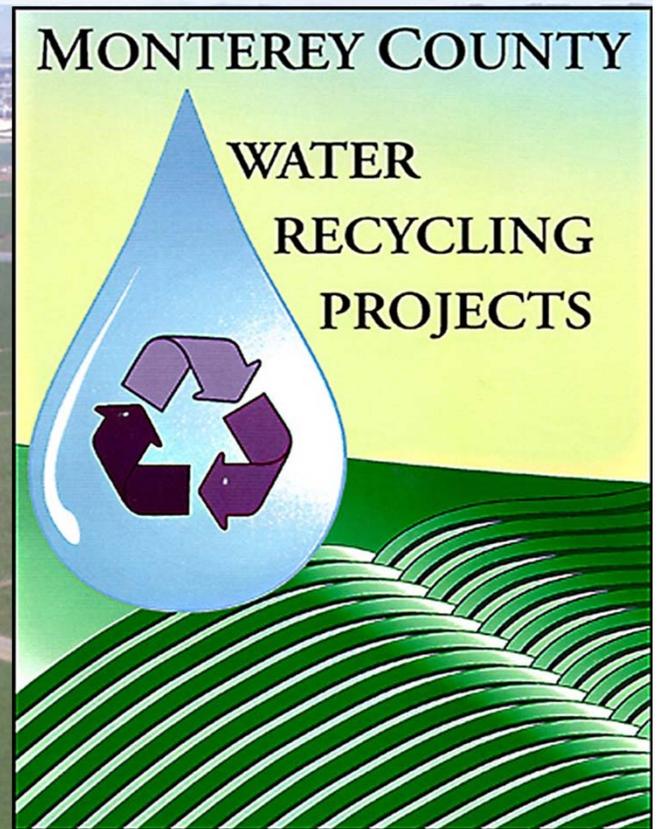


History of the Largest Reclaimed Water Facility for Irrigation of Food Crops Eaten Raw

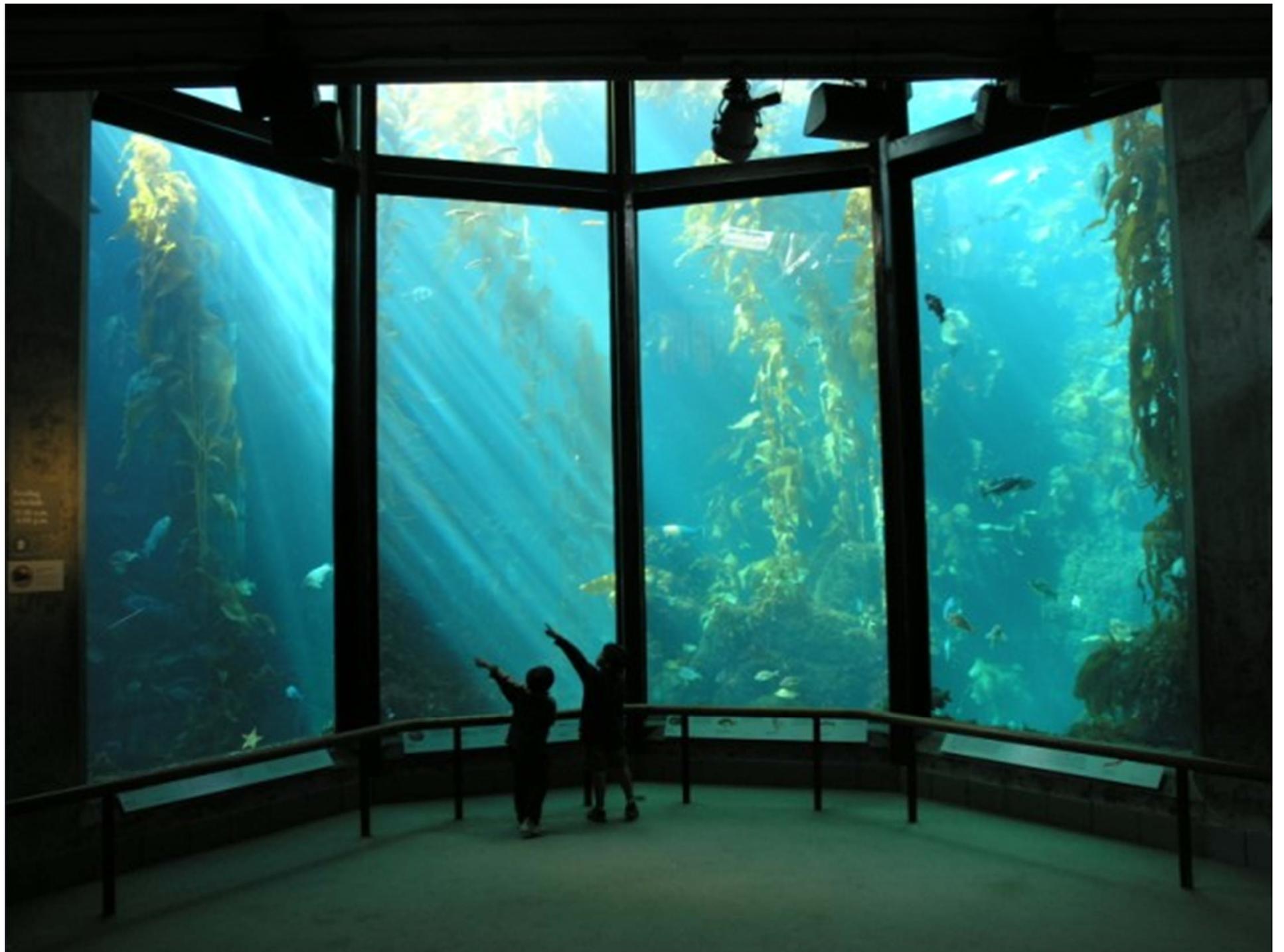


Bob Holden, MRWPCA









Monterey County Agriculture \$4B



Lettuce = \$1.23 billion, 133,000 acres

Strawberries = \$714 million, 10,992 acres

Broccoli = \$298 million, 52,694 acres

450,000 AFY Groundwater Pumping

90+% Agriculture

1,800 Wells

REGULATIONS FORCED REGIONAL SOLUTIONS

- **FEDERAL CLEAN WATER ACT 1972**
 - Secondary treatment
- **California Ocean Plan**
 - Outfall pipe to extend past “zone of prohibition”



