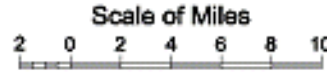


Contours are dashed where inferred. Contour interval is 10 feet.

http://www.sjd.water.ca.gov/groundwater/basin_maps/index.cfm

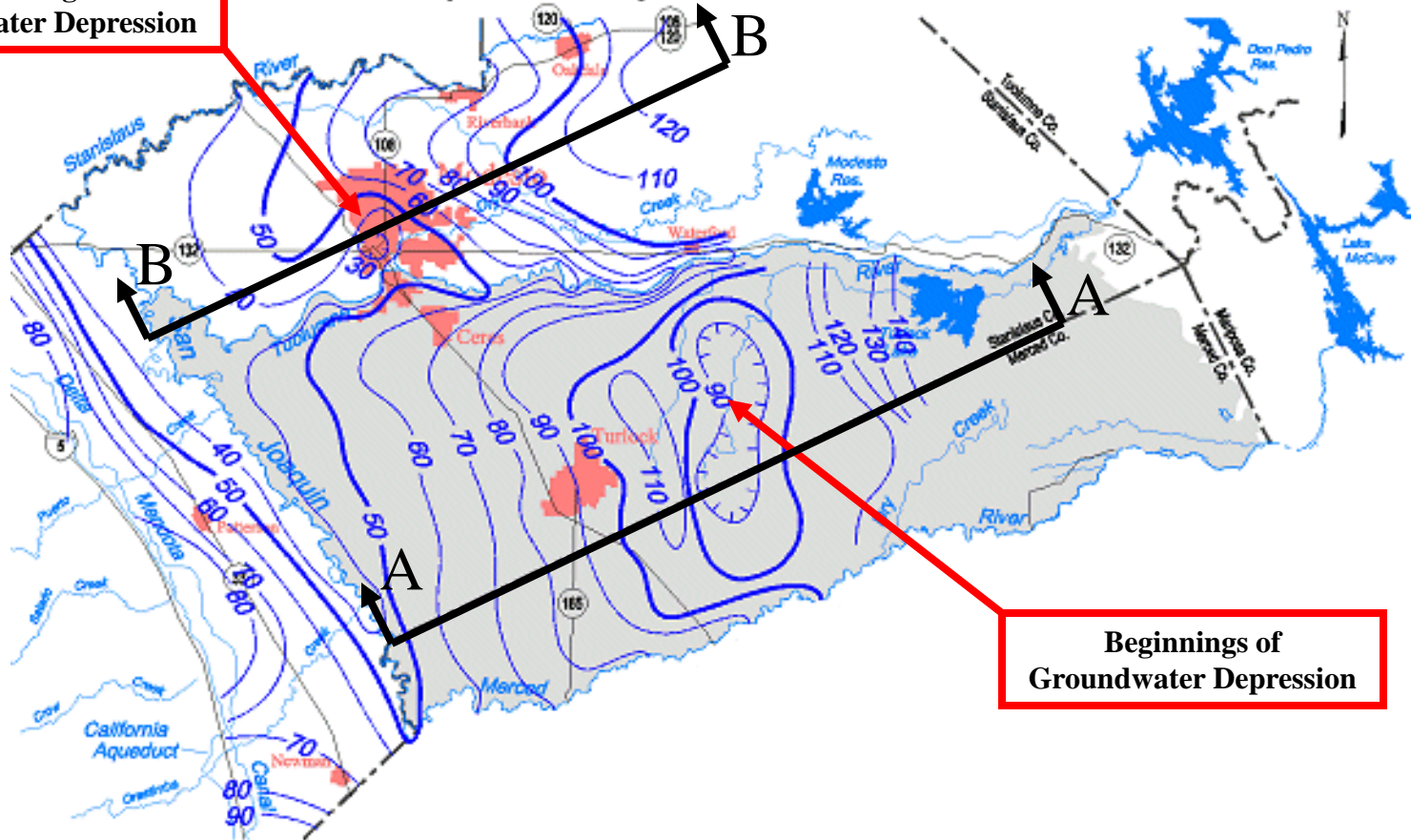
Stanislaus County Groundwater

Spring 1976, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer



Disclaimer: Base map created from current USGS 1:24,000 and 1:100,000 maps. Some base map features may not have been present (i.e. roads, canals, reservoirs) for the water year shown.

Beginnings of Groundwater Depression



Beginnings of Groundwater Depression

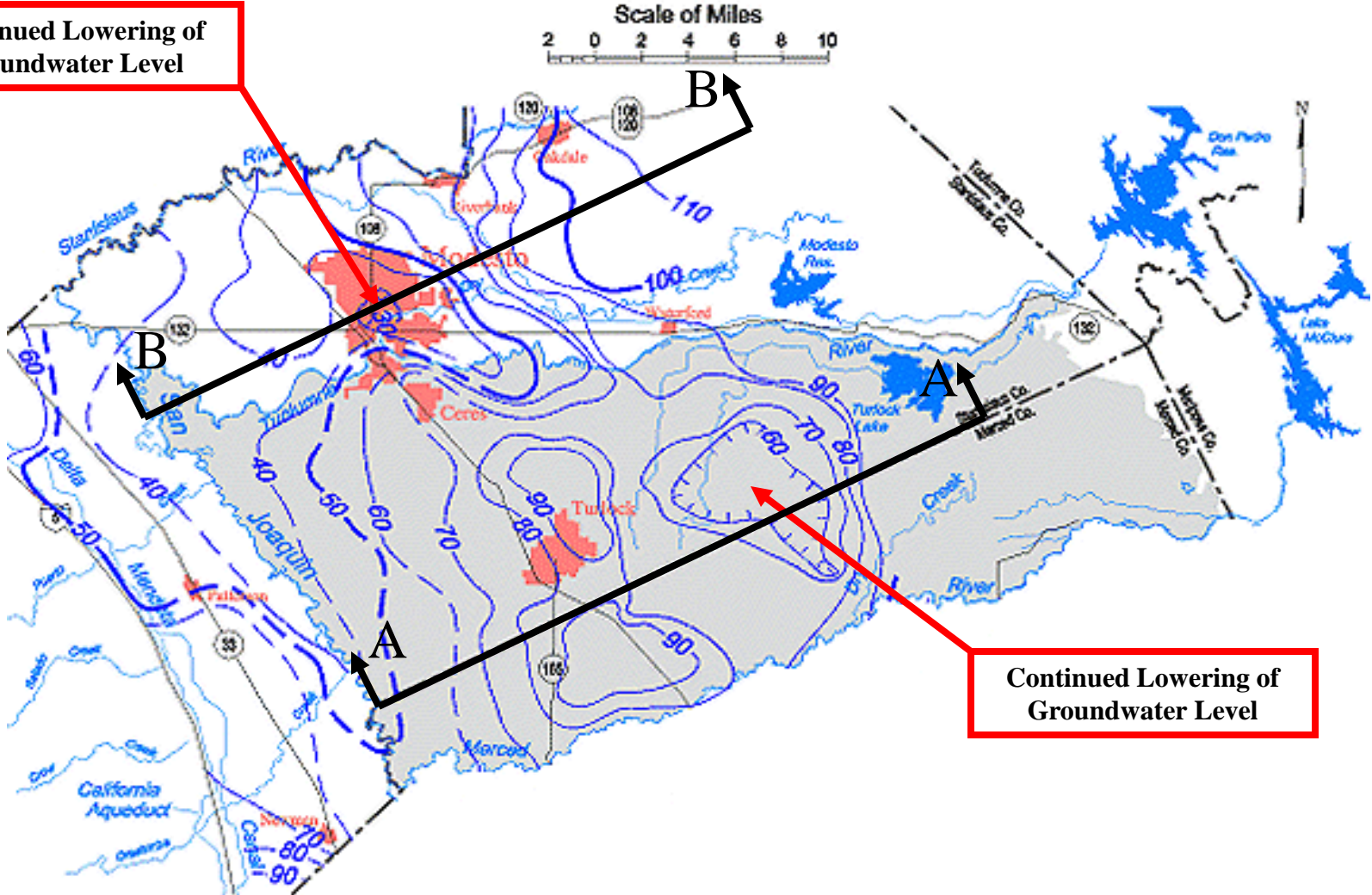
Contours are dashed where inferred. Contour interval is 10 feet.

http://www.sjd.water.ca.gov/groundwater/basin_maps/index.cfm

Stanislaus County Groundwater

Spring 1996, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

Continued Lowering of Groundwater Level



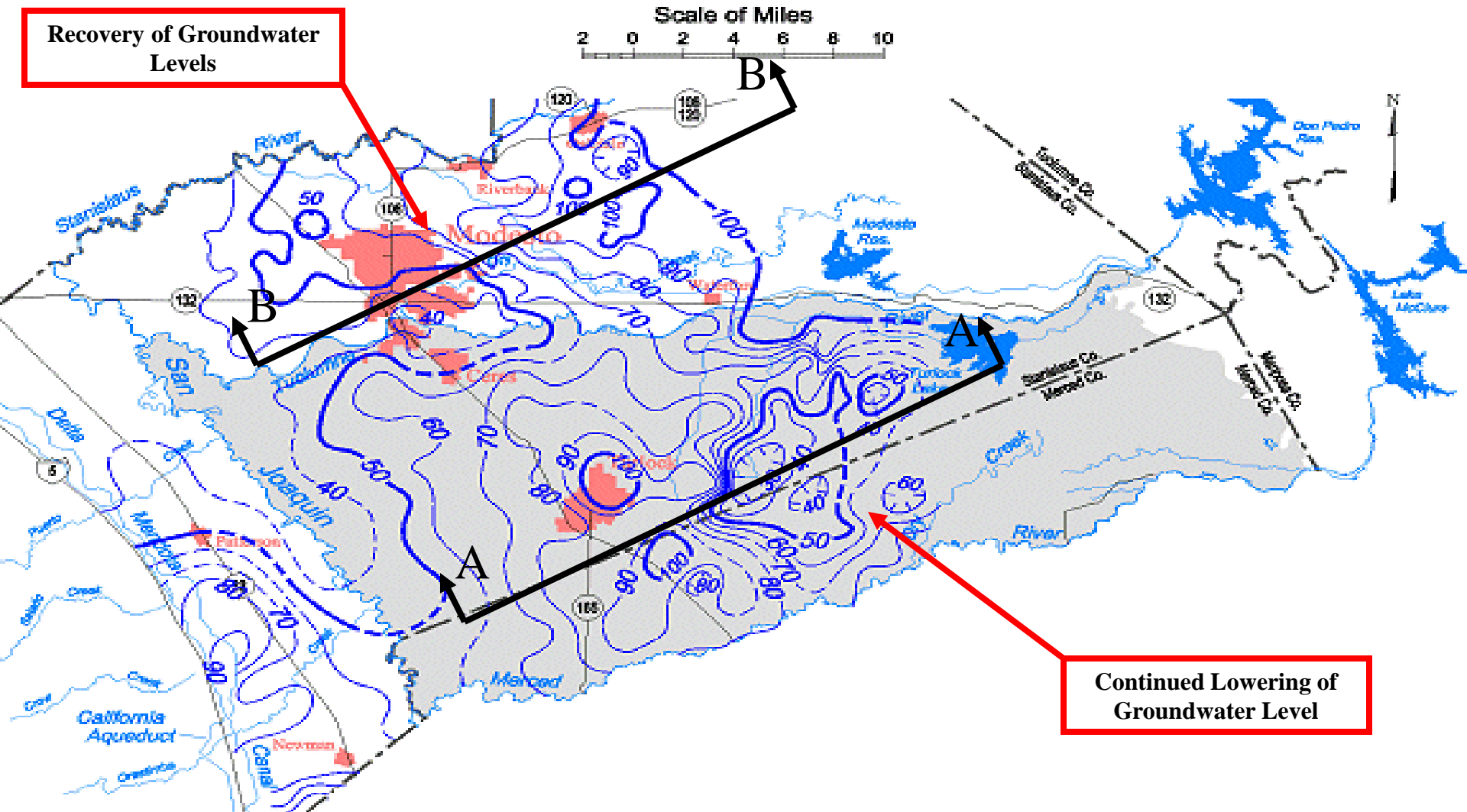
Continued Lowering of Groundwater Level

Contours are dashed where inferred. Contour interval is 10 feet.

http://www.sjd.water.ca.gov/groundwater/basin_maps/index.cfm

Stanislaus County Groundwater

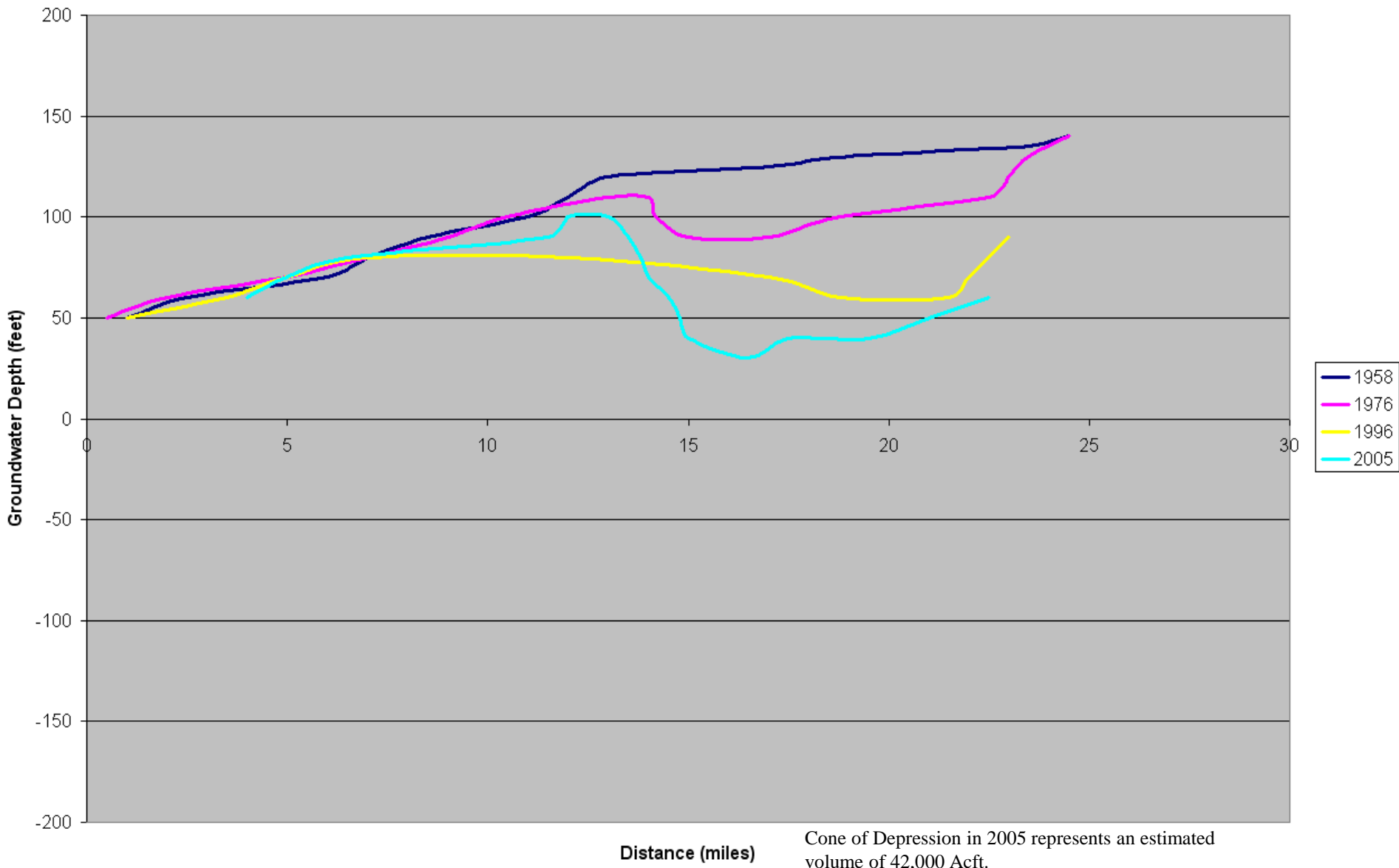
Spring 2005, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer



Contours are dashed where inferred. Contour interval is 10 feet.

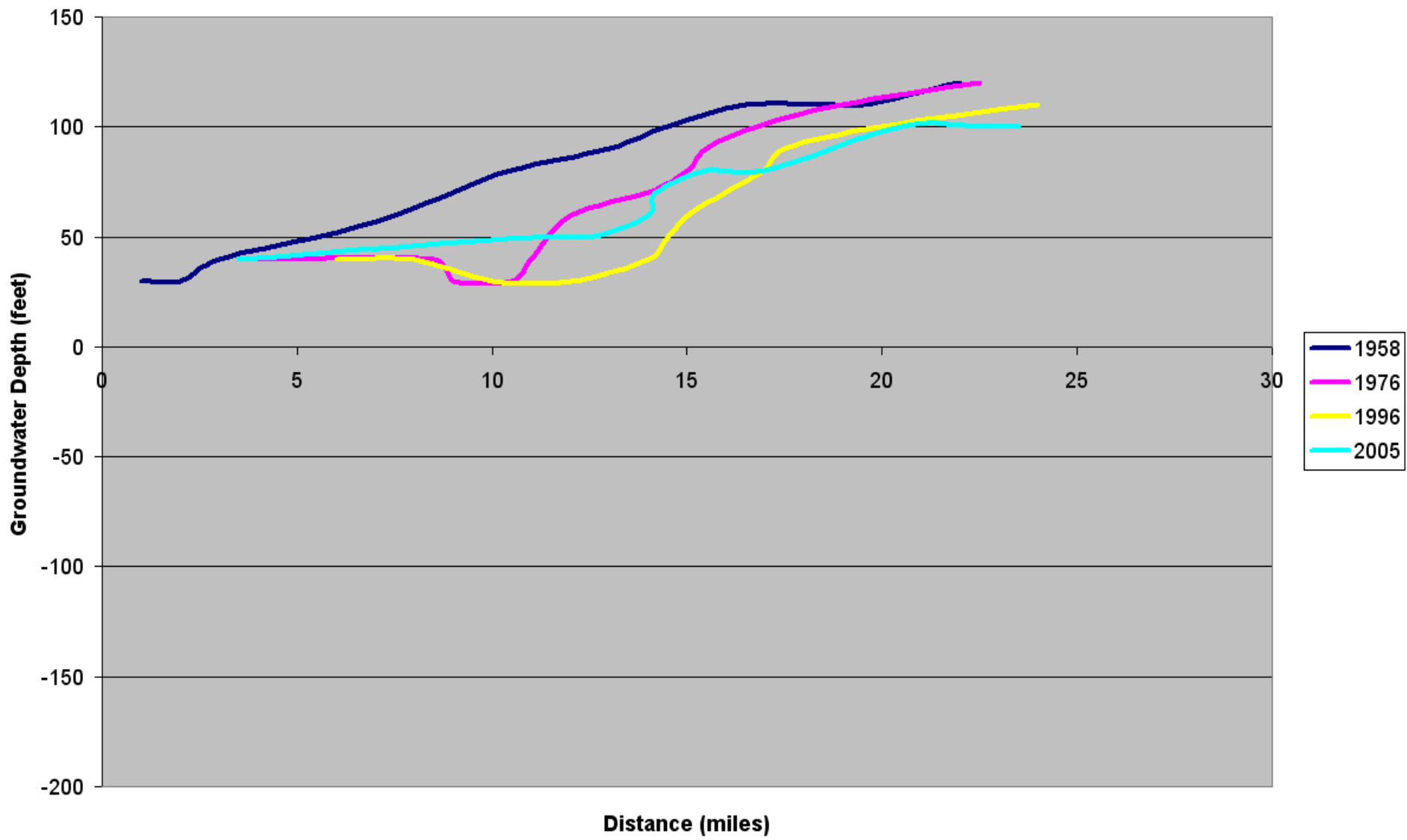
http://www.sjd.water.ca.gov/groundwater/basin_maps/index.cfm

Turlock Area Groundwater Levels Section A



Cone of Depression in 2005 represents an estimated volume of 42,000 Acft.

