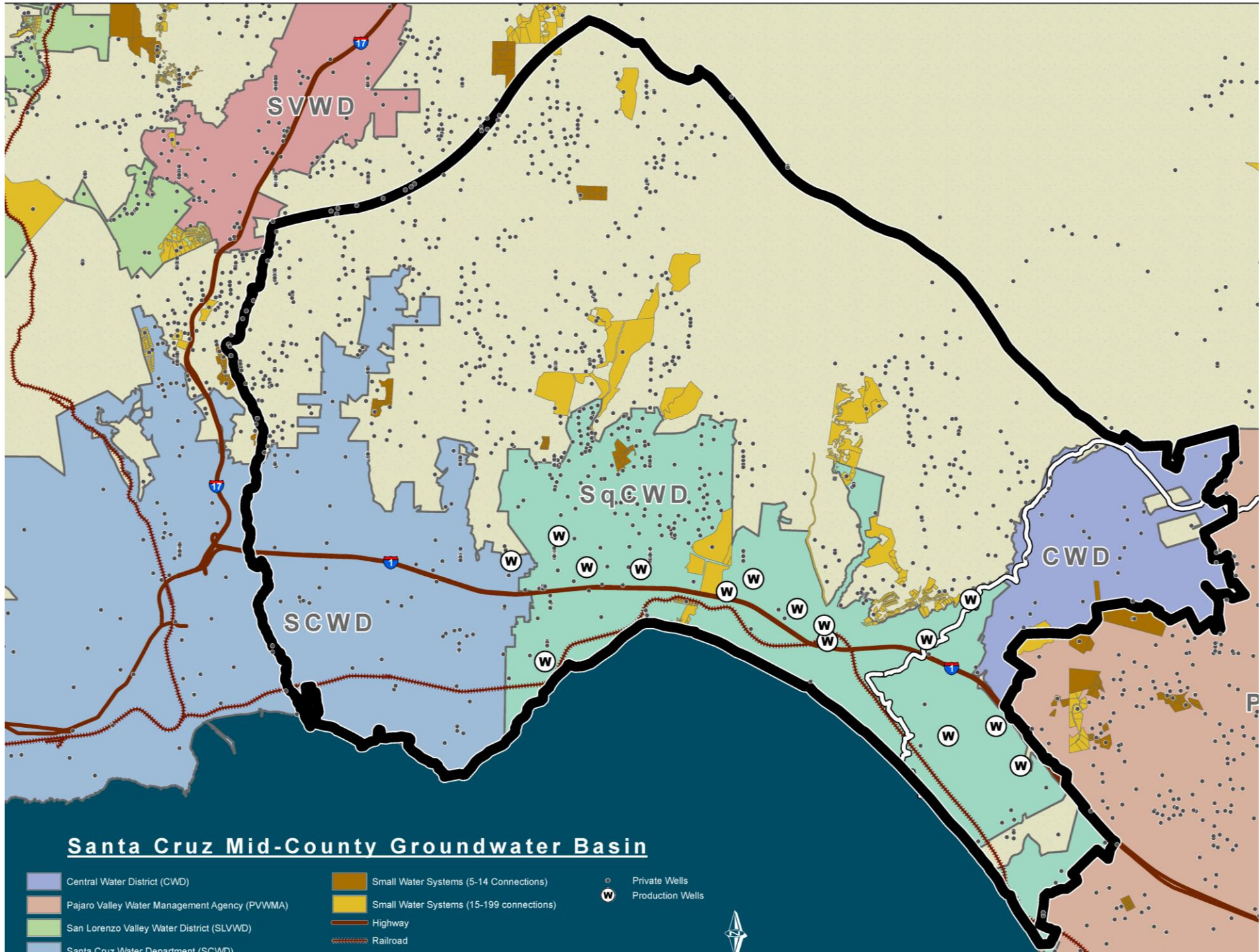


# Mid County Groundwater

Toward Sustainable Use...