- **National Marine Sanctuary Regulations**

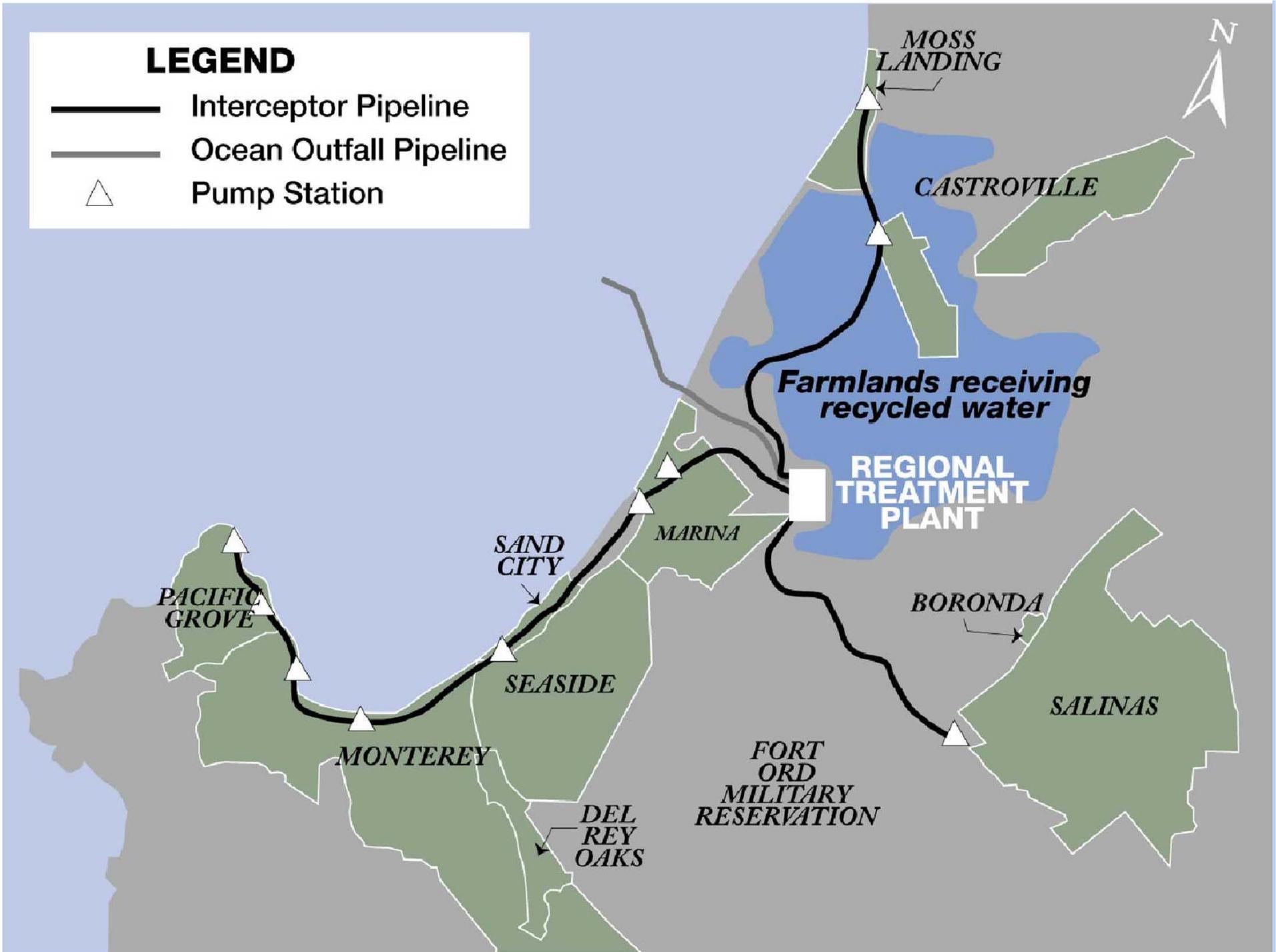


Old Treatment Plants: Over Capacity, Building Moratoriums, Non-Compliant with Federal Clean Water Act, Outfalls on Beach