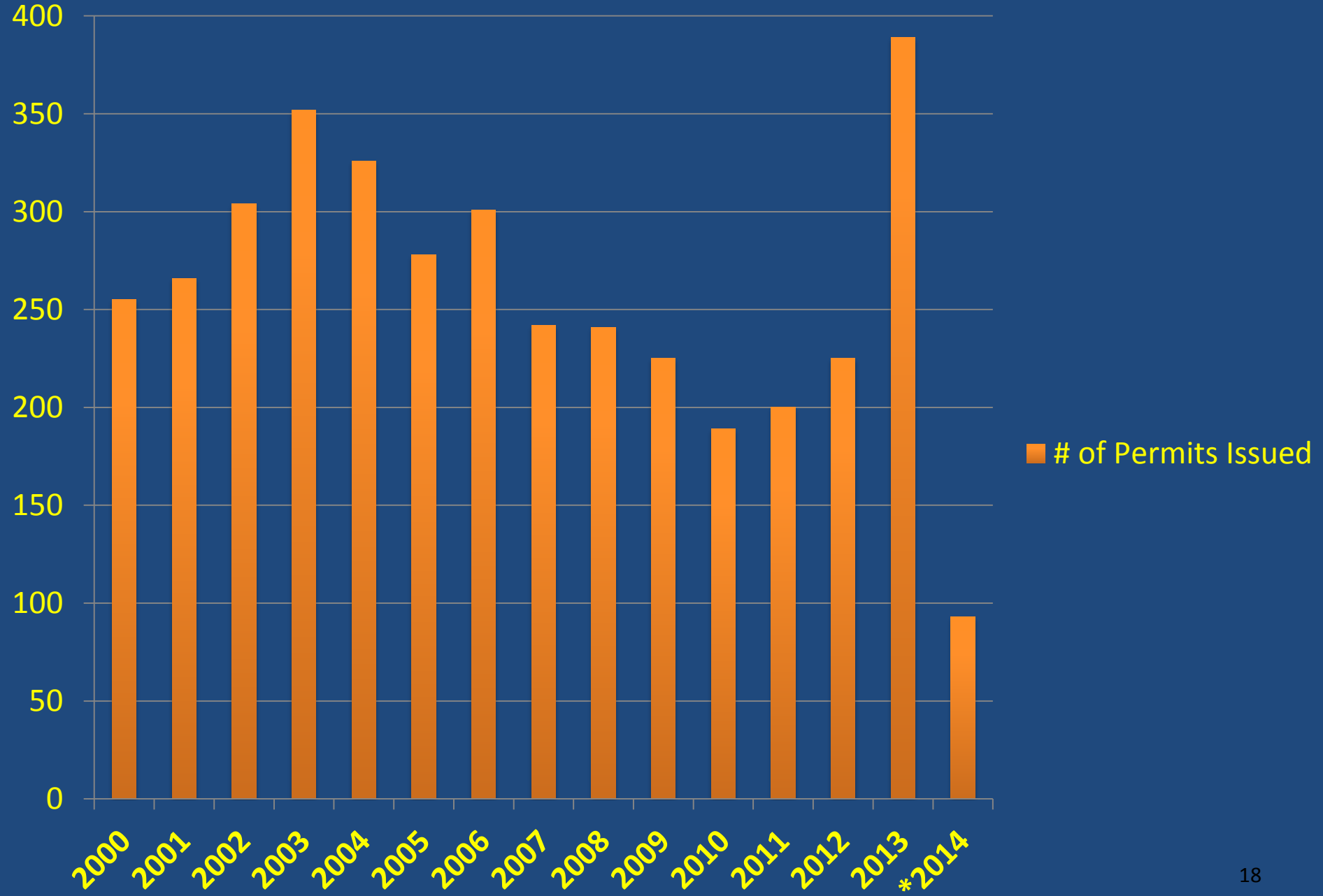
Modesto Area Groundwater Levels Section B



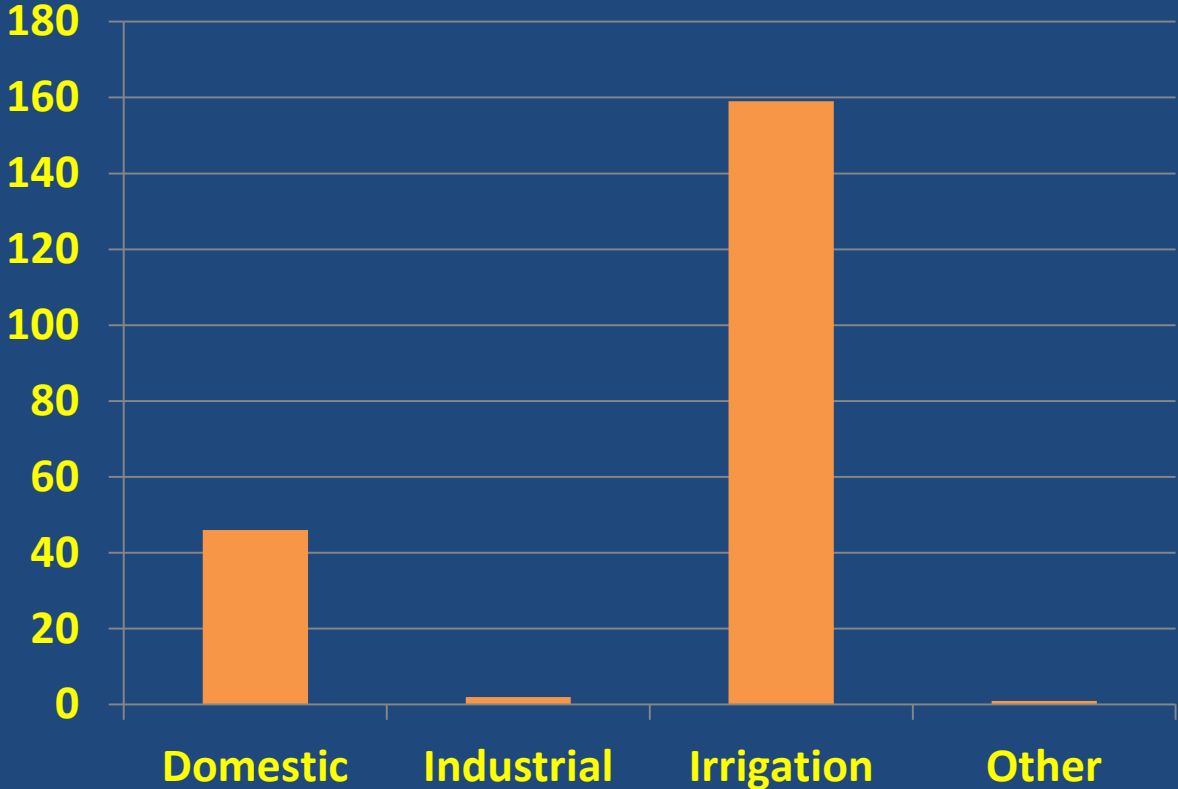
Cause for Concern

- Drought
 - Three years running
 - 1976-1977
 - 1987-1992
- Land conversion
 - Rangeland to Tree Orchards & Vineyards
- Groundwater Development
 - Large diameter (capacity) wells drilled
- Well Interference
 - Drawdown impacts to existing users
- Sustainability??

Well Construction Permits Issued Annually

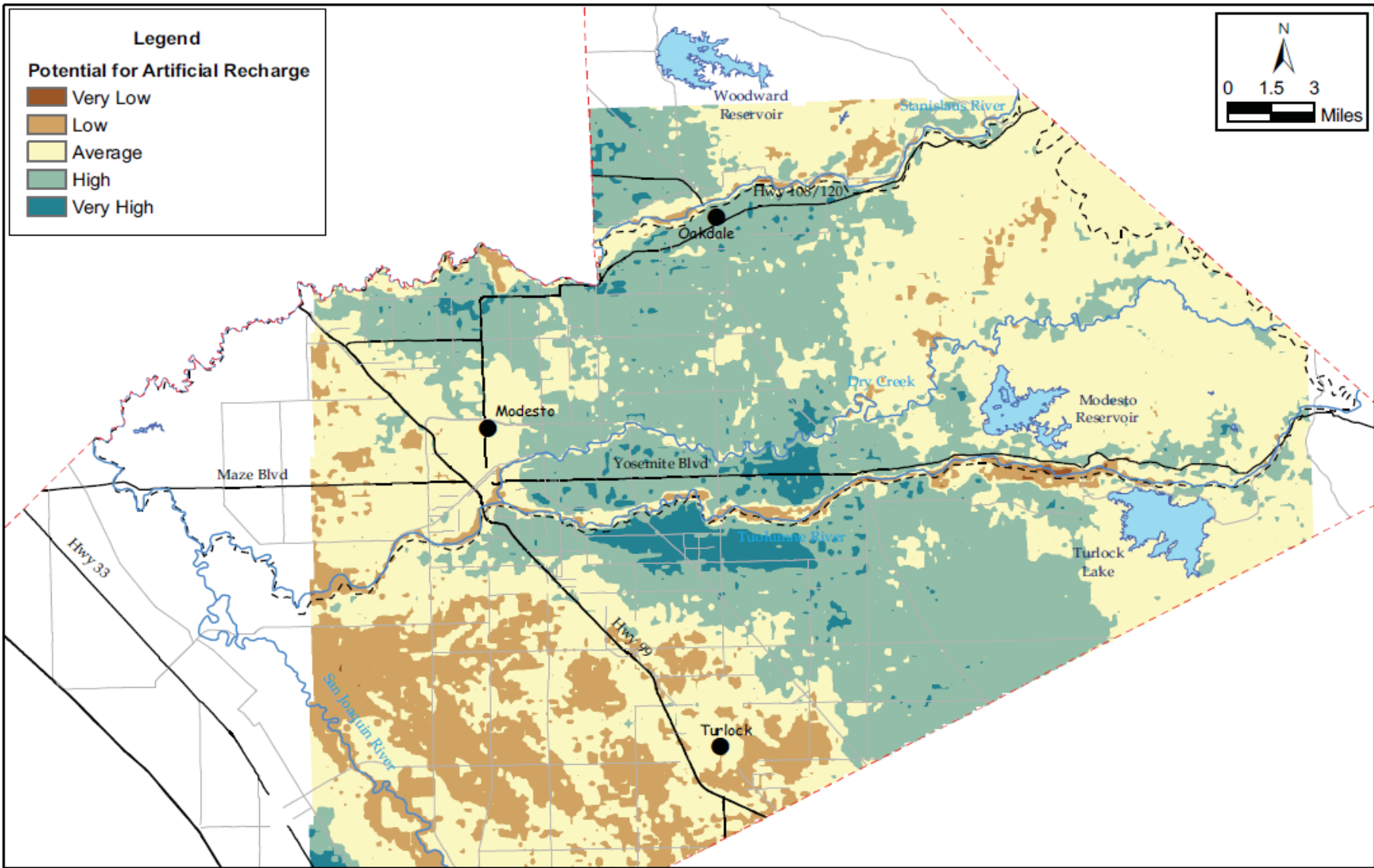


Well Construction Permits Issued in the Northeast County Foothills Area in 2013



GENERAL FINDINGS

- **Semi-Arid climate (12 inches average annual rainfall; 10% recharge).**
- **All water use classes, primarily urban and agricultural, are dependent on groundwater supplies, in whole or in part (City of Modesto sole exception).**
- **Well managed surface water supplies exist in most of the County for most year types (surface water storage reservoirs).**
- **Primary means of groundwater recharge in the County is via the application of applied surface water for agricultural irrigation purposes.**
- **Flood irrigation methodology has been shown to be the best means of recharge.**
- **There are localized issues with groundwater quality and water levels which need to be addressed.**



Potential for Artificial Recharge

STRGBA Recharge Analysis

February 2007

Figure 10

Northeast County Foothills Area

- No developed, or very little, surface water supply
- Located in an hydrogeologically vulnerable area (aquifer margin, up gradient, poor recharge)
- Very little known hydrogeologic data
 - Water levels
 - Aquifer characteristics
 - Withdrawal quantity

Summary Comparison

Groundwater Management Elements	Water Provider Service Areas	Northeast County Foothills Area
Thresholds	Yes	No
Monitoring	Yes	No
Funding	Yes	No
Governance	Yes	No
Enforcement	Yes	No



Power Hydrodynamics Inc.

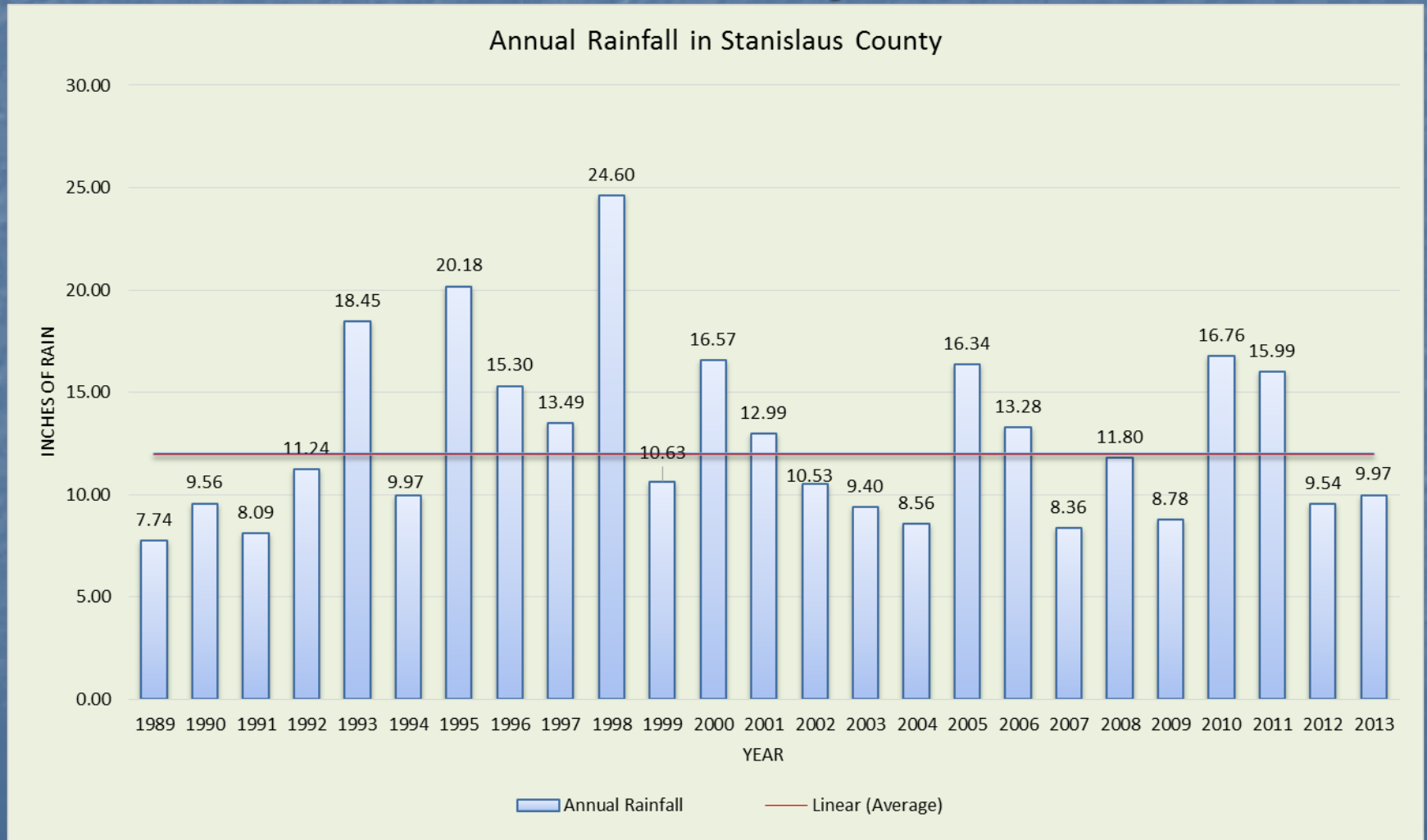
Stanislaus County Ground Water

The Facts about our Aquifer.