### Santa Cruz Mid-County Groundwater Basin

- Central Water District (CWD)
- Pajaro Valley Water Management Agency (PVWMA)
- San Lorenzo Valley Water District (SLVWD)
- Santa Cruz Water Department (SCWD)
- Small Water Systems (5-14 Connections)
- Small Water Systems (15-199 connections)
- Highway
- Railroad
- Private Wells
- W Production Wells



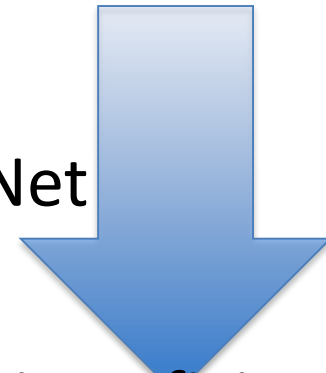
- Populations & Connections:

SqCWD	38,000	14,200
Santa Crz	3,800	1,600
CWD	2,700	810
Sm Dists	1,800	670
Rural Res	5,000	1,600
Ag + Inst		200
Total	50,300	19,100

- Available Water:

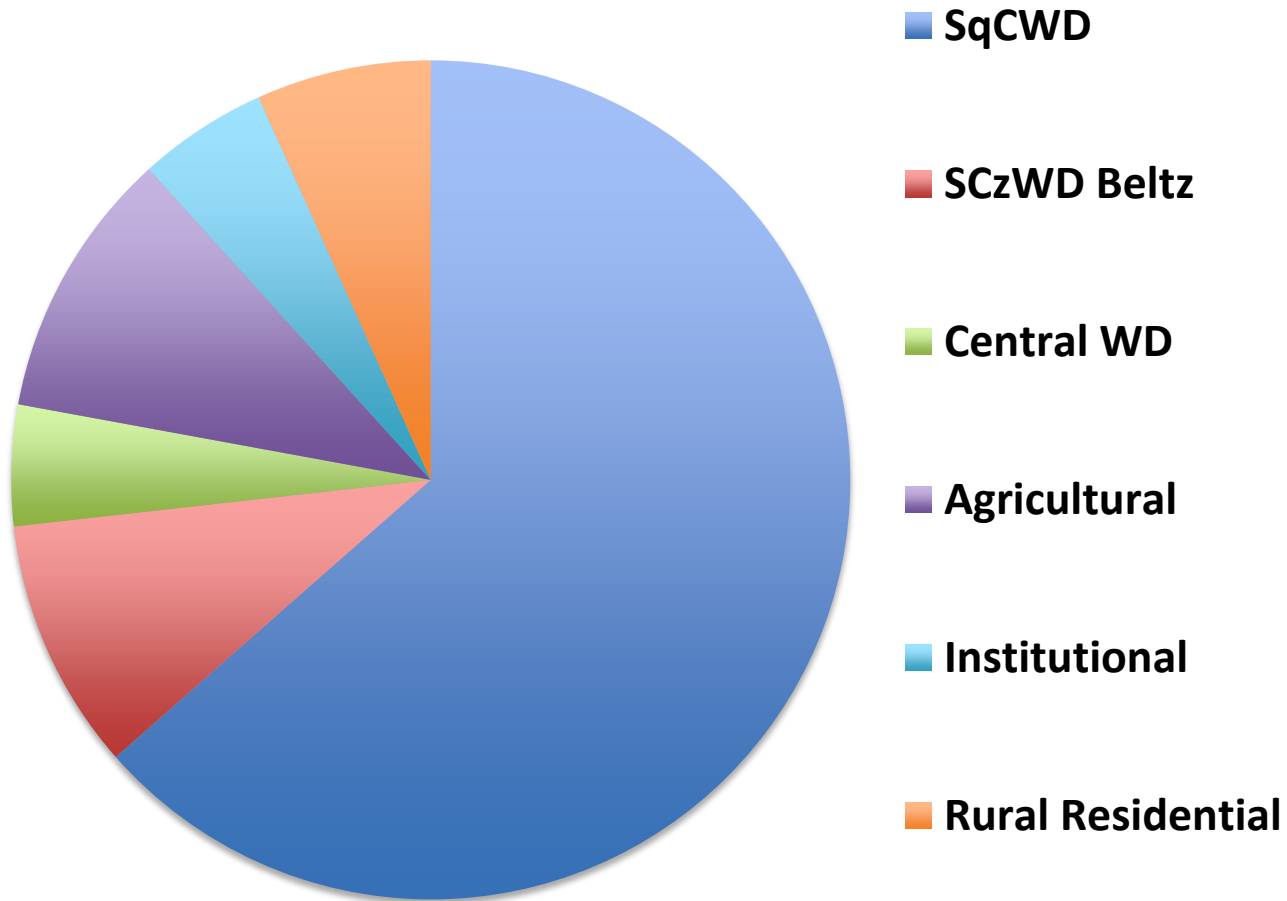
– ReCharge	9,000 AF
– Outflows	3,000
– Net	6,000
– Fix Deficit	4,500

(for next 20 yrs)