LEGEND

- Interceptor Pipeline
- Ocean Outfall Pipeline
- △ Pump Station



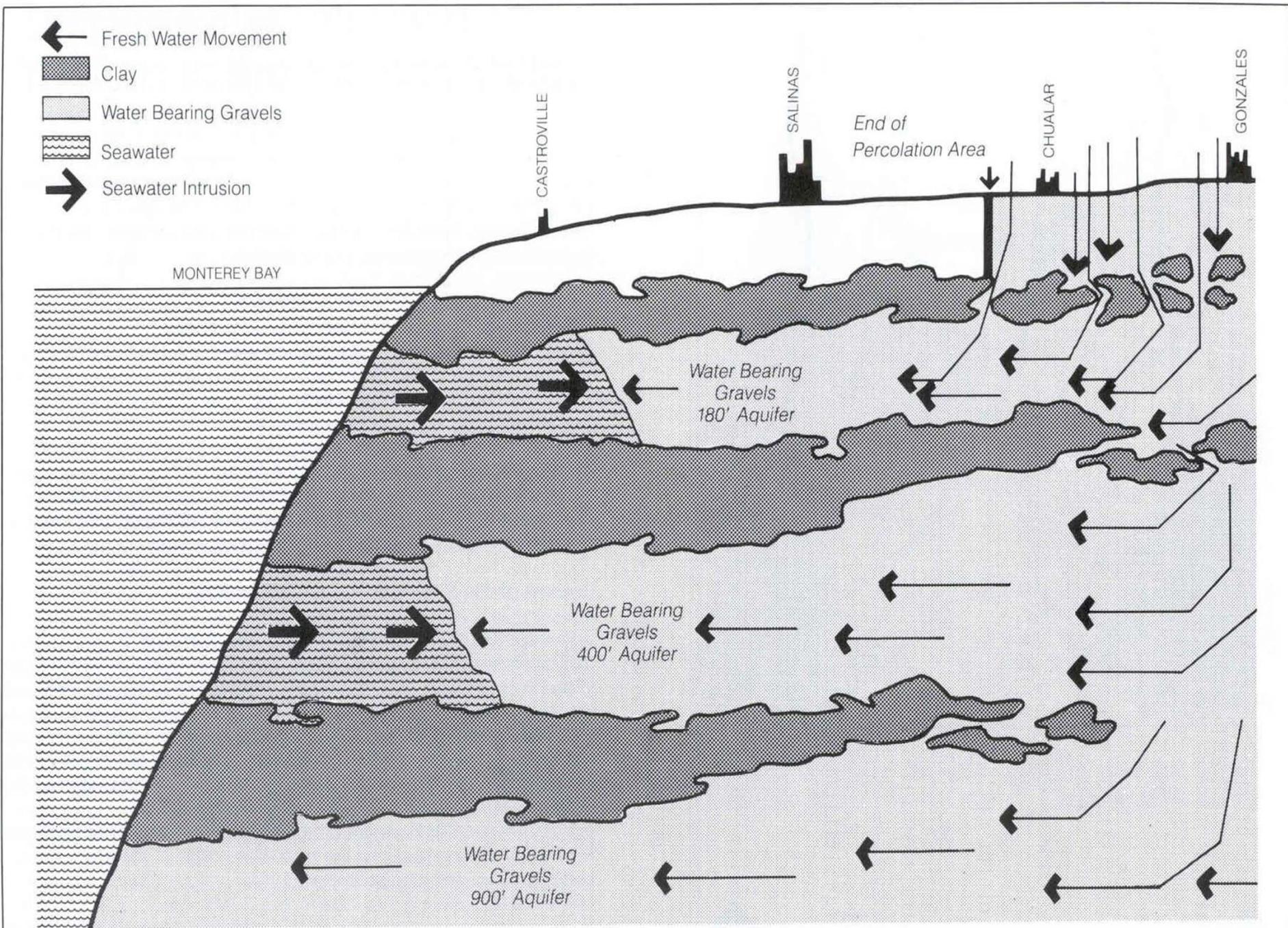
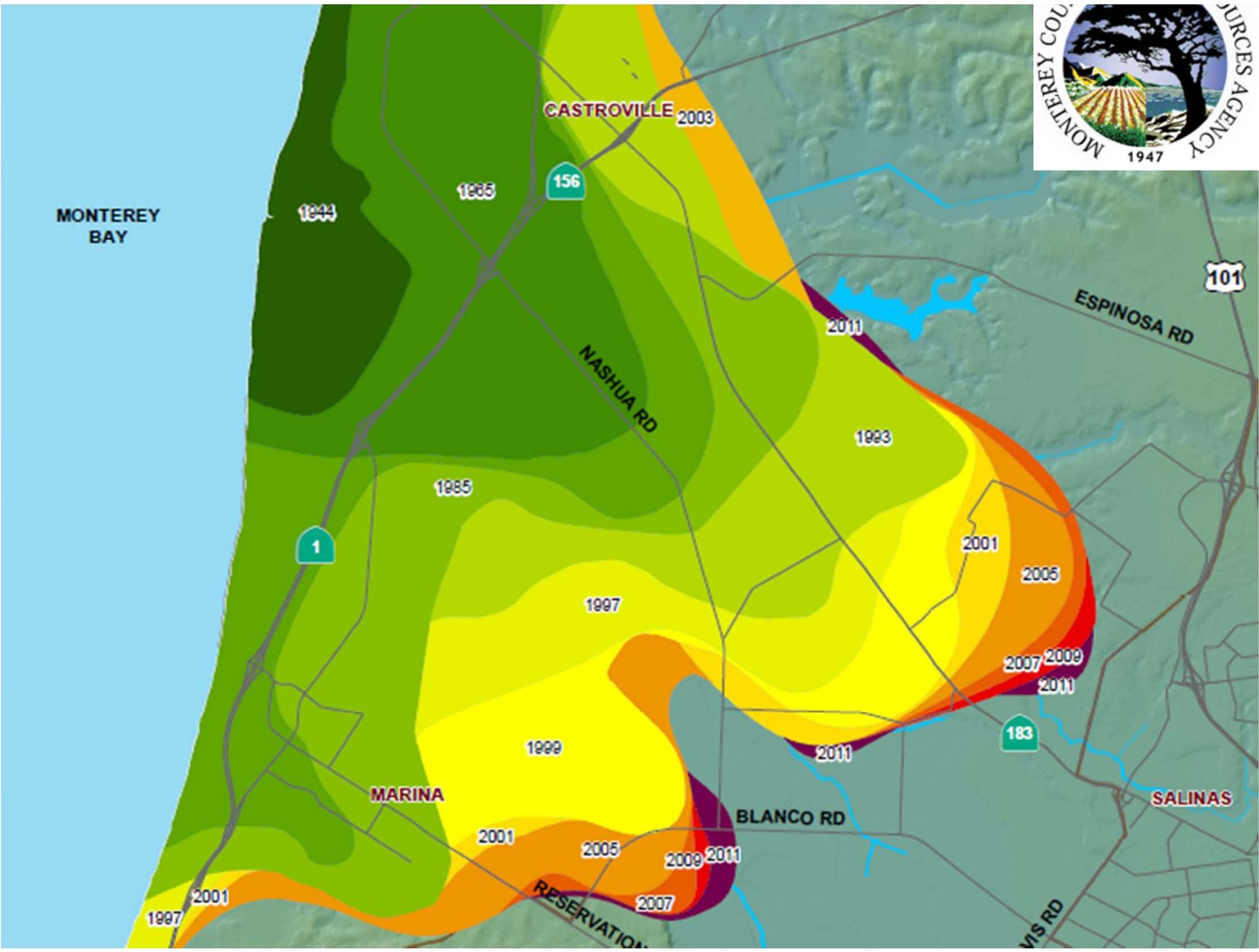
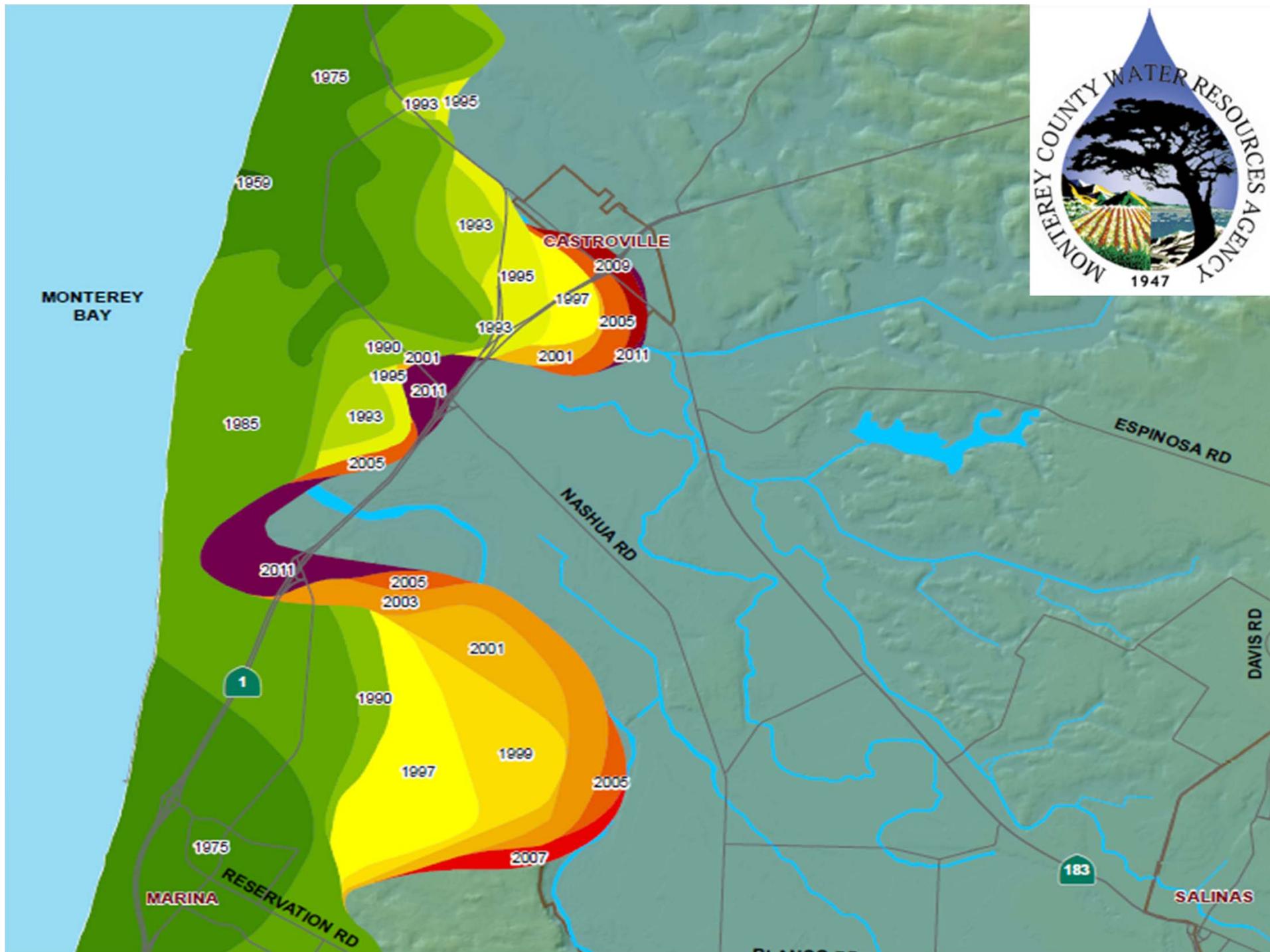