Introduction

- Bill Power of Power Hydrodynamics, Inc.
- Twenty four years of experience with Energy and Water Conservation
- Certified Pump Specialist, Certified Energy Manager, Certified Agricultural Irrigation Specialist
- Over 29,000 pumps tested in the last 24 years

Historic Rainfall for Stanislaus County



Topics Covered

- Aquifers
- Wells
- Water Levels in the Oakdale Area
- Water levels in other areas of the county

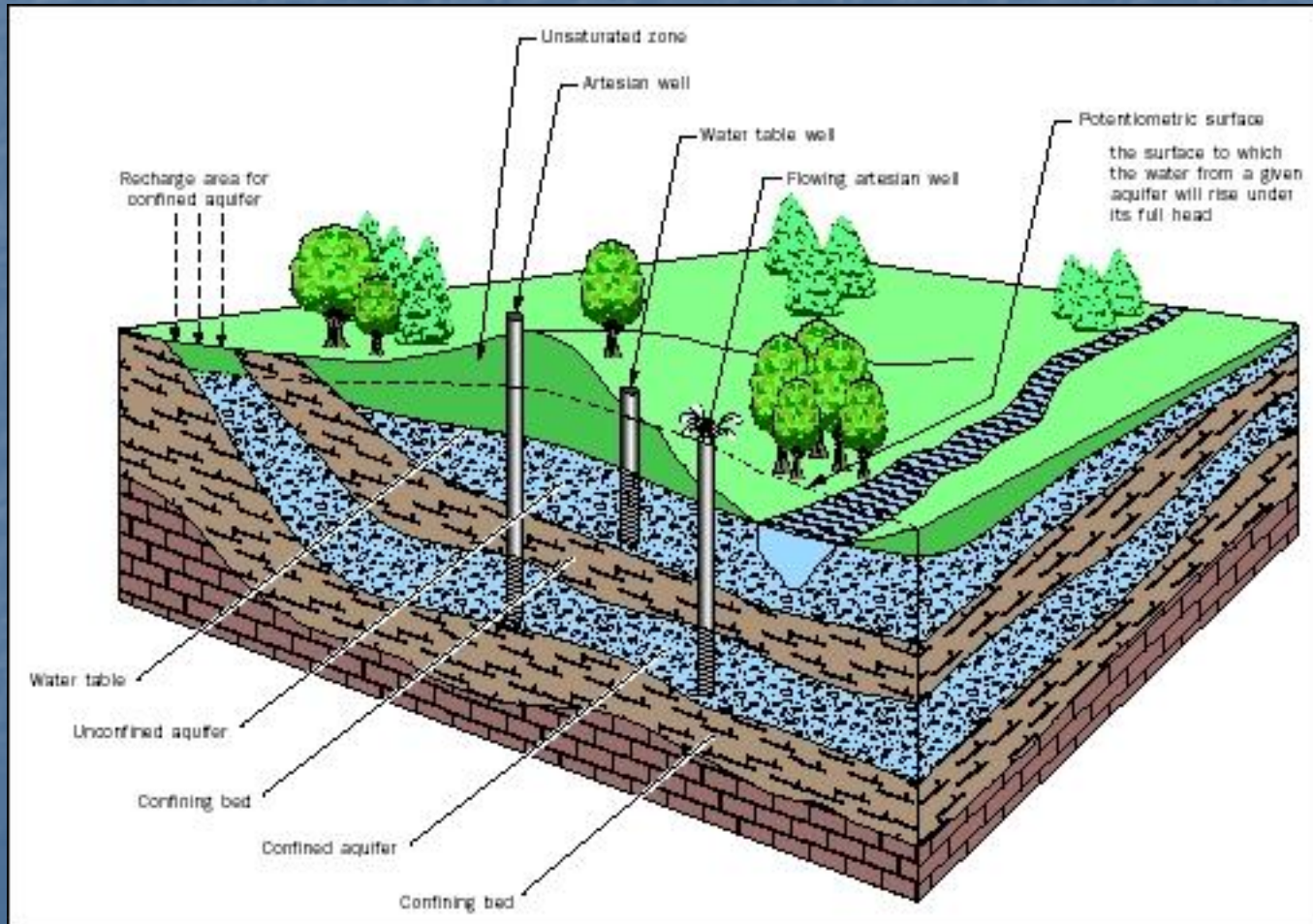
Key terms to remember

- Standing Water Level (SWL)
- Pumping Water Level (PWL)
- Specific Capacity (Well Yield)
- Strata's

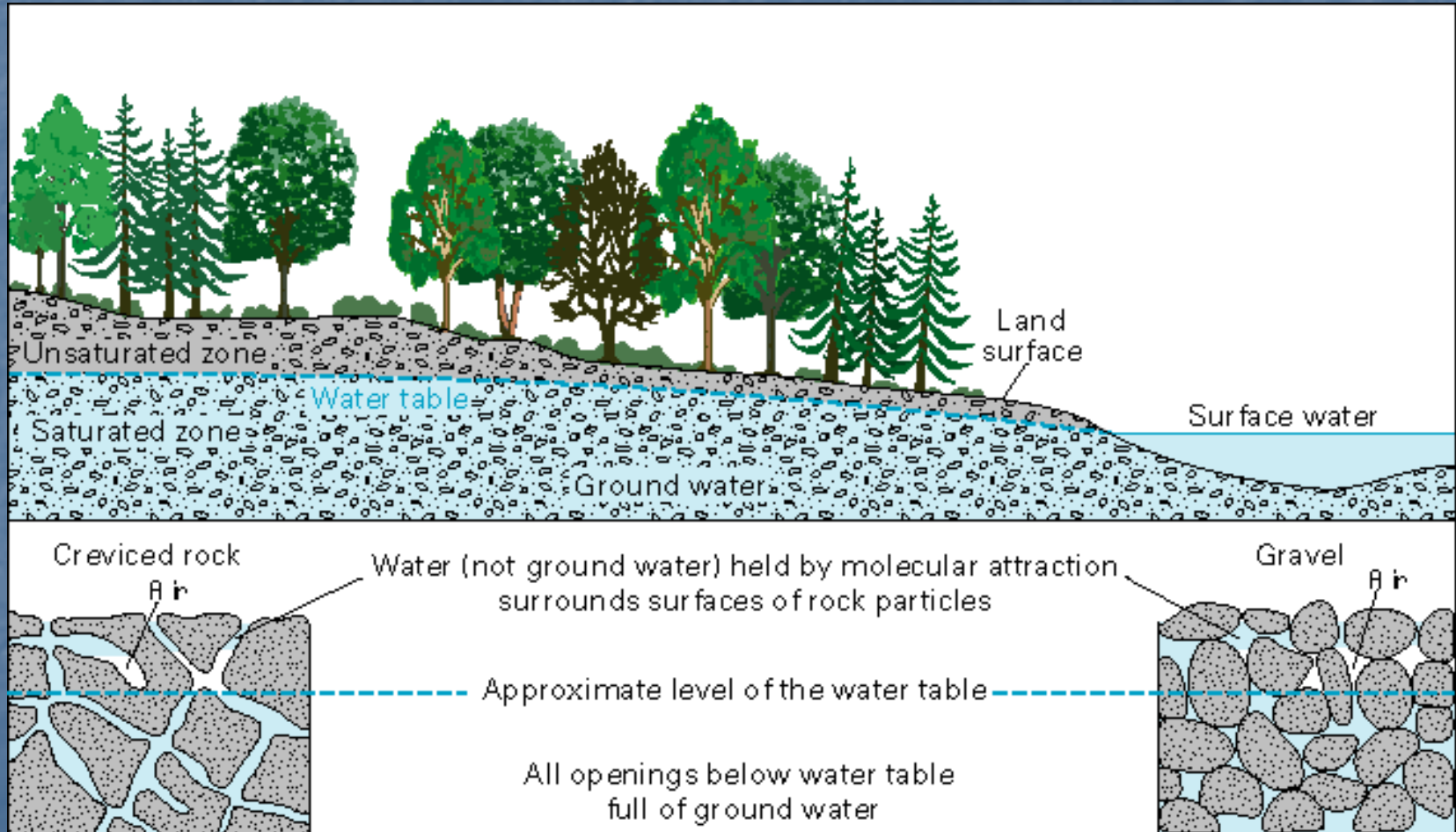
Key parts of a well

- Hole
- Casing
- Column
- Screened or perforated casing

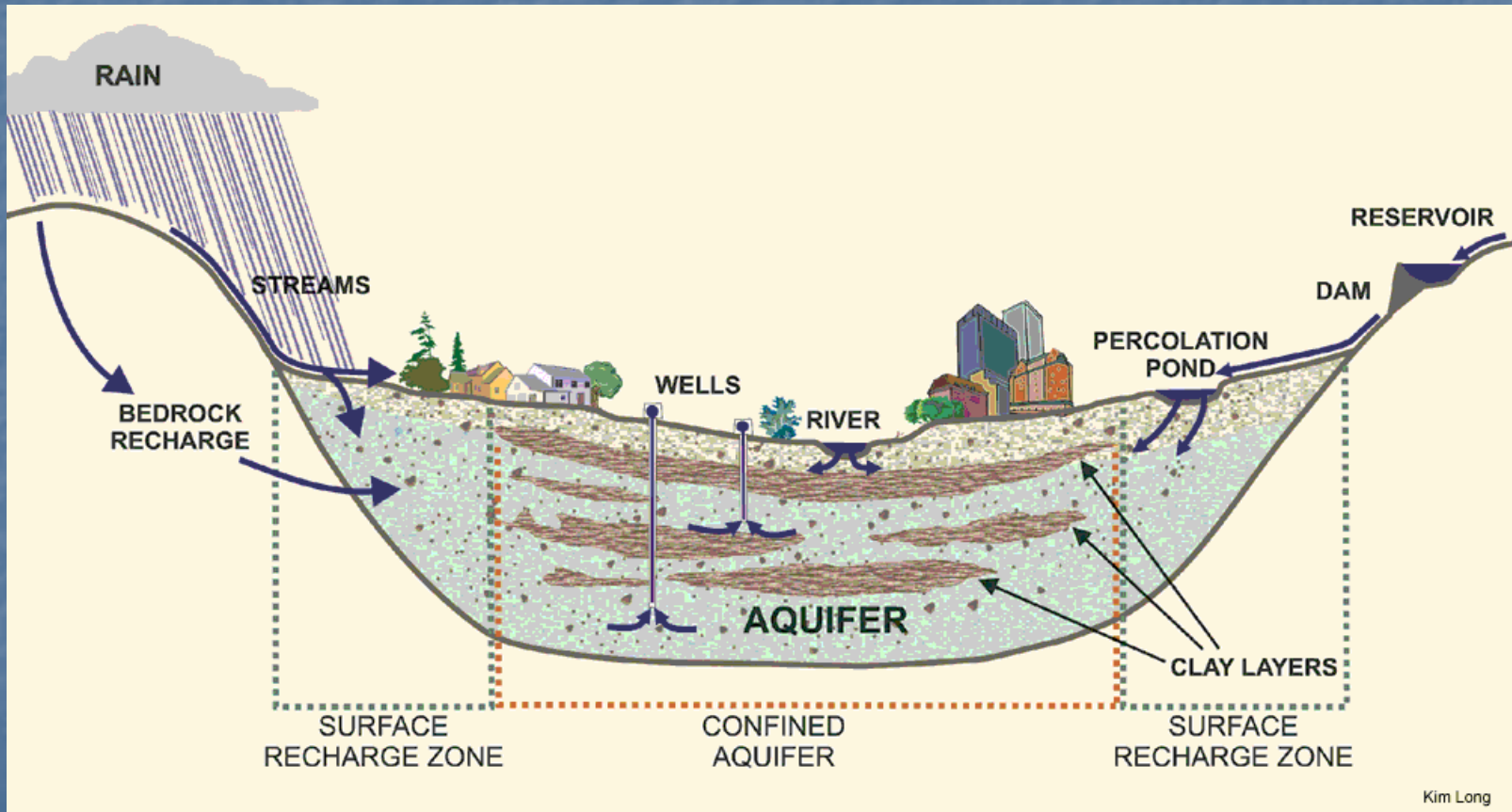
Aquifers



Aquifers



How water gets into our Aquifer

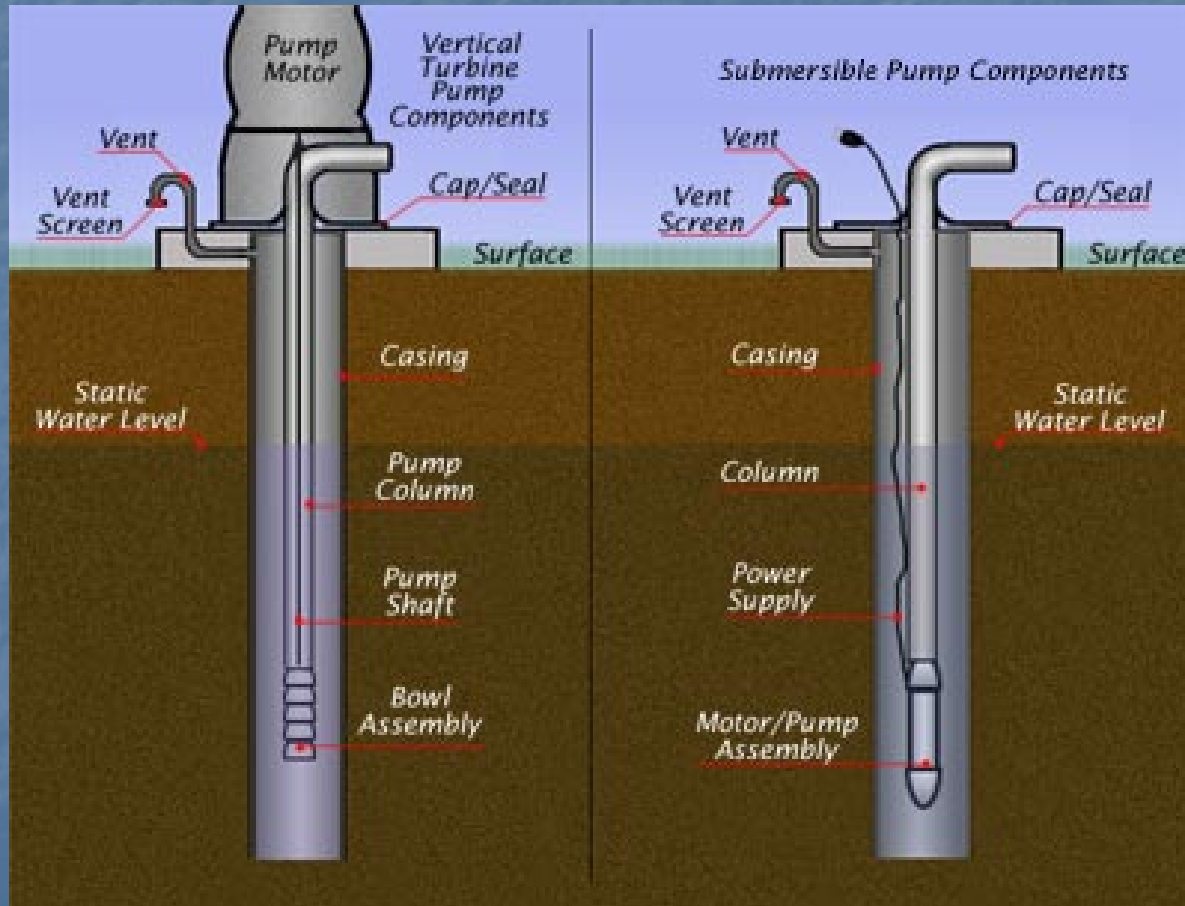


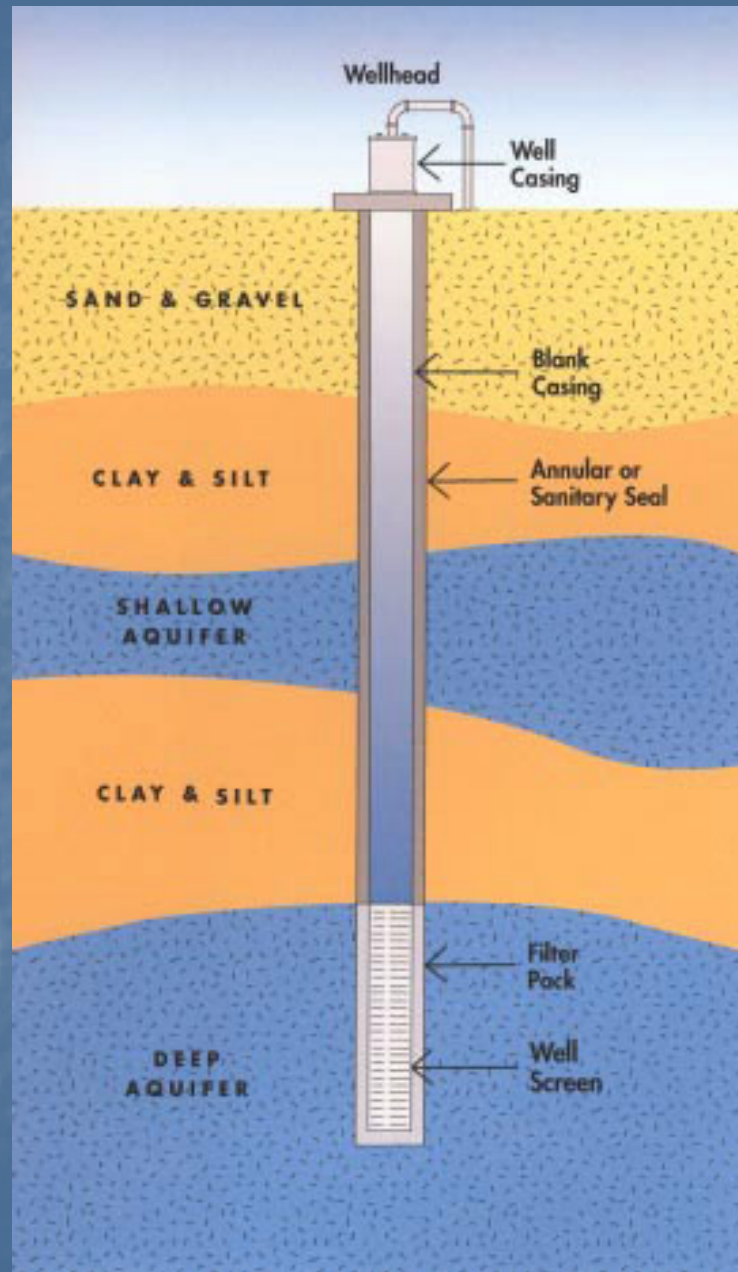
So what does this mean?