# 2014 Use Volumes, after return flow

6100 AF total, 5225 after return flow



# Basin Use in 2015

[in 2005]

• Soquel Creek	3106	5000
• Santa Cruz City	450	520
• Central Water	420	510
• Residential	552	945
• Institutional	306	
• Agricultural	644	
Total	5478	7415

# Estimating Private Usage

- Water use factors from hydrologists
- Agreement with groundwater model
- GIS and aerial surveys of non-muni parcels, structures, irrigated land
- Water use by crop type
  - Row crops      88 ac      235 af
  - Pasture          50 ac      108 af
  - Vineyards      186 ac      83 af
  - Nurseries        27 ac      74 af
  - Orchards        268 ac      62 af

# Impacts of Commercial & Agricultural Pumping

- Close to the coast: more impact on sea water barrier
- About 17% of total pumping
- Sea levels will rise
- Need higher groundwater levels to hold back salt water intrusion
- Pajaro has shifted to purple water for irrigation near the coast

# Groundwater Model

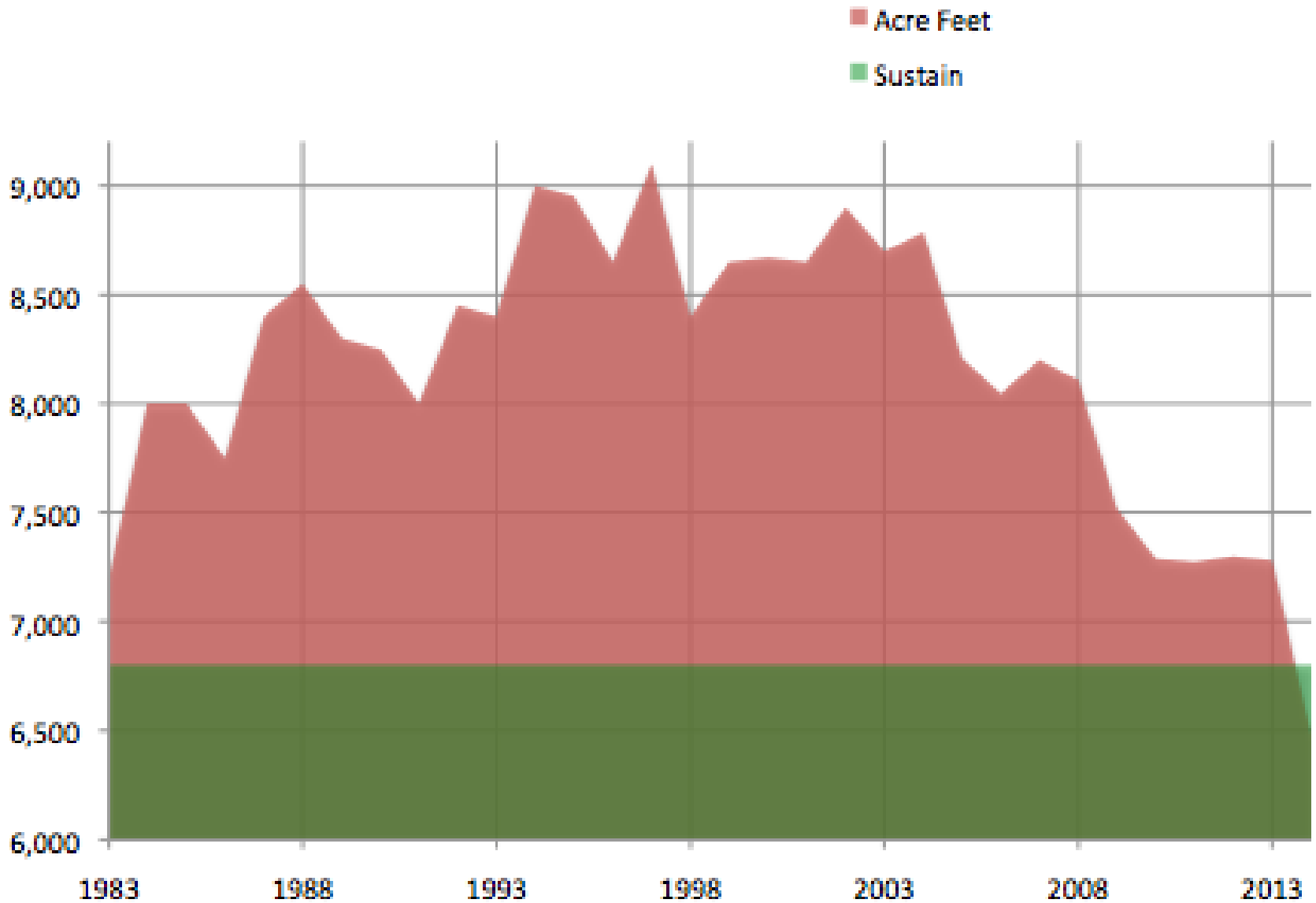
- In development over last 2+ years
- Estimate inputs and outputs: individual cells of 800 ft on a side (15 acres).
  - Effect of geography, soil type, rainfall absorption, underground flow
- Integrated use of several well-tested models
- Will use to project a water budget, using varying assumptions of rain and temperature