Figure 3 Movement of Groundwater in the North Salinas Valley





**“Whiskey is for
drinking;
water is for
fighting over.”
Mark Twain**

Salinas River Basin
Seawater Intrusion

Seaside Basin
Adjudicated

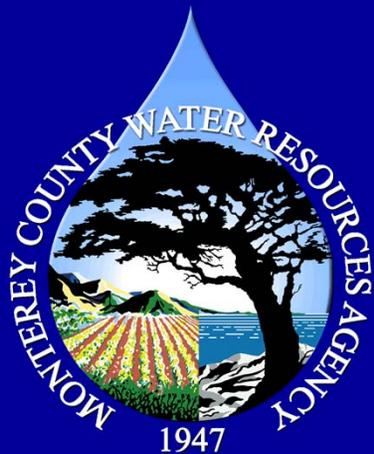
Carmel River
SWRCB Order
95-10 and CDO



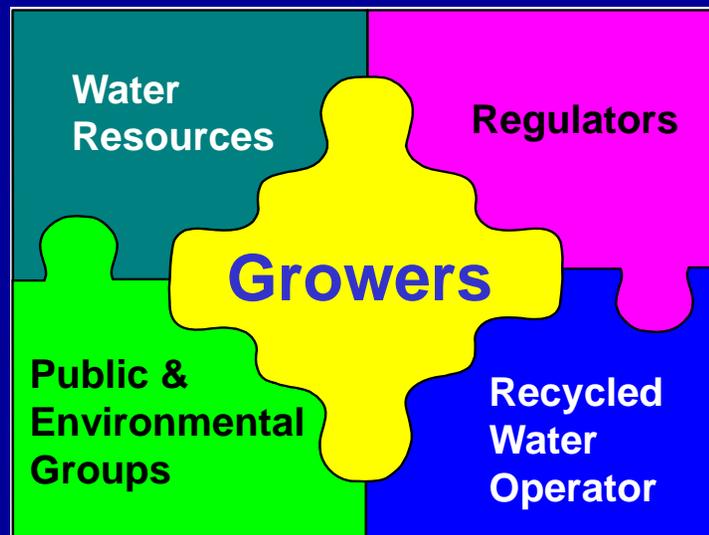
STRONG PARTNERSHIPS

The Key to Success

From Concept in 1970's



"...manages, protects, and enhances the quantity and quality of water ..."



"Dedicated to meeting the wastewater and reclamation needs of our member agencies while protecting the environment"



"...exists to protect and improve the health of the people in Monterey County."

Current Status in U.S.

- >1,500 water reuse facilities in U.S.
- 2.5-3.0 billion gallons/day of municipal wastewater was recycled in 2008
- 5-6% of municipal wastewater is reused
- Majority of recycled water from 4 states
 - Arizona
 - California
 - Florida
 - Texas

Water Reuse Criteria Adopted

❖ California	1918 (1968)
• Arizona	1985
• North Carolina	1988
• Florida	1989
• Oregon	1990
• Texas	1990
• US EPA	1992
• Washington	1993
• Utah	1995
• Colorado	2000
• Idaho	2007
• Virginia	2008
• Massachusetts	2009

CA Recycled Water History

- Indirect Potable Reuse—1962
- Recreational Lakes—1965
- Irrigating Lettuce & Strawberries—1967
- Dual Plumbing Systems—1977

Uses of Recycled Water

- Agricultural Irrigation
- **Landscape Irrigation**
- Toilets & Urinals
- **Construction & Concrete**
- **Street Sweeping**
- **Power Plants & Boilers**
- **Impoundments**
- **Cooling Towers**
- **Manufacturing**
- Environmental Uses
- **Groundwater Recharge**
- **Seawater Intrusion Barrier**
- **Indirect Potable Reuse**
- **Fire Fighting**

California Water Recycling Criteria

- Disinfected Tertiary Reclaimed Water -

- Media Filtration

- 5 gpm/ft² maximum (2 gpm/ft² for traveling bridge automatic backwash filters)
- ≤ 2 NTU average turbidity in any 24-hour period
- ≤ 5 NTU 95% of time in any 24-hour period
- 10 NTU maximum
- Coagulation required unless secondary effluent 5 NTU or less