- Standing water level of ag pump 160.0 feet
- Standing water level of domestic pump 44.0 feet
- These two measurements $\frac{1}{4}$ mile apart February 2014

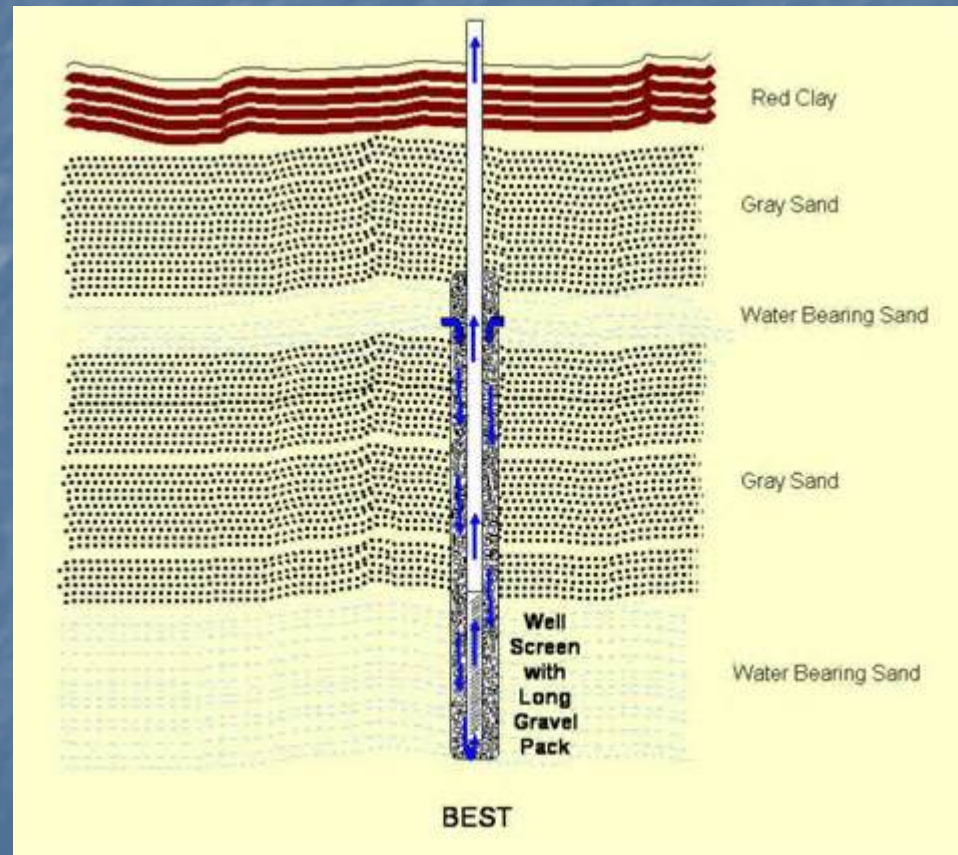
Why Are Some Pumps Running
Out of Water?

What goes into a well?

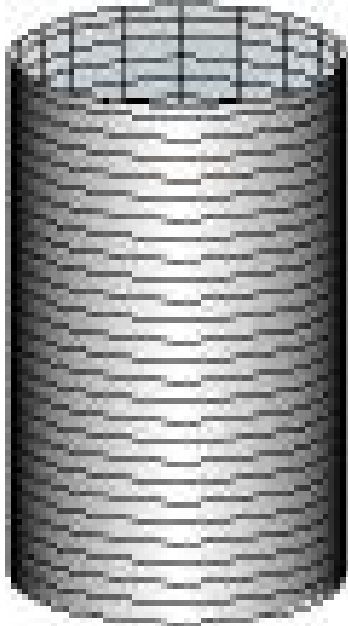




What is the goal of the well driller?



Types of perforations



Continuous
Slot



Machine
Slotted



Perforated

Perforated



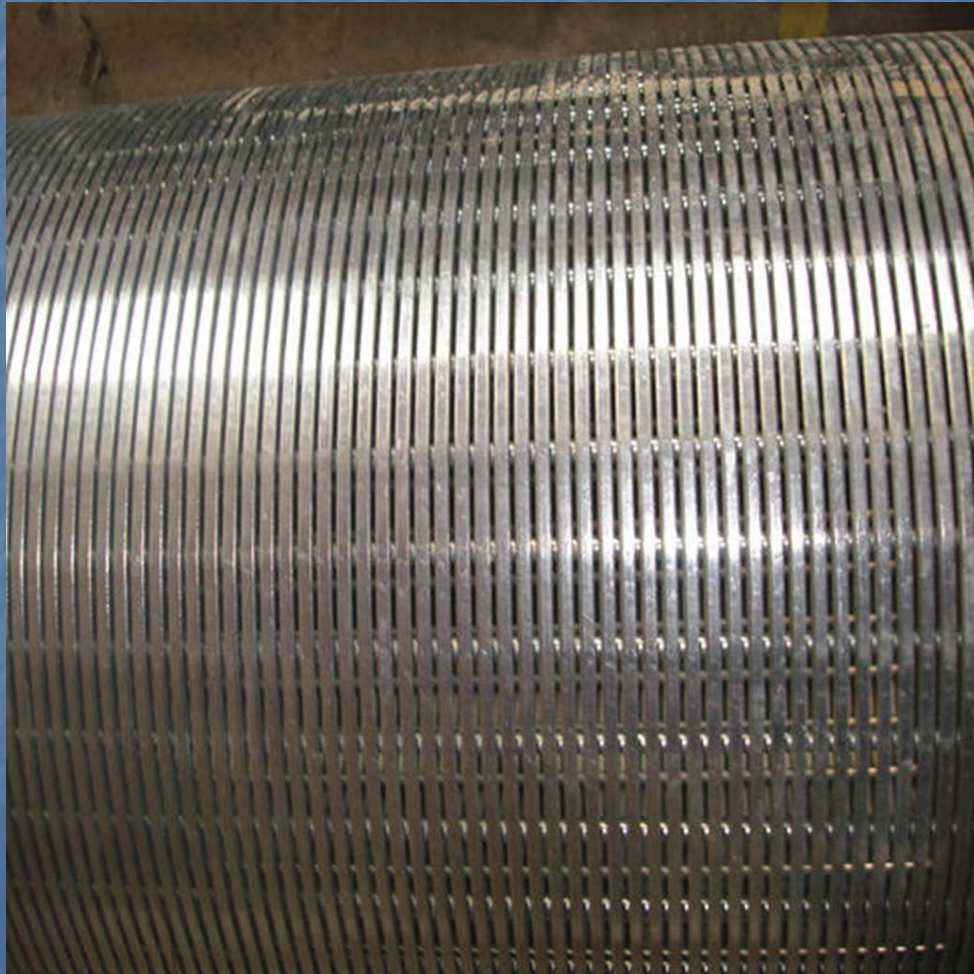
Slotted Steel



Slotted PVC



Continuous Slot



What can go wrong?

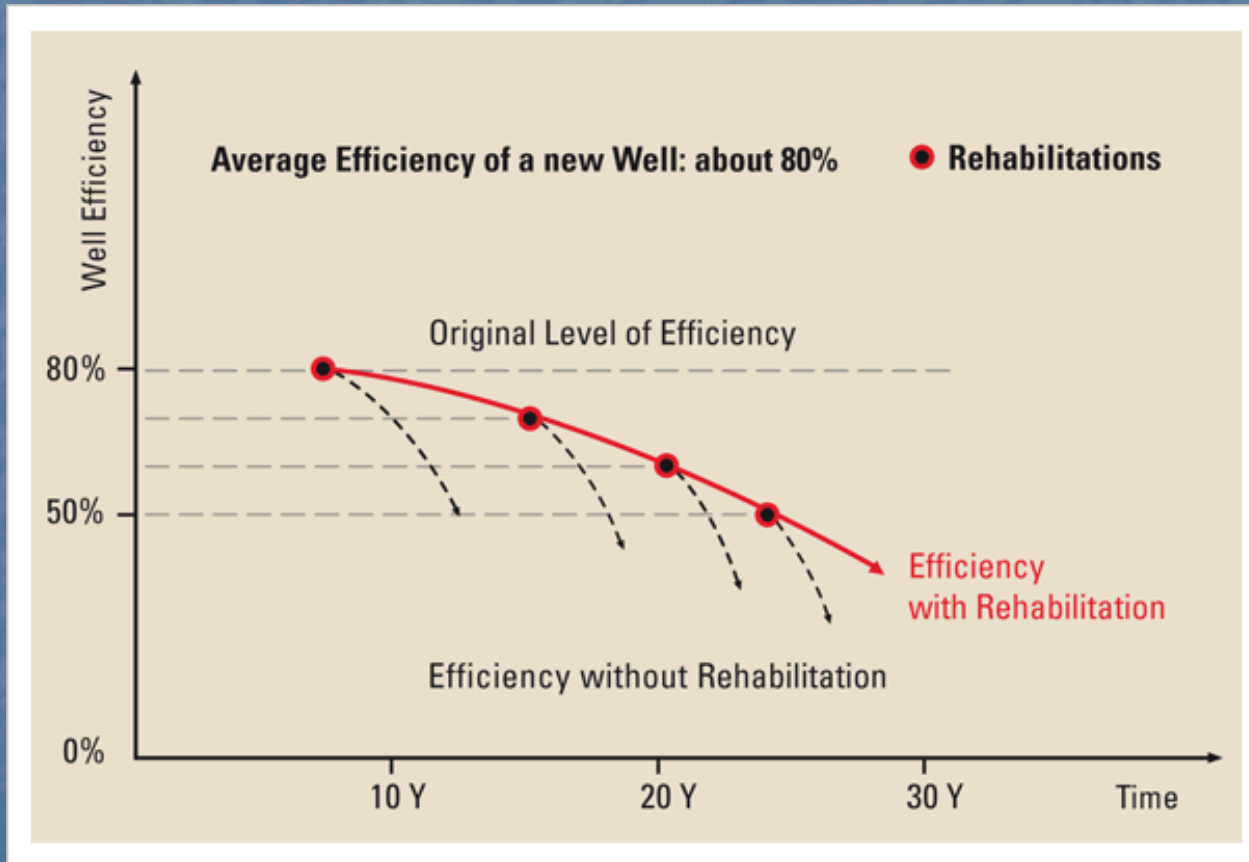
- Iron Bacteria



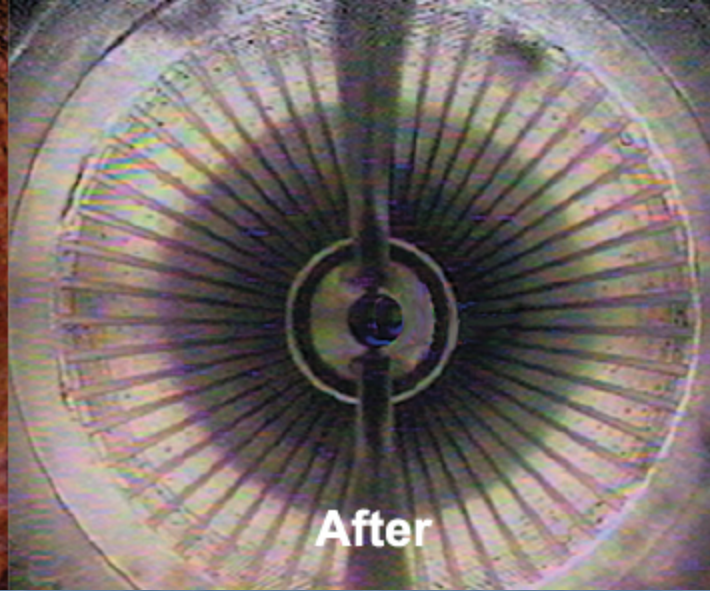
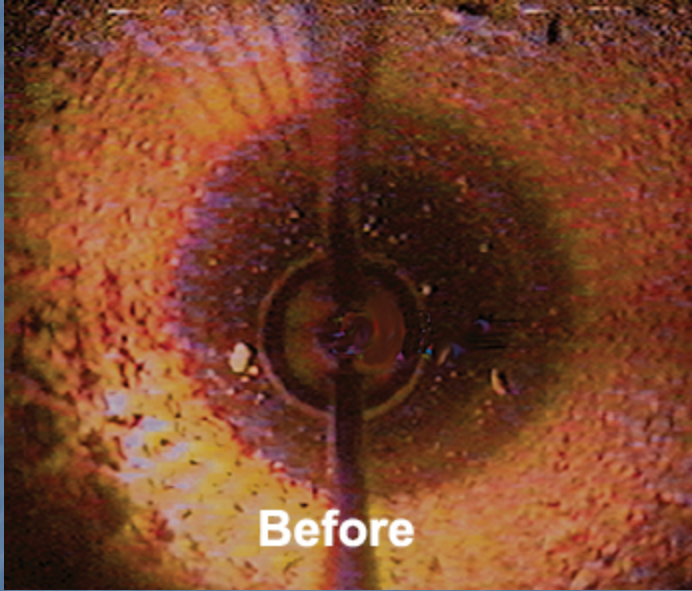
Rust



What this does to your well



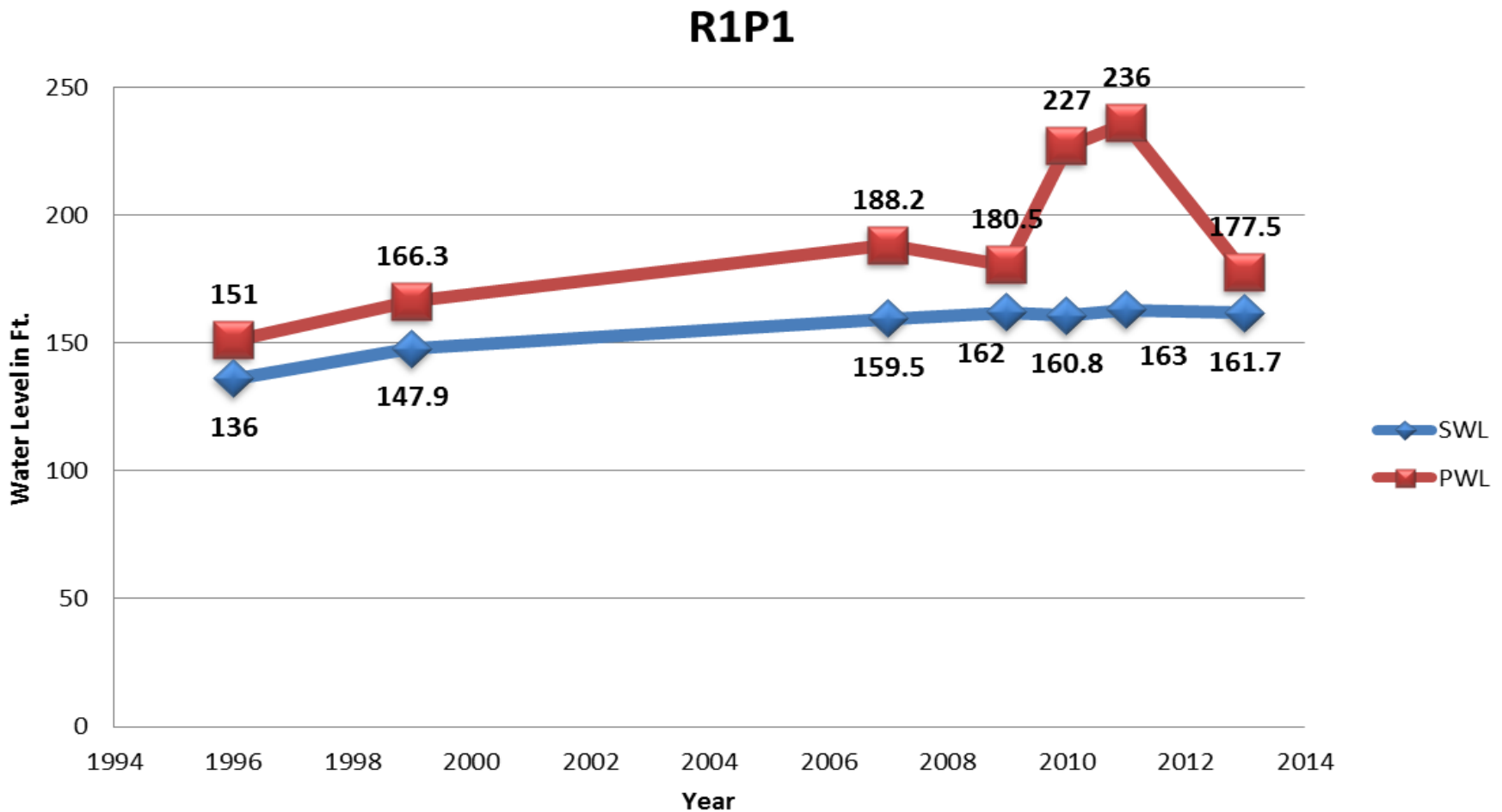
How do you fix this?



How do I know if I have a well problem?

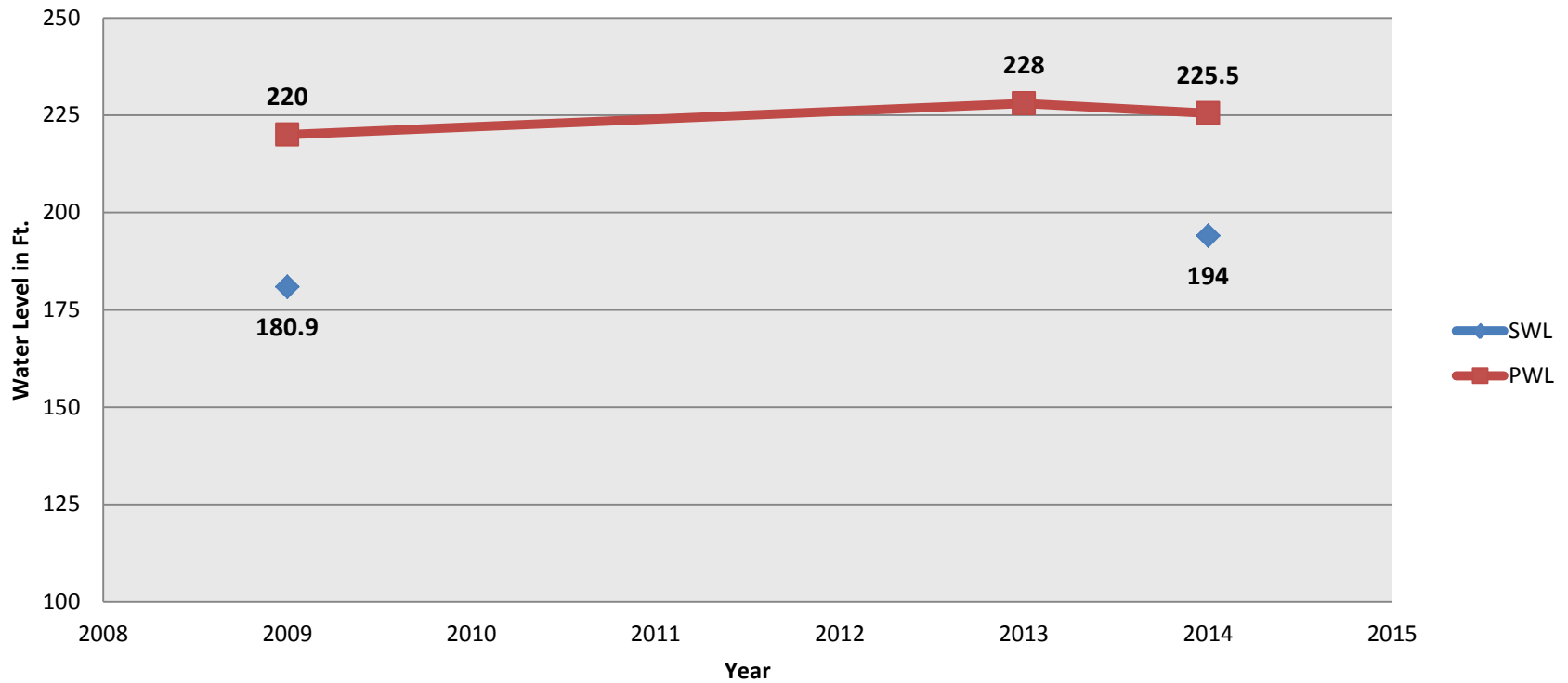
- Your pumping water level keeps getting deeper while your standing water level stays the same.
- You run out of water.
- You had your well inspected and the video showed clogging.