# Sustainability Planning

- Determine impacts on the basin
- Plan for changes in rain, temp, sea level
- Plan for additional supply
- Consider how changes will be paid for

# Mid County Overpumping History



--- end ---

[following slides are earlier references]

Groundwater:  
Deep ReCharge and Outflows  
*(old figures – new ones will be lower)*

	Purisima	Aromas
ReCharge	5,000	4,200
Outflows	900	2,320
Available	4,100	1,880

Sustainable total: 5,980 acre feet

From Todd Peer Review, 2014....Hydrometrics Revised Protective Groundwater Levels, 2012

# Reduced Usage

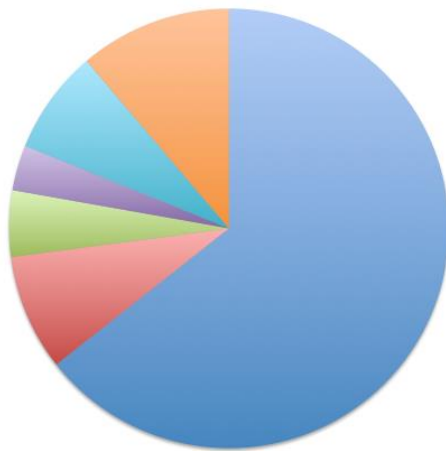
revised w higher Agr numbers 1/27/15

2012

2014

Pumped	7,700
w return flow	6,600

6,880
5,800



# Groundwater in Soquel and Aptos: All we've got

## Water

- How much is there?
    - 9,000 AFy w normal rainfall
    - 6000 available per hydrology
    - 2013: 7200 pumped, 6200 w rechg
    - Deficit: 30 yrs of overpumping
  - Current use
    - 70% SqCWD + SCzWD + CWD
    - 12 % Rural Residences
    - 17% Ag, Golf, Cabrillo
  - How much recharged yrly?
    - 10% of rainfall > 15"
- = Aquifers
- Purisima 66%. Stratified
  - Aromas 33%. Porous
- = Water Model?

## Who Gets to Use It (when scarce)

- Land owners
  - Residential
  - Agricultural
  - Institutional
- Nature (regulators)
- Water districts
- Schools, parks
  
- Reasonable + Beneficial

## Solutions

- Conserve
  - we're top tier on this already
- Run-off to Re-Charge groundwater
  - Roofs and storm run-off
- Transfer
  - Excess S Lorenzo winter flow
  - regulatory & ownership issues
- Re-Cycle
  - SqCWD is moving on this
  - Difficulties in injecting into Puris
- Buy
  - ??
  - transport costs
- Make
  - Deep DeSal
  - transport costs

## Control

- State
- County
- Community
- 
- Muni Water Dists
- Basin Sustain Agency
- PVWMA

## Environment

- Drought
- Planned development?
- Saltwater interface?
- Climate change
- Sea level rise

## On the Horizon

- How will SCz & PVWMA affect Mid Co?
- How and who will pay for new supply?
- What has worked elsewhere?
- Change in usable projected rainfall?
- Fracking?

# What does Sustainable mean?

- Frugal with our use of this precious resource
- steward our aquifers to be free of contamination: by sea water, by chemicals, by waste.
- steward our environment to be regenerating, safe, and sustaining of life.
- manage our surface and ground water so that we do not overuse it, and do not waste it. We will manage our environment to maximize its ability to recharge our water resources.
- balance the needs and use of all our stakeholders: urban residents, rural residents, urban businesses, agricultural businesses, wildlife and fish habitats, schools, camps, and recreation.
- plan, and develop actions, to mitigate the effects of climate change and population growth.
  - Managed recharge of our groundwater
  - Frugal use of water in a balanced system
  - Creative solutions to drought and climate change
  - Feedback systems to reinforce good stewardship