- Membranes

- ≤ 0.2 NTU 95 % of time in any 24-hour period
- 0.5 NTU maximum

California Water Recycling Criteria - Disinfected Tertiary Reclaimed Water -

- $CT \geq 450$ mg-min/L
- ≥ 90 minutes modal contact time or ≥ 5 logs virus removal
- ≤ 2.2 total coli/100 mL (7-day median)
- ≤ 23 total coli/100 mL in more than one sample in any 30-day period
- ≤ 240 total coli/100 mL (maximum)

Treatment Reliability

- Standby power supply
- Alarms
- Multiple or standby unit processes
- Emergency storage/disposal provisions
- Provisions for continuous disinfection
- Non-design features
 - Qualified personnel
 - Monitoring
 - O & M program

California Water Recycling Criteria

- Agricultural Uses -

Type of Use	Total Coliform Requirements	Treatment Required
Irrigation of fodder, fiber & seed crops, processed food crops, pasture for non-milking animals, orchards & vineyards (no contact with edible portion of crop)	None specified	<ul style="list-style-type: none">• Secondary
Irrigation of pasture for milking animals	23/100 mL	<ul style="list-style-type: none">• Secondary• Disinfection
Irrigation of food crops (no contact with edible portion of crop)	2.2/100 mL	<ul style="list-style-type: none">• Secondary• Disinfection
Irrigation of any food crop where reclaimed water comes in contact with the edible portion of the crop, including root crops	2.2/100 mL	<ul style="list-style-type: none">• Secondary• Filtration• Disinfection

FACILITY FUNDING

- **Wastewater Facilities - \$130 M**

- Environmental Protection Agency (EPA) clean water grants 75%
- California State Water Resources Control Board (SWRCB) clean water grants 12.5%
- Tax free bonds/interest 12.5%
- Utility fee for rate payers

- **Reclamation Facilities - \$75 M**

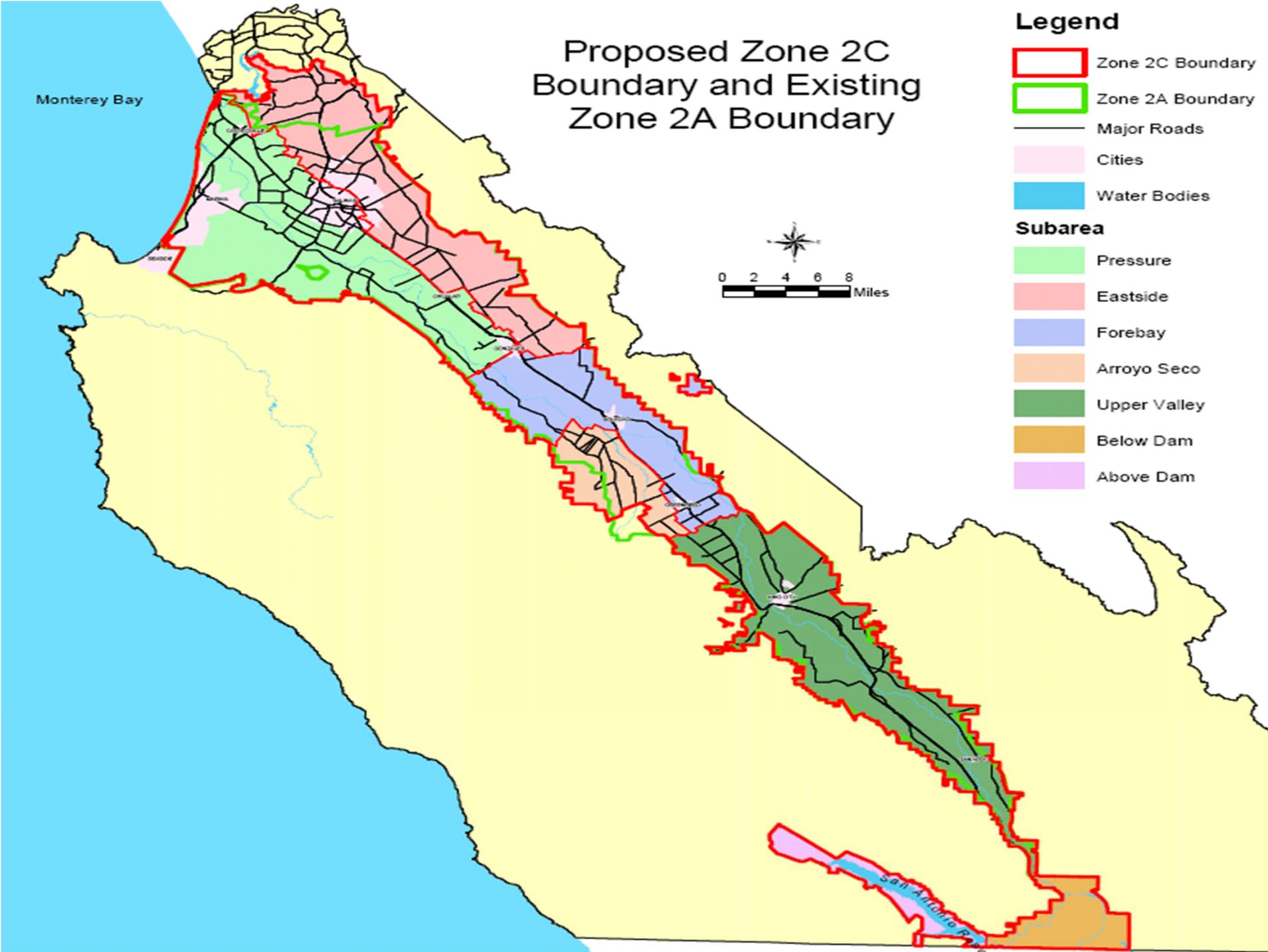
- Low interest loans from the Bureau of Reclamation & SWRCB
- Salinas Valley landowners pay property assessment for benefit
- Water delivery charge. Users pay about 50% cost of water



Proposed Zone 2C Boundary and Existing Zone 2A Boundary

Legend

- Zone 2C Boundary
- Zone 2A Boundary
- Major Roads
- Cities
- Water Bodies
- Subarea**
- Pressure
- Eastside
- Forebay
- Arroyo Seco
- Upper Valley
- Below Dam
- Above Dam



Property Tax Annual Assessment per Acre

- Within Project **\$303.26**
- Agriculture North **\$11.61**
- Agriculture South **\$5.15**
- 1-4 Unit Residential **\$11.61**
- Commercial/Industrial **\$101.22**
- Dry Farming **\$1.24**