What does this look like over time

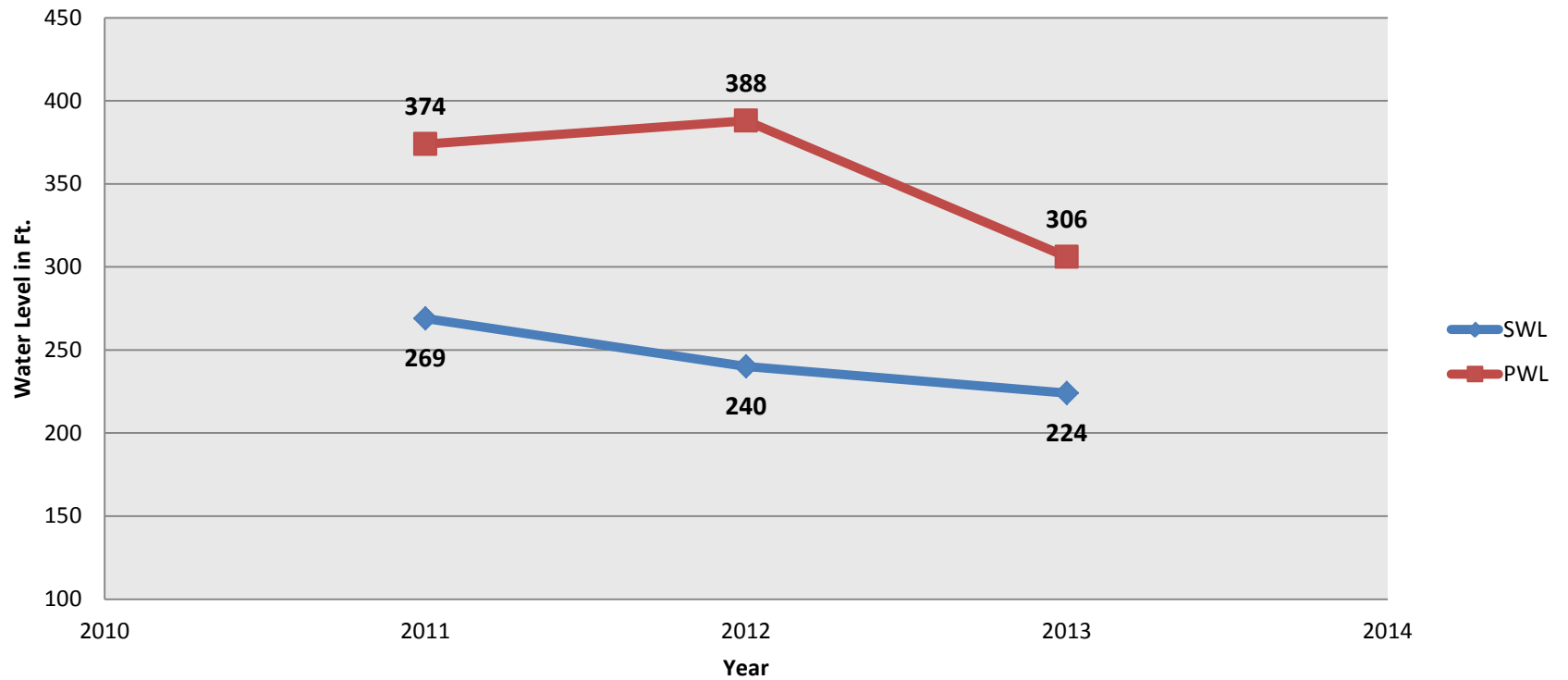


Oakdale Area

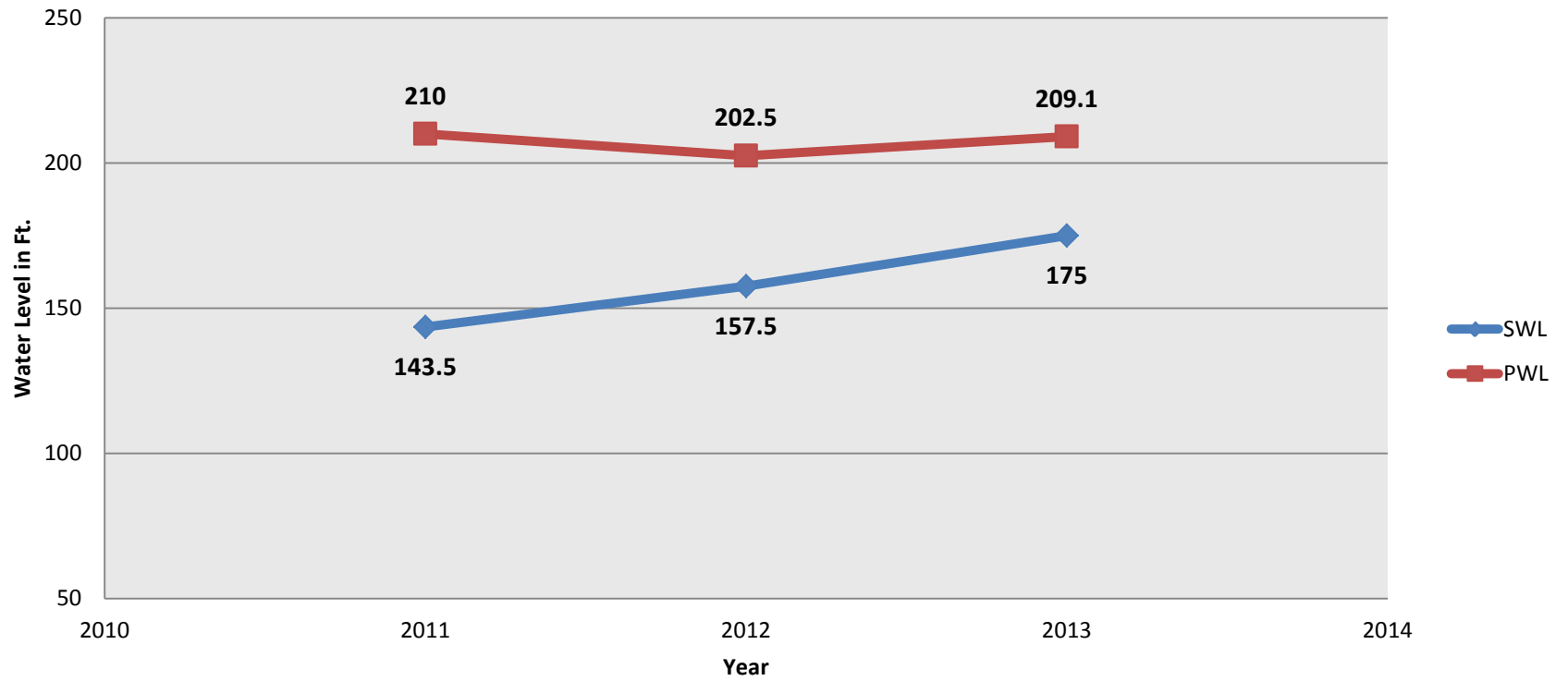
Claribel Road 8 Miles Out of Town



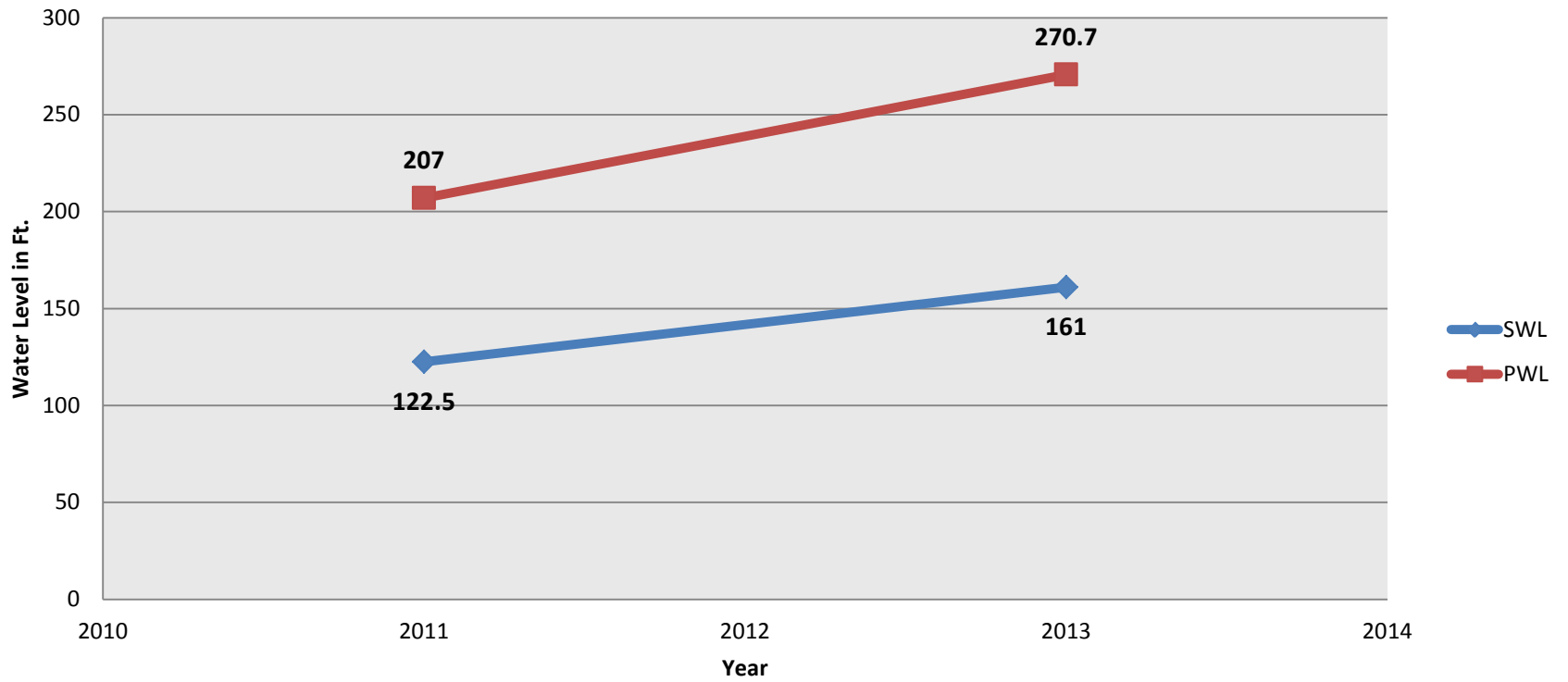
Warnerville Road #1 11 Miles Out of Town



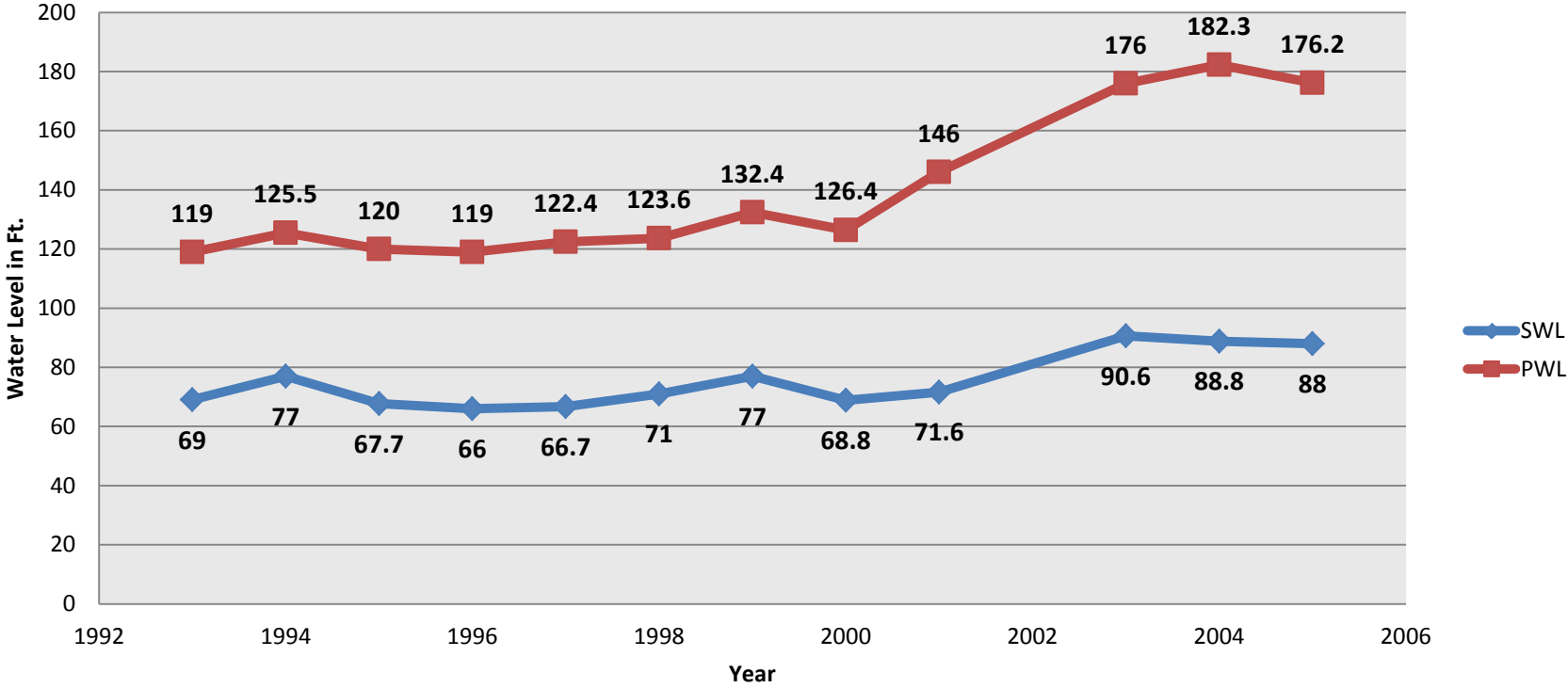
Warnerville Road #2 11 Miles Out of Town



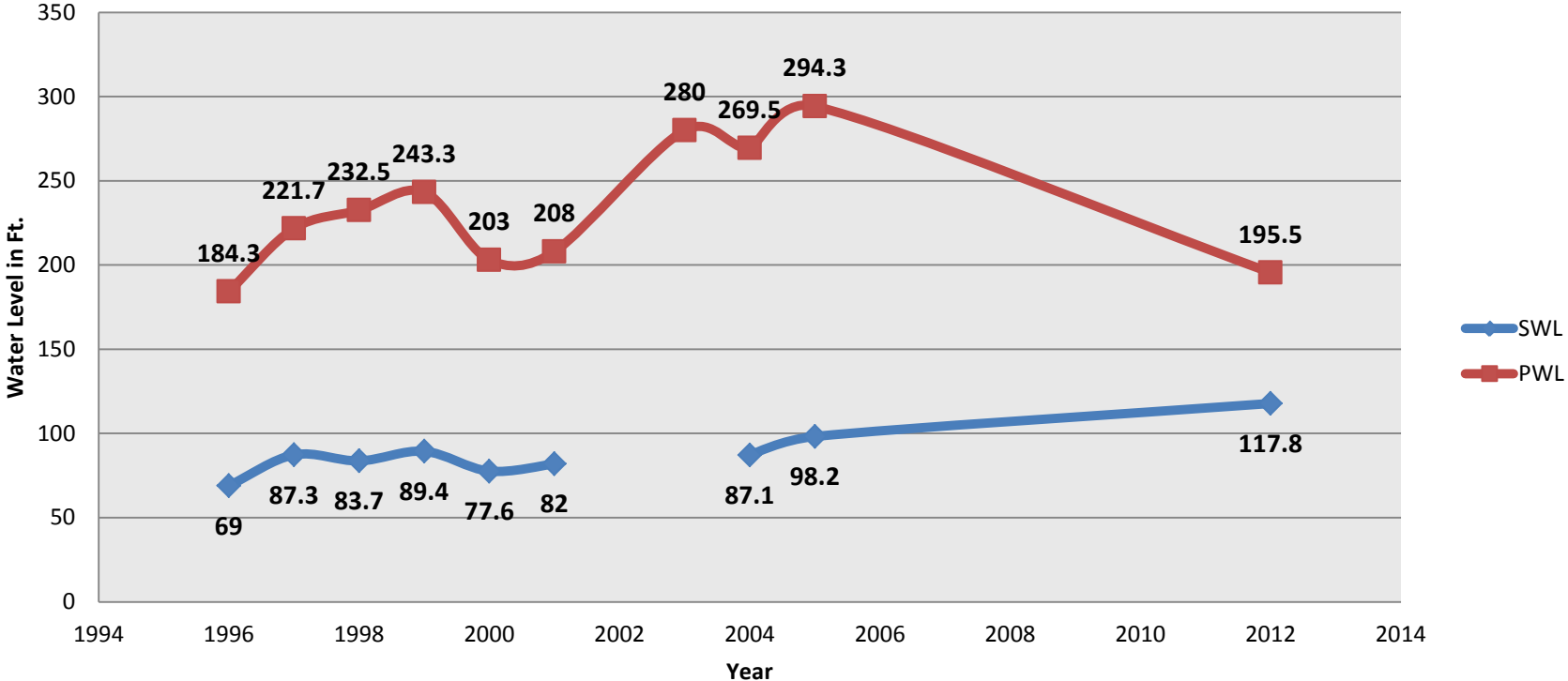
Warnerville Road #3 11 Miles Out of Town



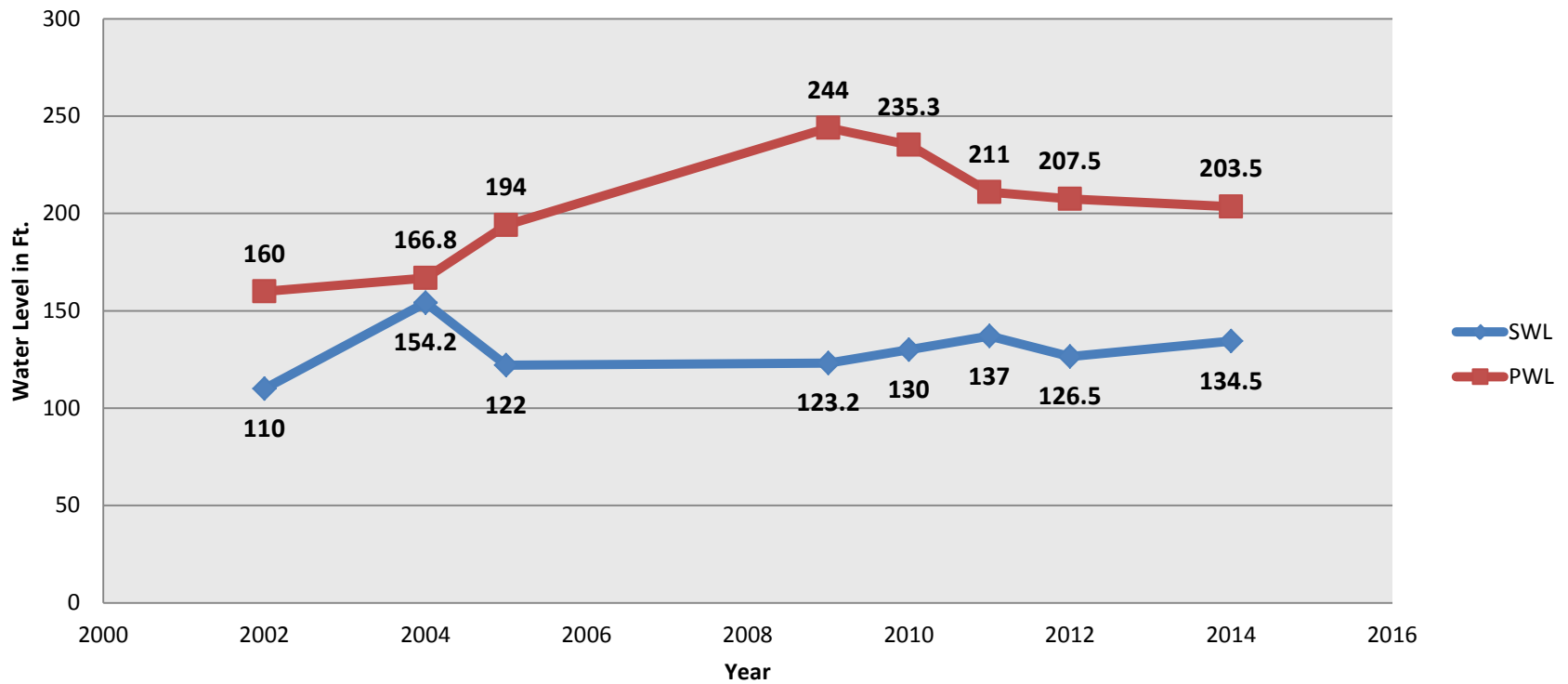
Claribel Road 9 Miles Out of Town



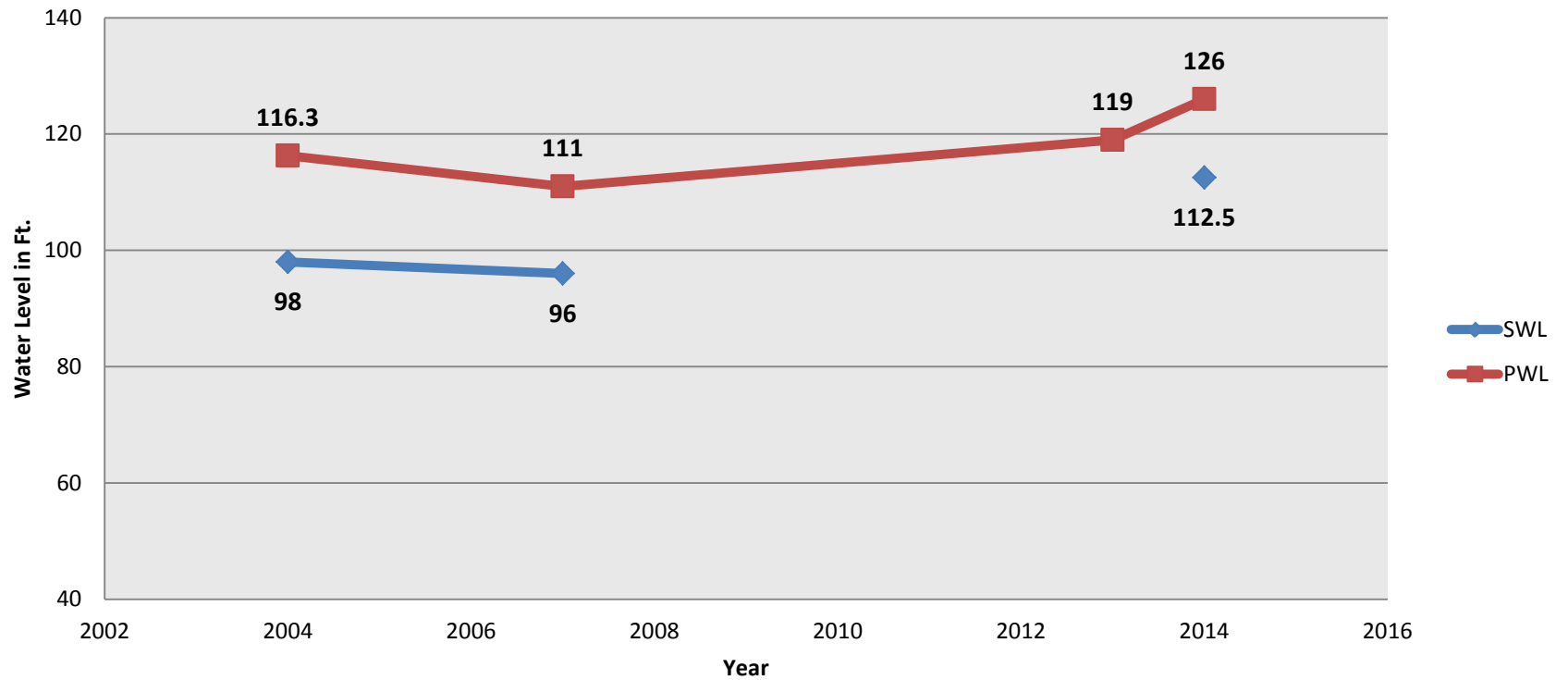
Claribel Road 9 Miles Out of Town



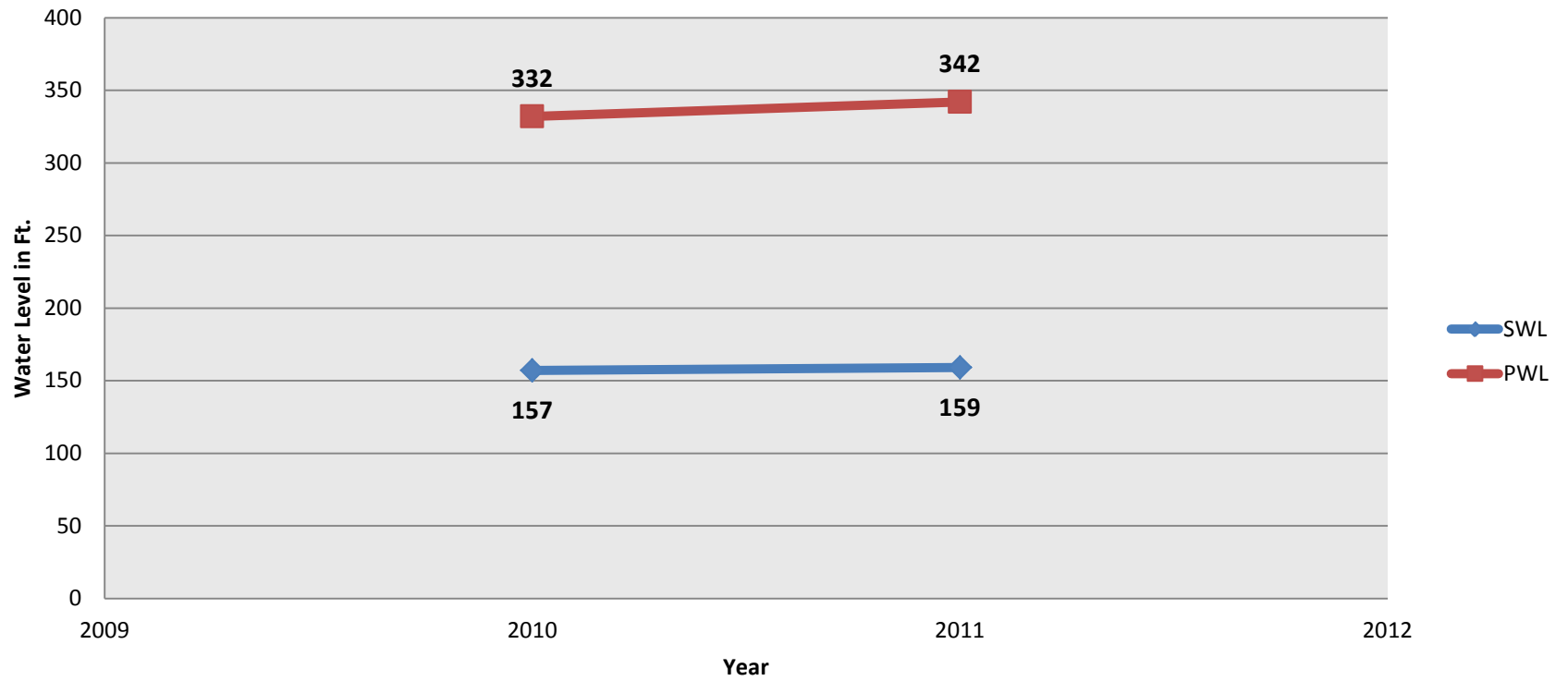
Claribel Road 14 Miles Out of Town



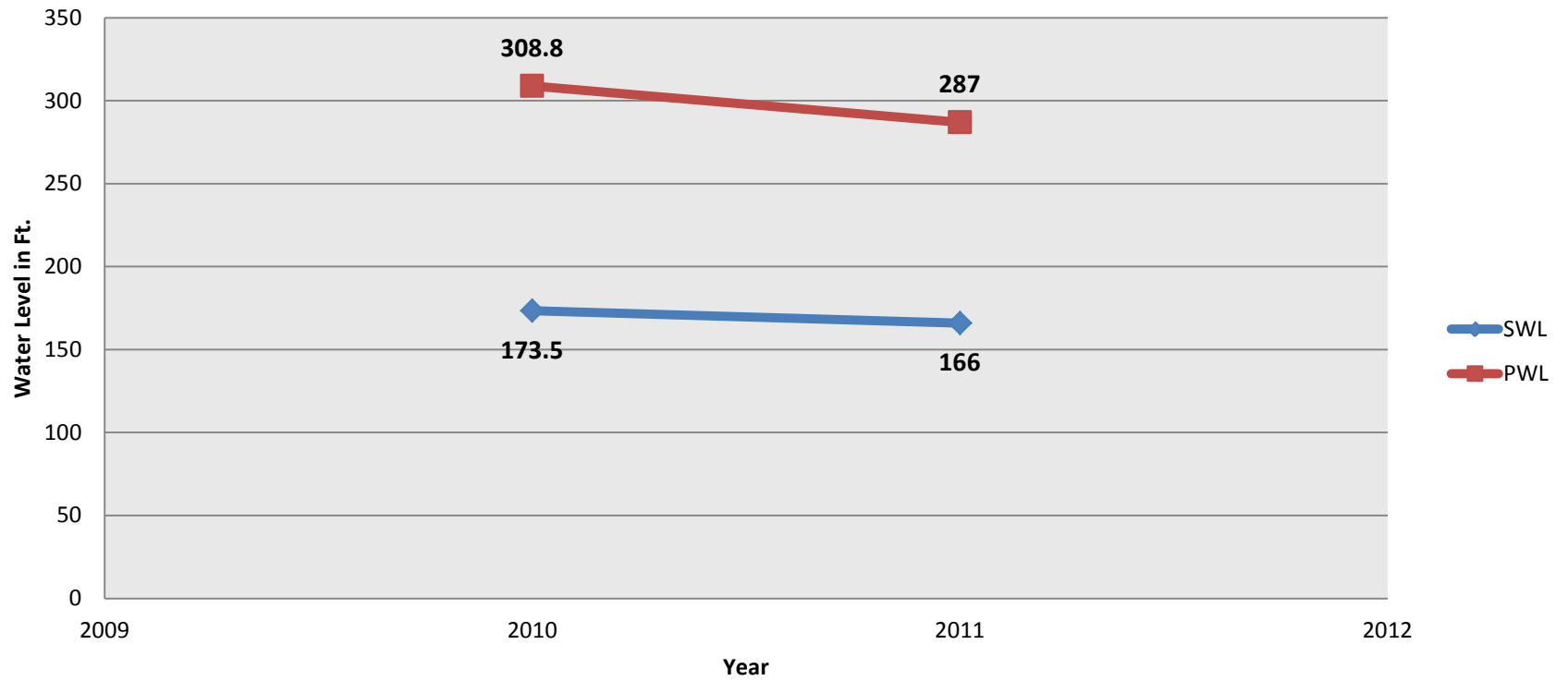
Claribel Road 14 Miles Out of Town



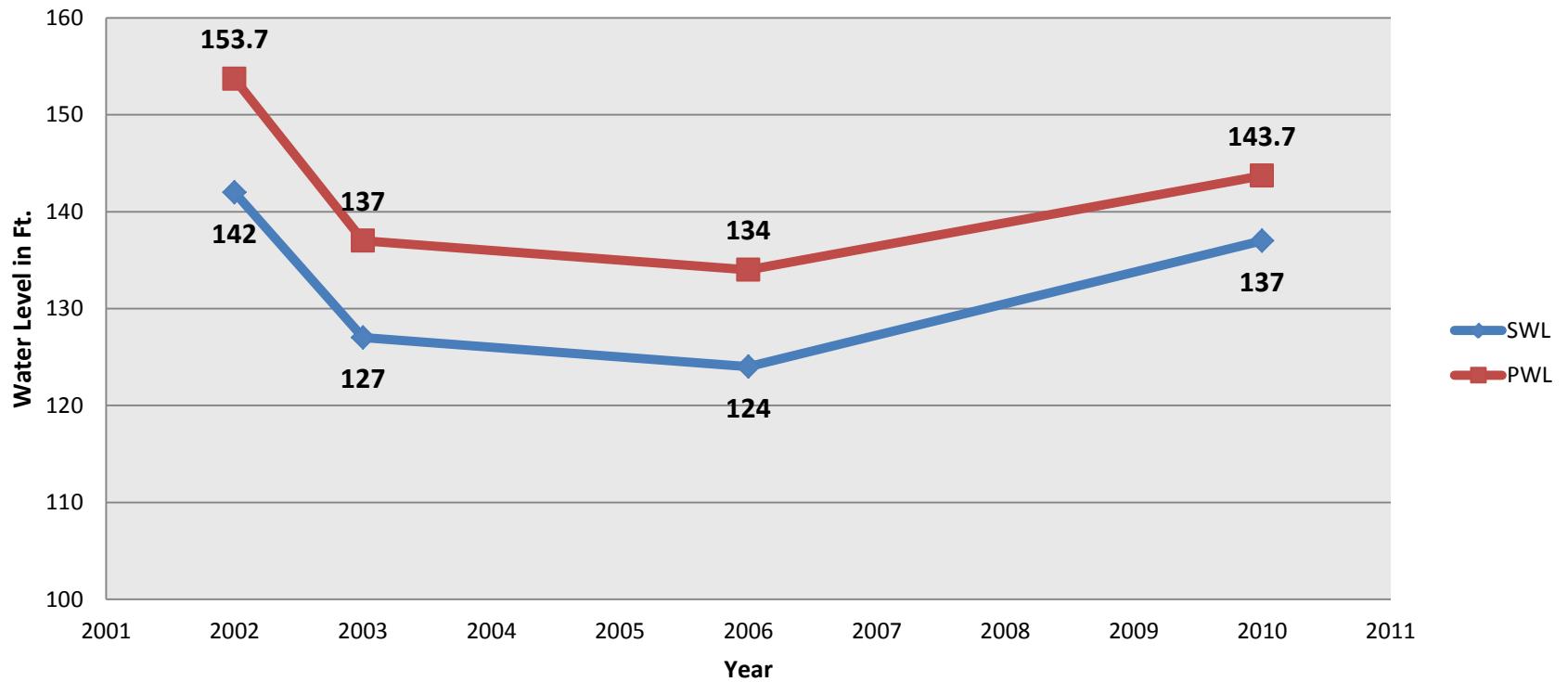
Hwy 108 8 Miles Out of Town



Hwy 108 8 Miles Out of Town

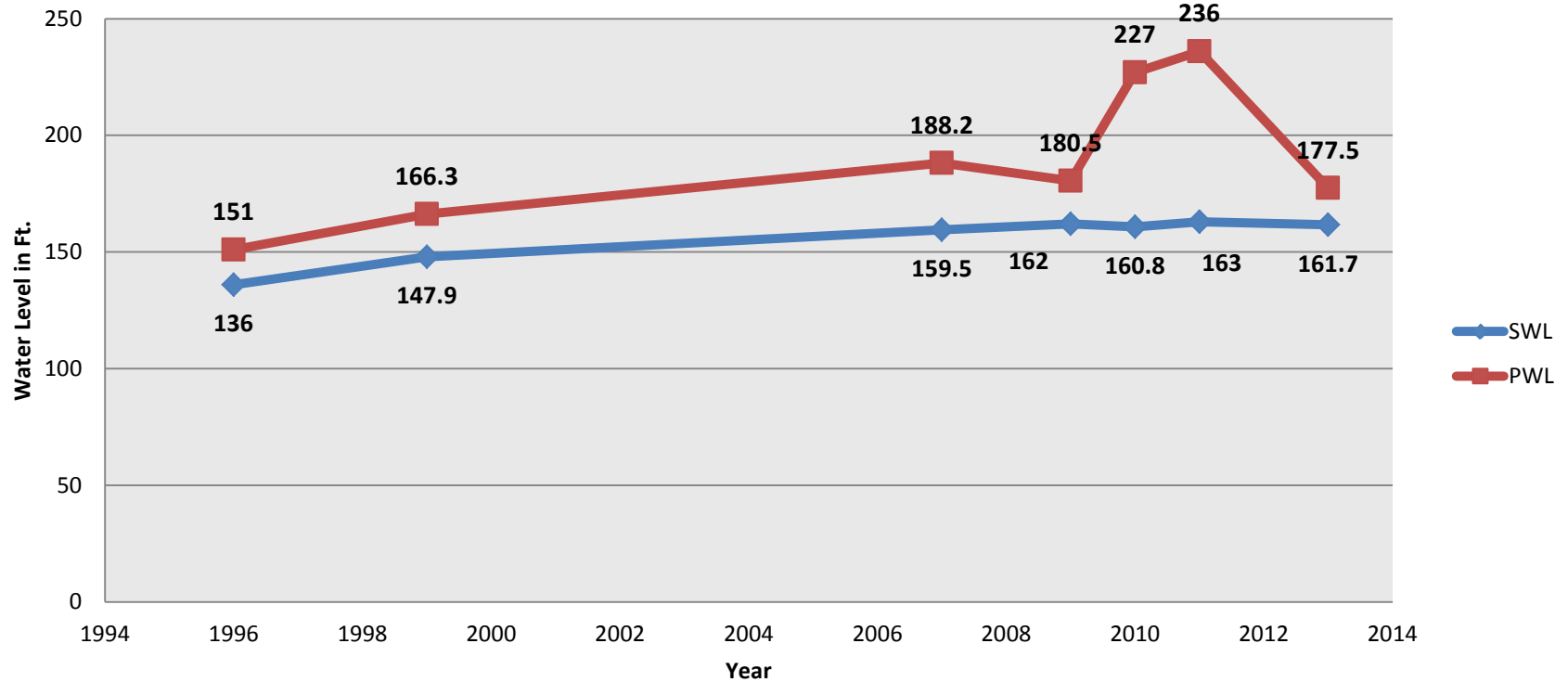


Warnerville Road 3 Miles Out of Town