Cost for Water

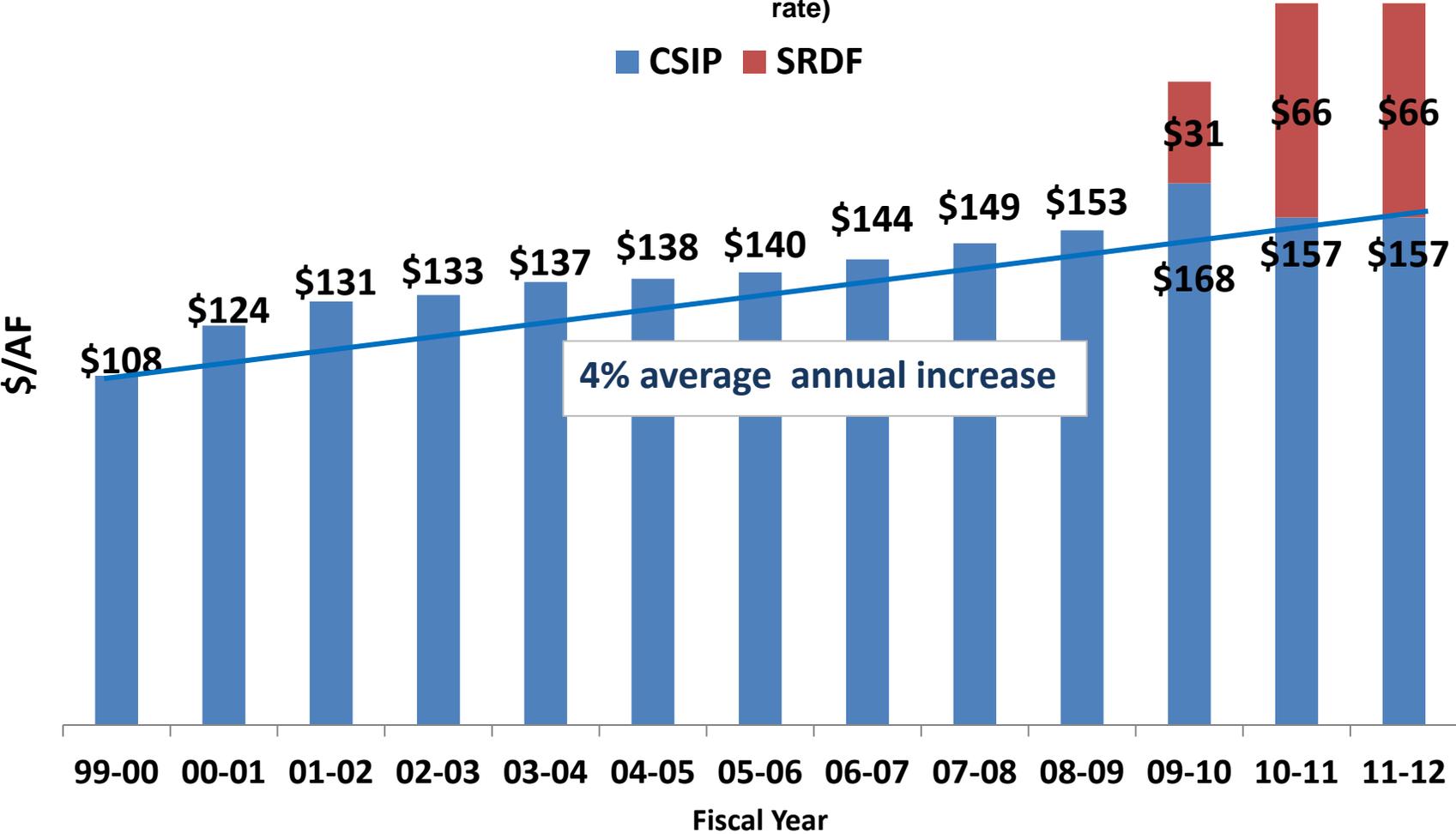
- Land Assessment \$303.26/acre/year
 - Water Delivery Charge \$71.73/AF
 - Combined Cost **About \$ 223/AF for 2.0 AF/acre. Well water costs \$90-\$130/AF**
- 95% Use Recycled Water**

CSIP Historical Water Cost

\$/Acre-Foot

(includes property assessments and water use charges for typical 2 AF/Acre application rate)