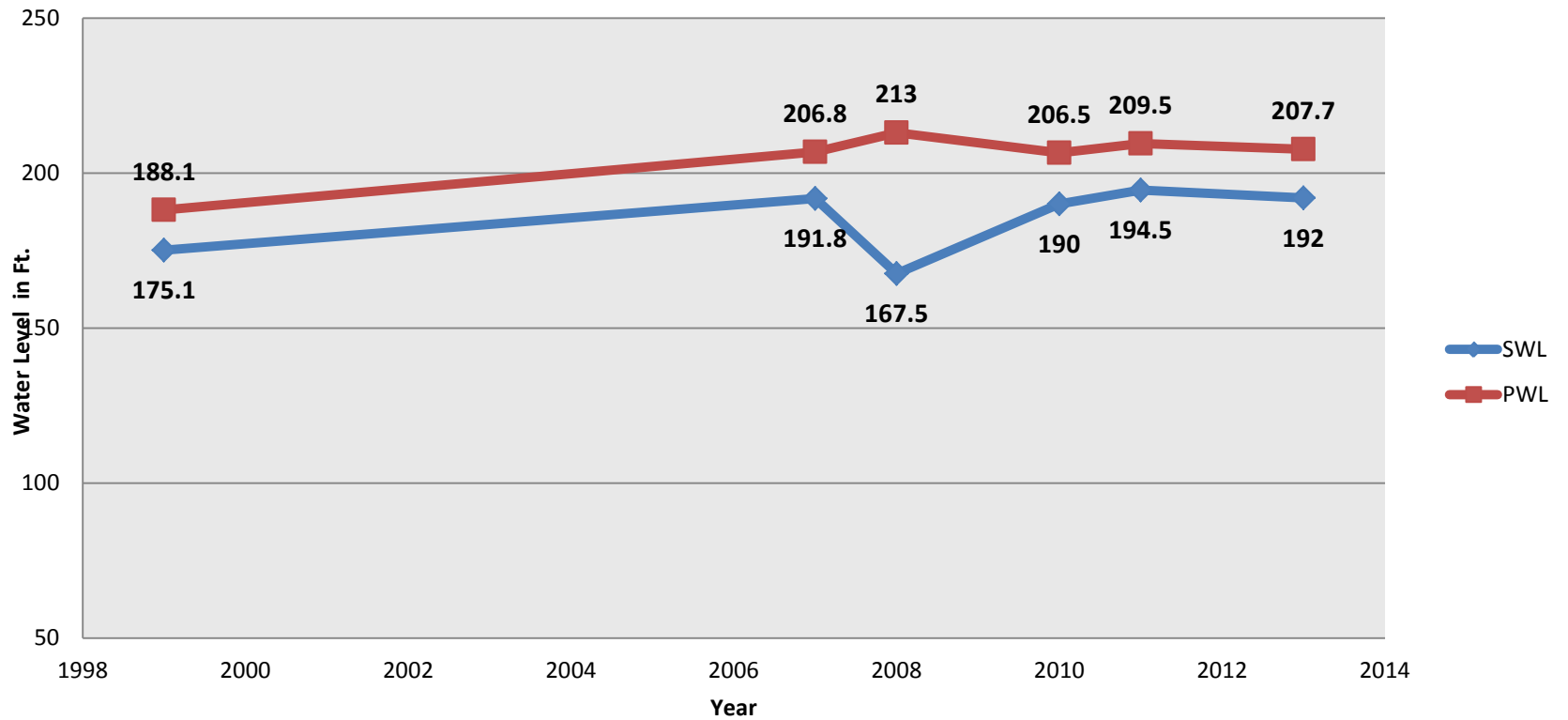


Keyes Road Area

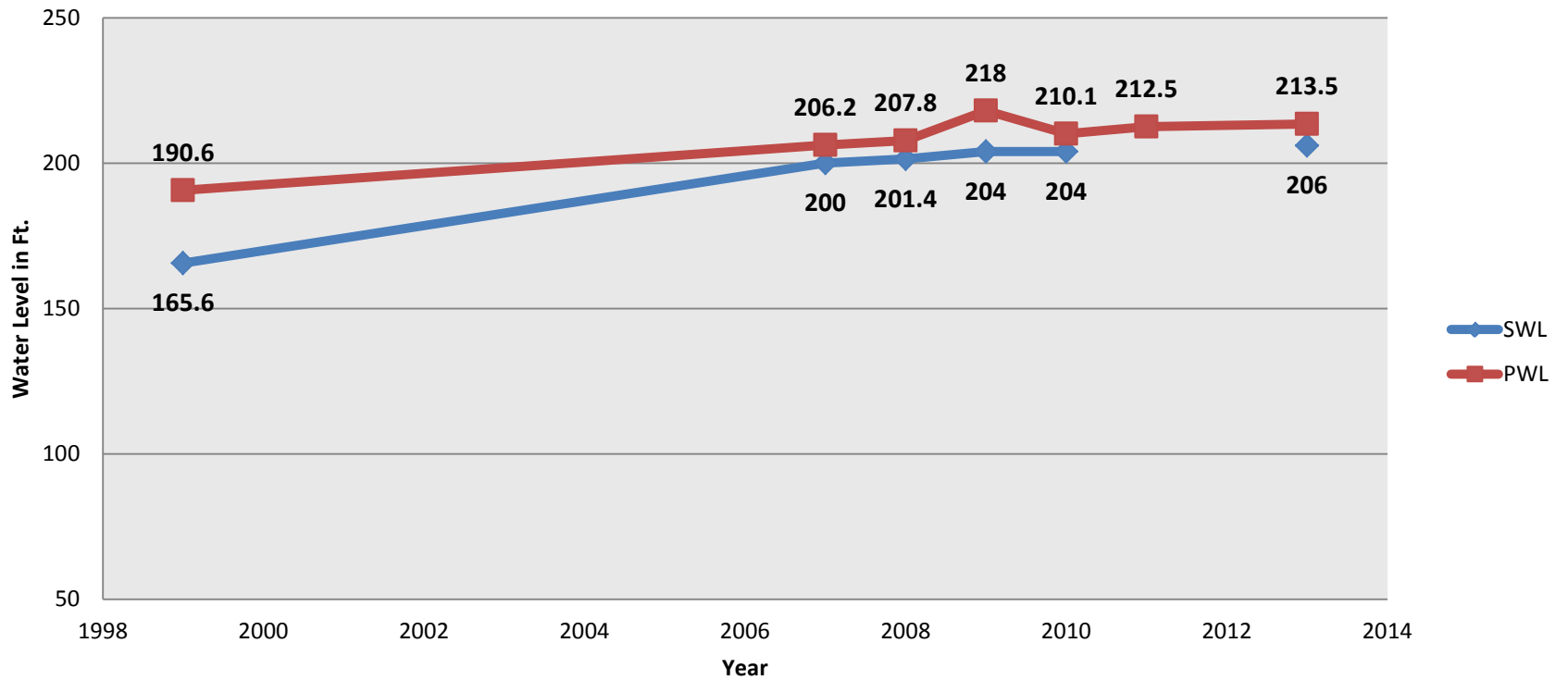
Keyes Road Close To Denair



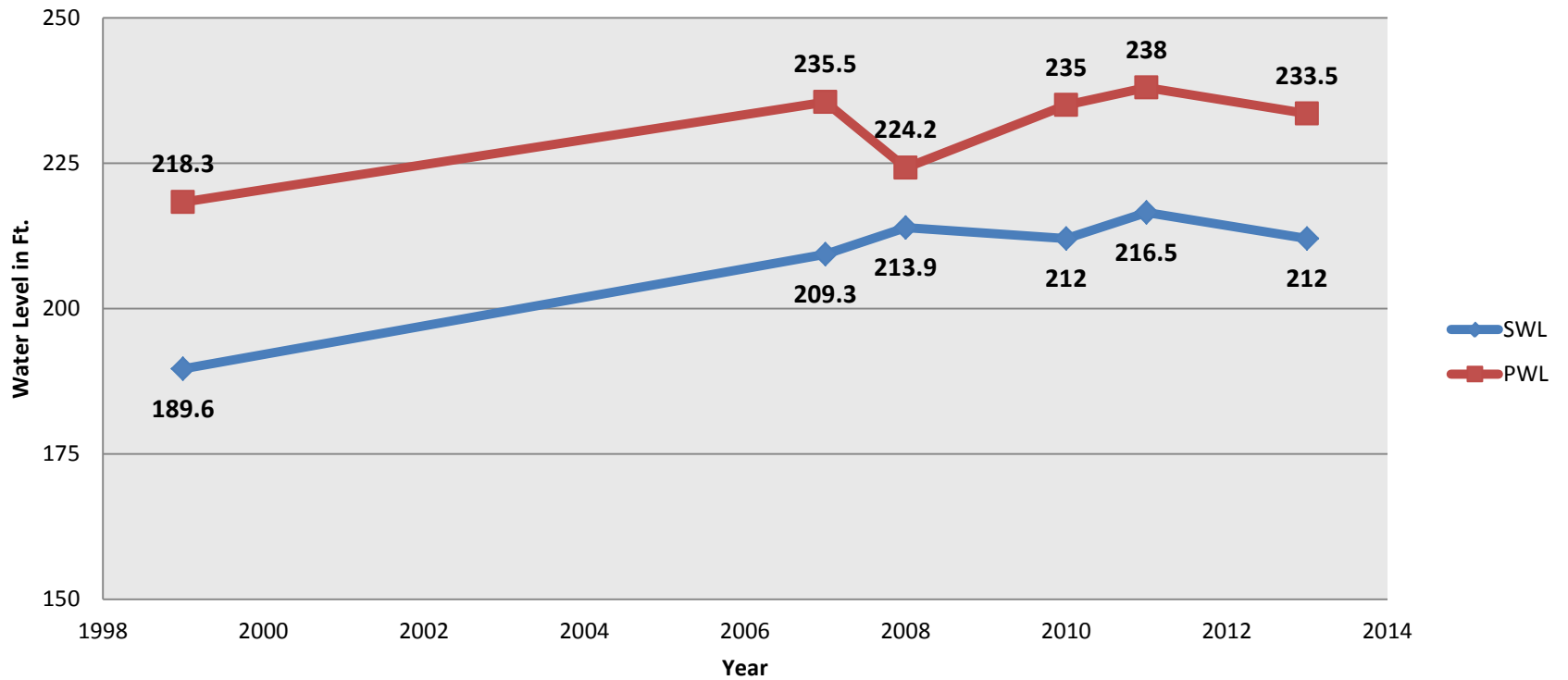
Keyes Road Close To Denair



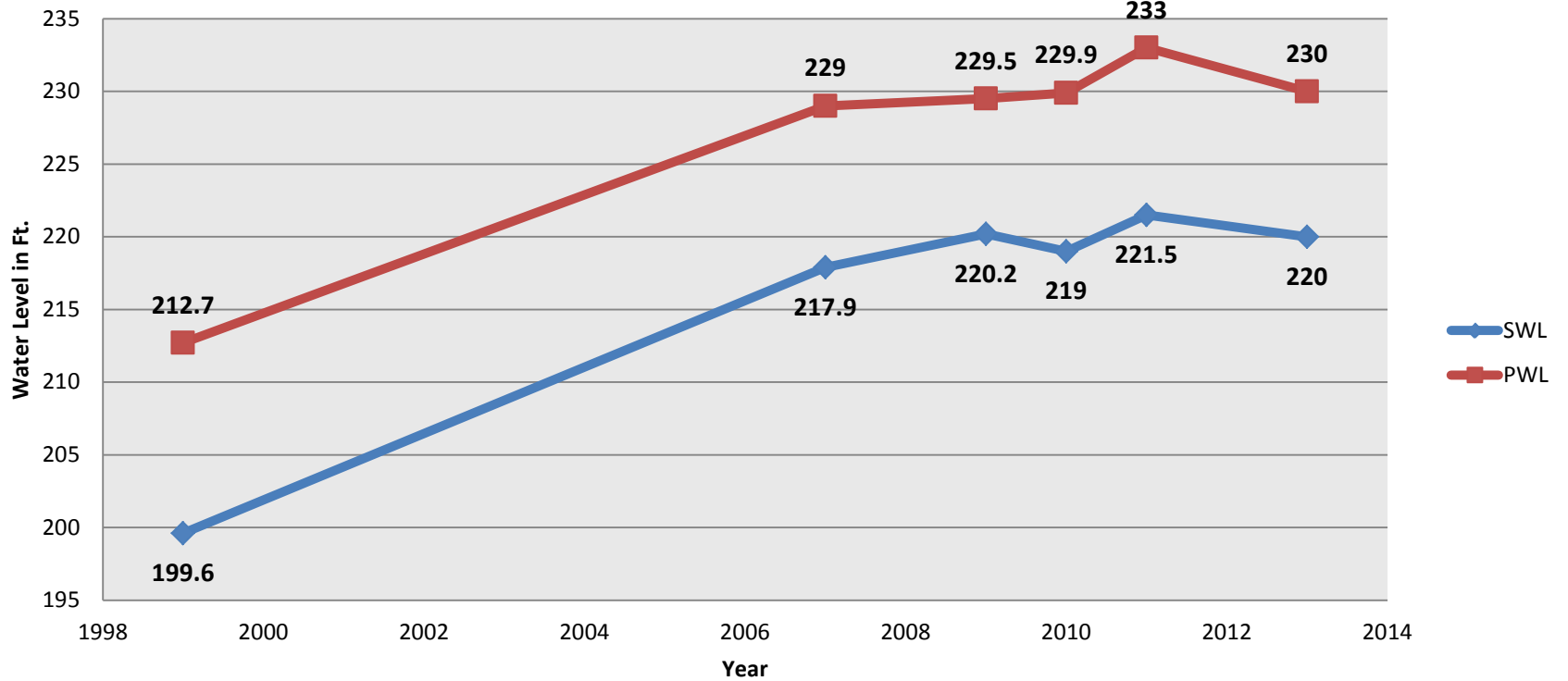
Keyes Road Close To Denair



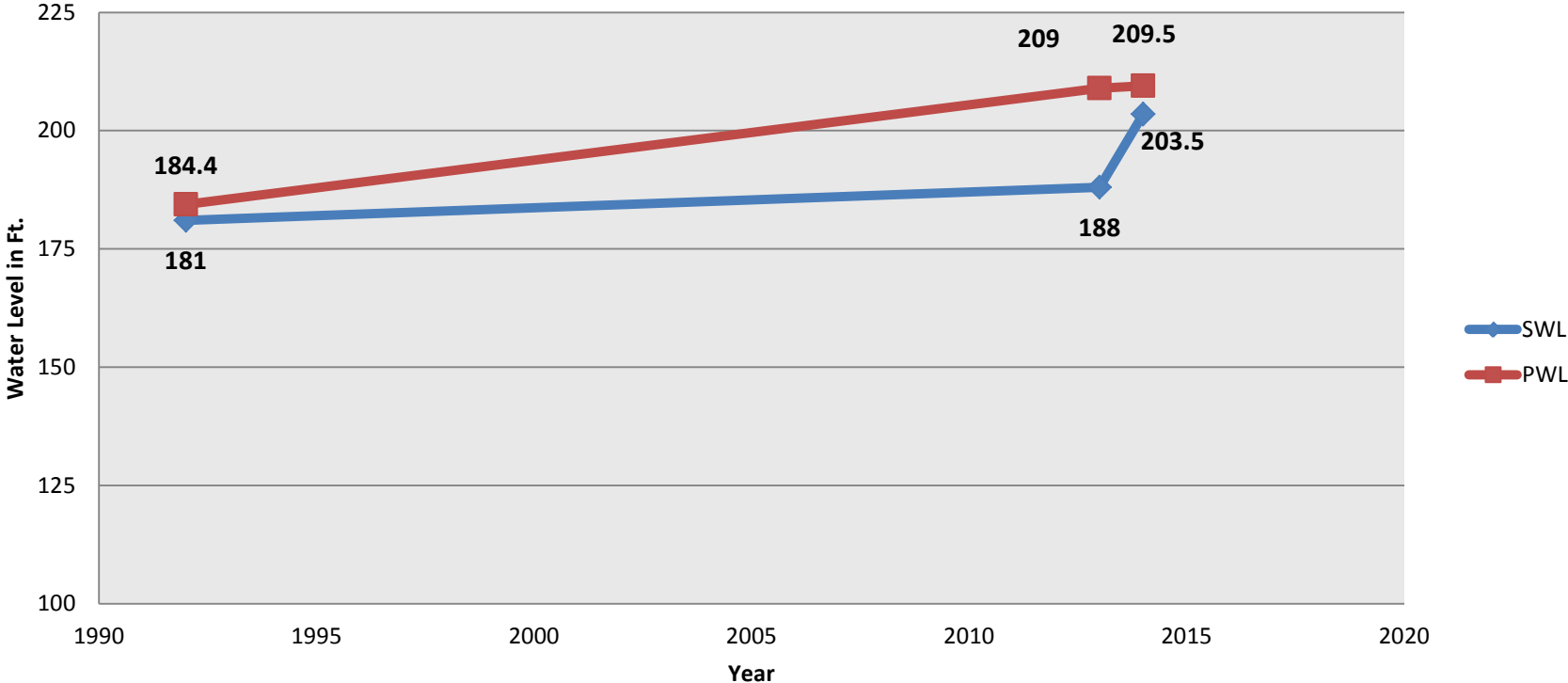
Keyes Road Close To Denair



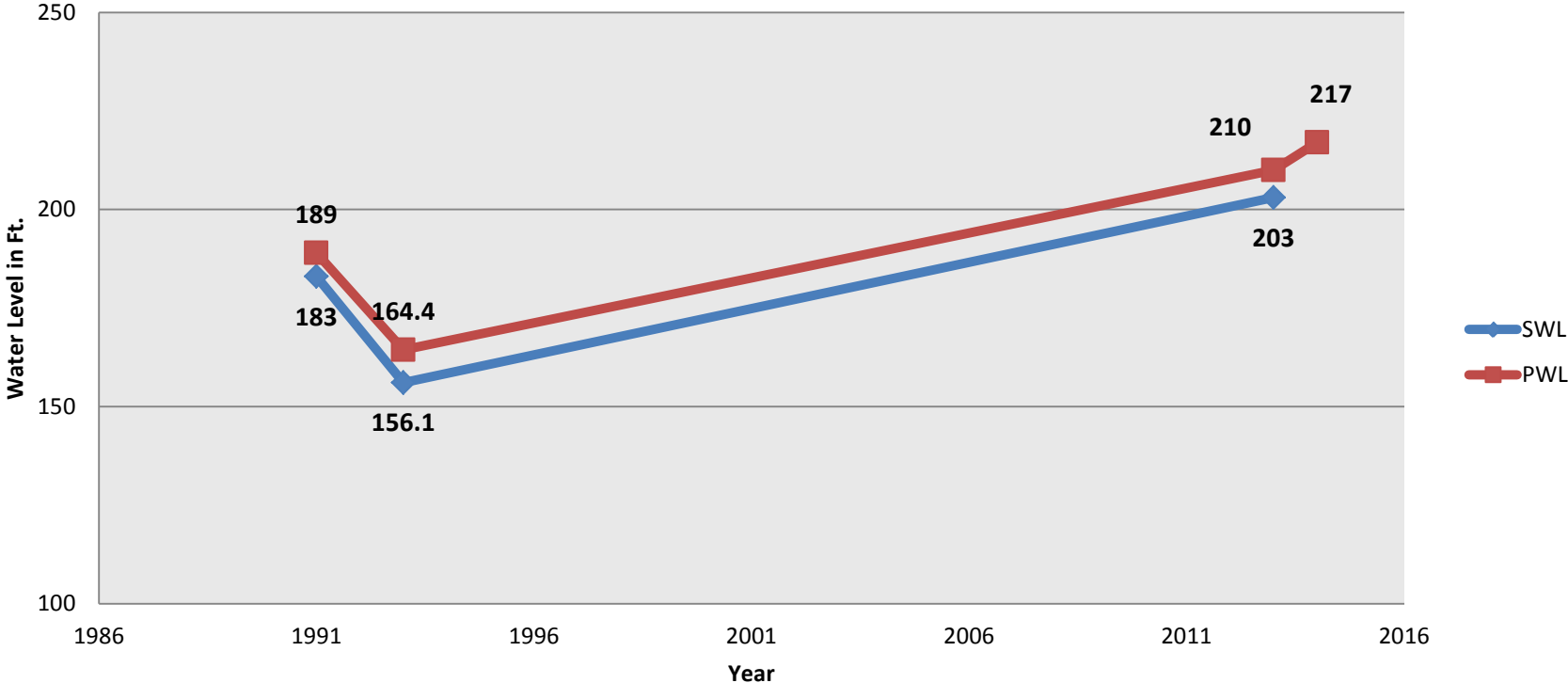
Keyes Road Close To Denair



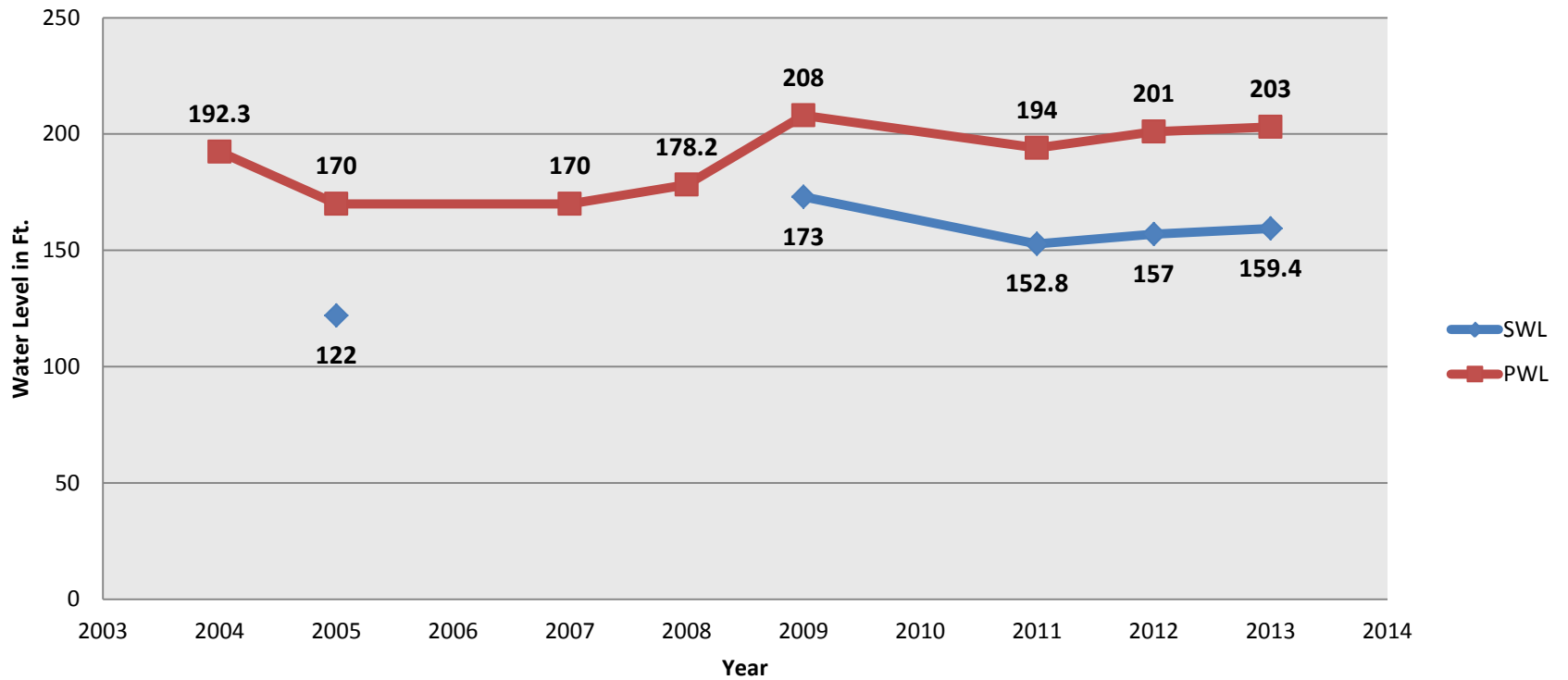
Keyes Road 3 Miles Out of Town