CSIP SRDF



Regional Treatment Plant 1989

Capacity: 29.6 MGD Current Flow: 18 MGD
Located on 100 Acres

Solar Facility 2010
1.12 MW

Tertiary Treatment Plant 1998

Capacity: 29.6 MGD Current Flow: 18 MGD

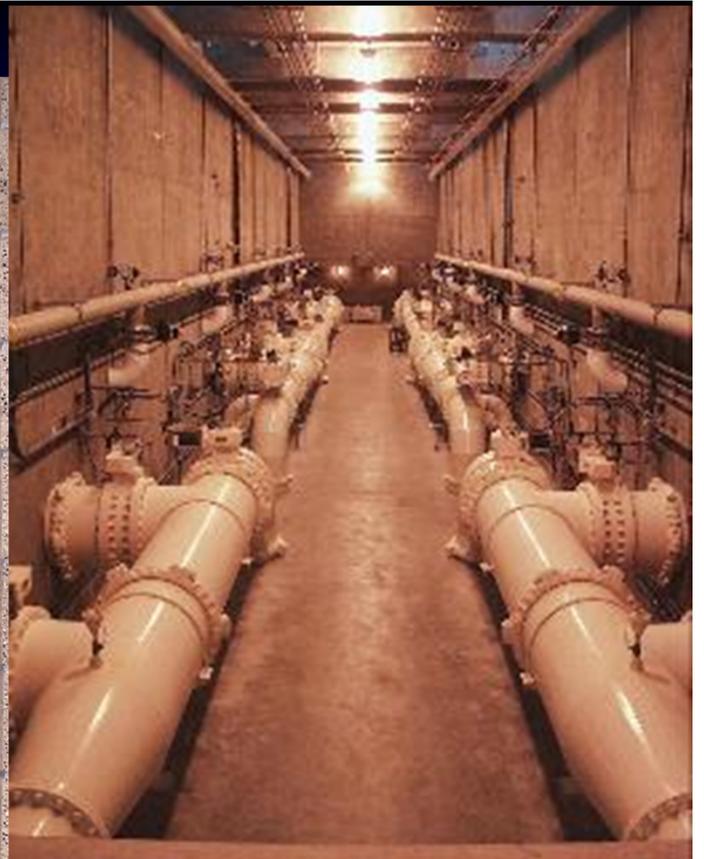


Control Room



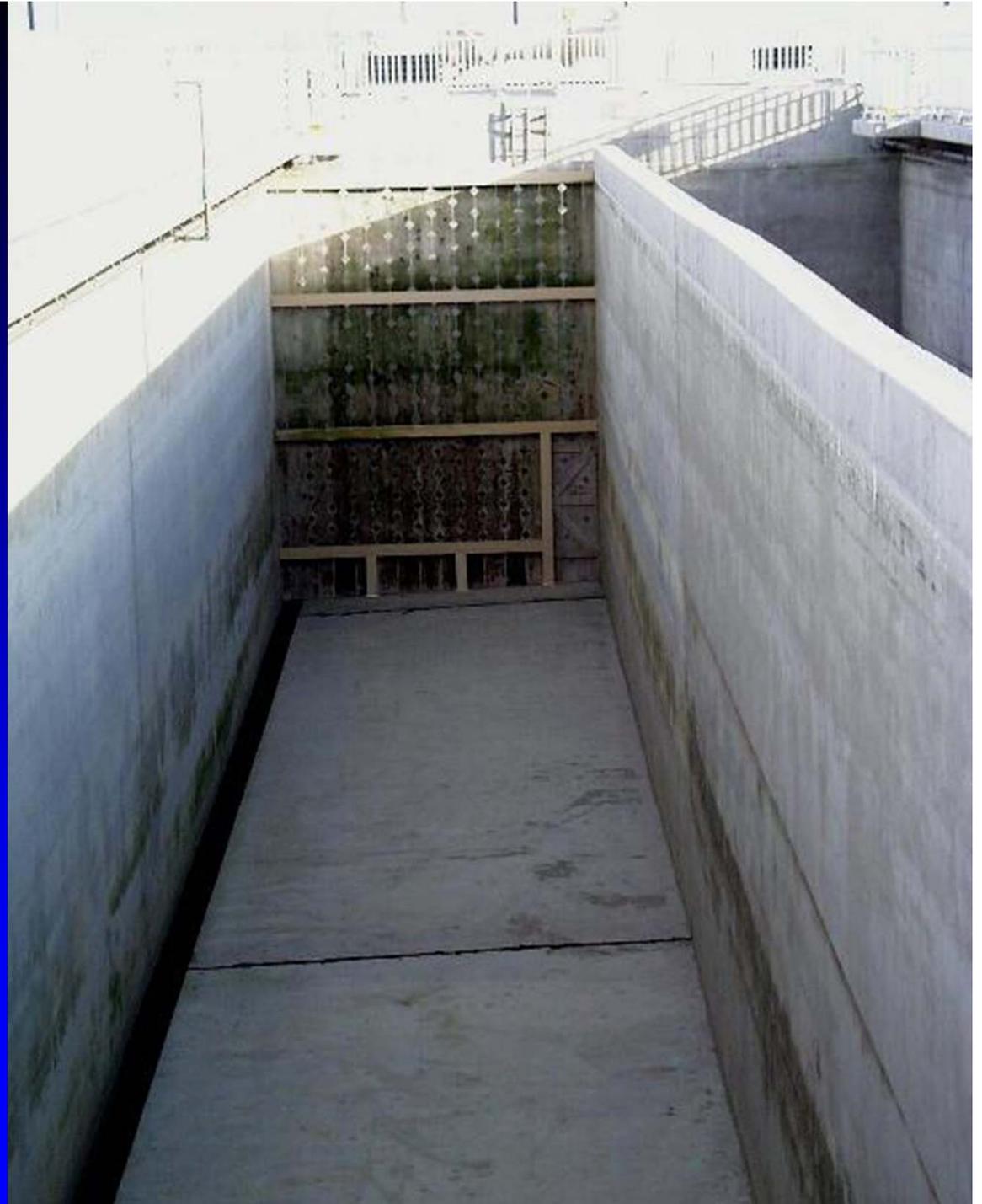


Coagulation Flocculation



Filtration

Disinfection





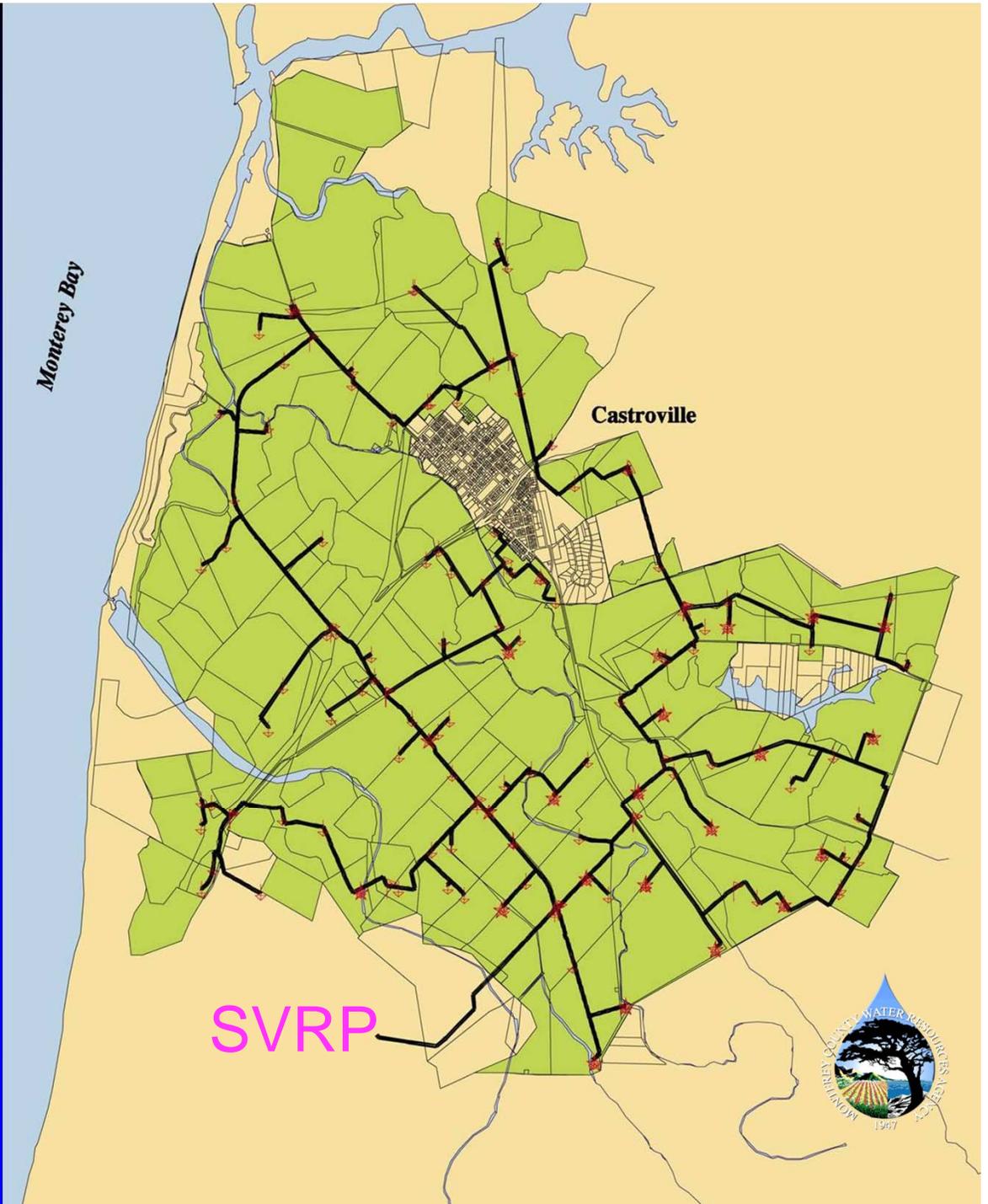
**Storage
Pond**

DISTRIBUTION

Castroville Seawater Intrusion Project (CSIP)

- 48 miles of pipeline
- 21 supplemental wells
- 222 parcels
- 112 turnouts
- 9 monitoring stations
- 3 booster pumps stations
- \$30M Treatment Plant and \$37M Distribution System

12,080 acres







Turnout Without Electrical Power



Turnout With Electrical Power

Major Crops Grown