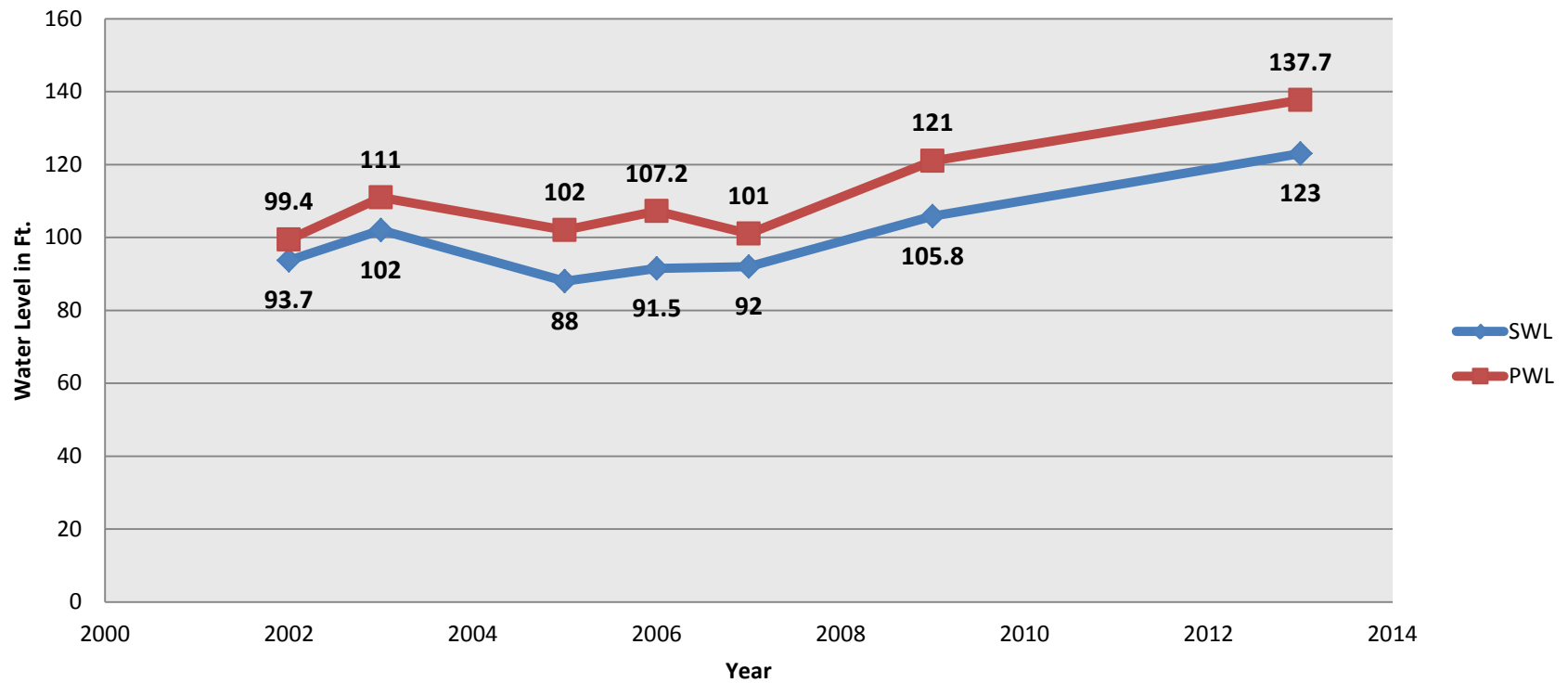
Keyes Road 3 Miles Out of Town



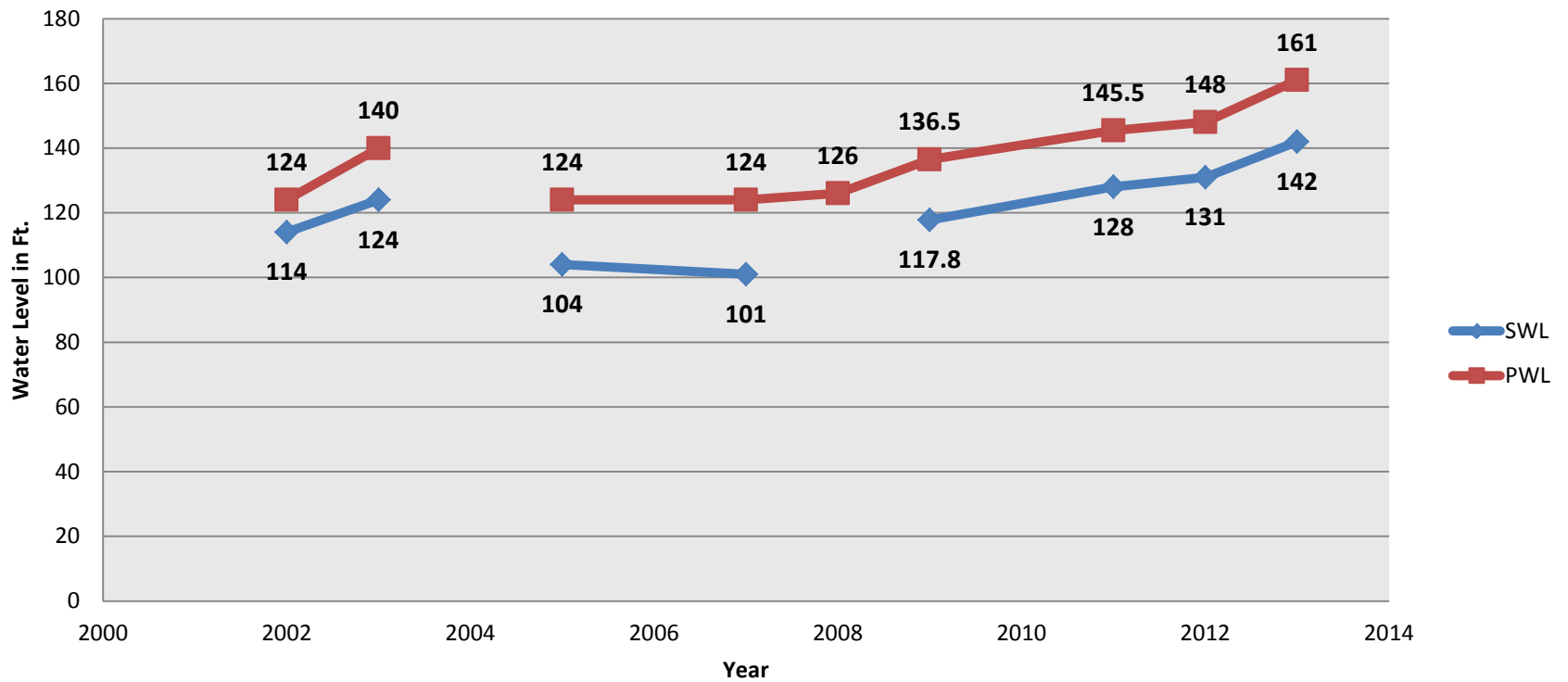
Monte Vista Road



Out Monte Vista Road

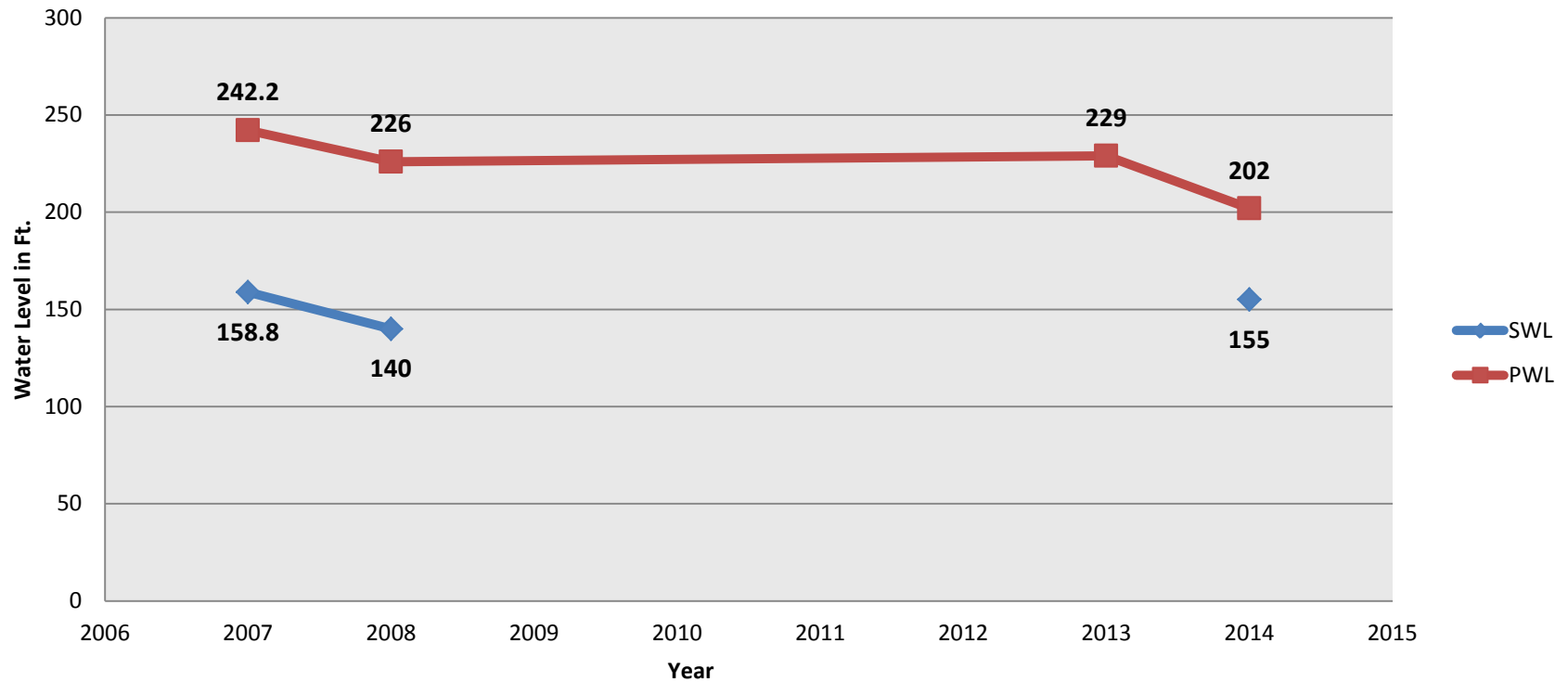


Out Monte Vista Road



Waterford Area

Out Past Modesto Reservoir



Pump by Modesto Reservoir

- Standing Water Level 1978 = 78 feet
- Standing Water Level 2014 = 88 feet
- 37 years only 10 feet difference and this is a drought year.

Questions?

www.powerhydrodynamics.com