Artichokes



Strawberries



Lettuce



Cauliflower



Broccoli



Celery



Furrow irrigation



Sprinkler irrigation





Surface drip irrigation

Buried drip irrigation



Drip & Sprinkler irrigation



Organic Crops

- Artichokes
- Strawberries

IRRIGATED WITH RECLAIMED WATER

DO NOT DRINK - AVOID CONTACT

WASH WITH SOAP & POTABLE WATER

REGADO CON AGUA RECICLADA

NO TOME - EVITE CONTACTO

LAVESE CON JABON Y AGUA POTABLE

Site Labeling

IRRIGATION WATER
NOT FOR DRINKING

AGUA PARA RIEGO
NO PARA TOMAR

**NO
TRESPASSING
PROHIBIDO
EL PASO**

WALTON HILLS, OH 44146-6106

3070

PRIVATE PROPERTY

NO TRESPASSING

**PROPIEDAD PRIVADA
SE PROHIBE EL PASO**

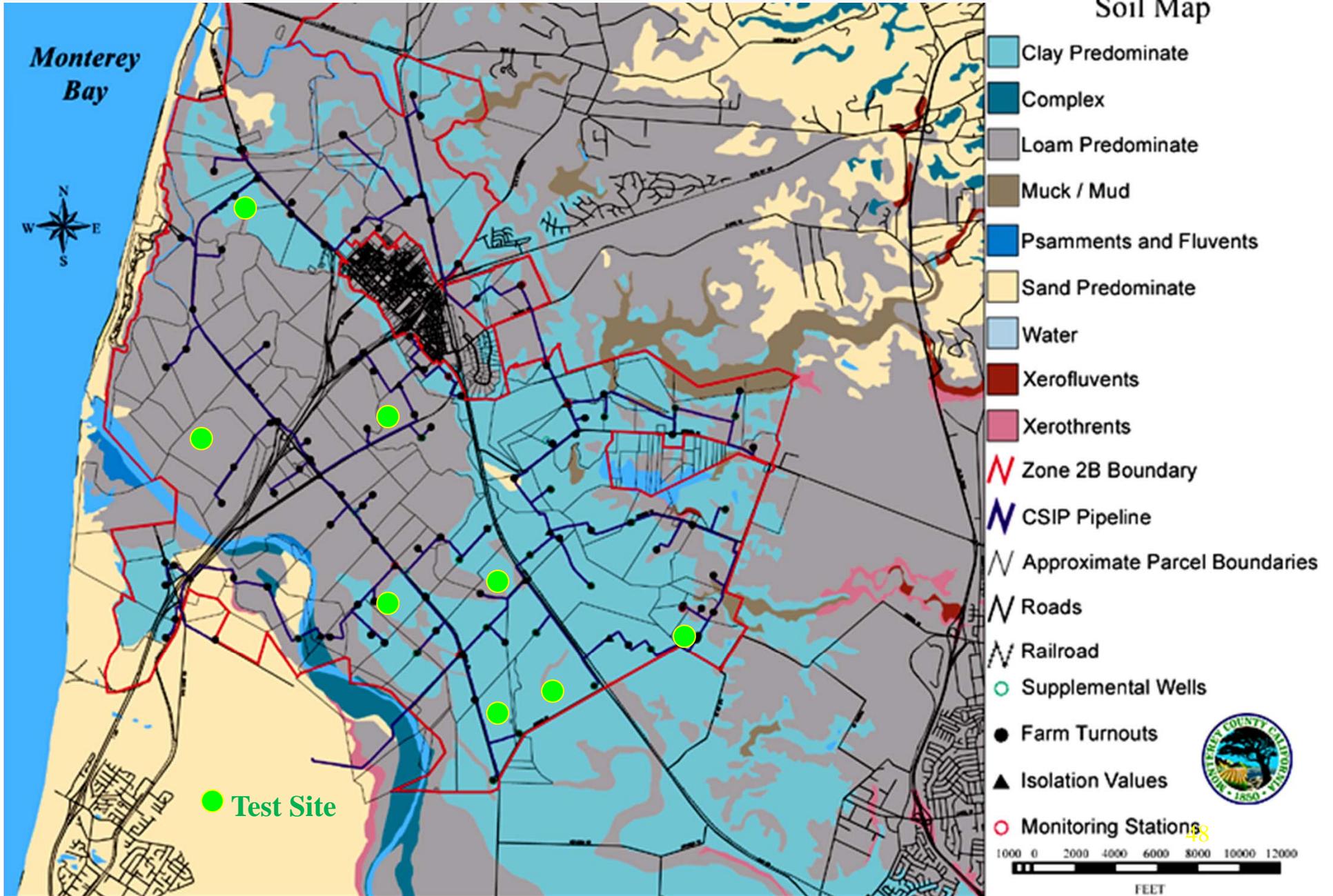
SEA MIST FARMS - MOLERA RANCH 4

RECYCLED WATER QUALITY 2012

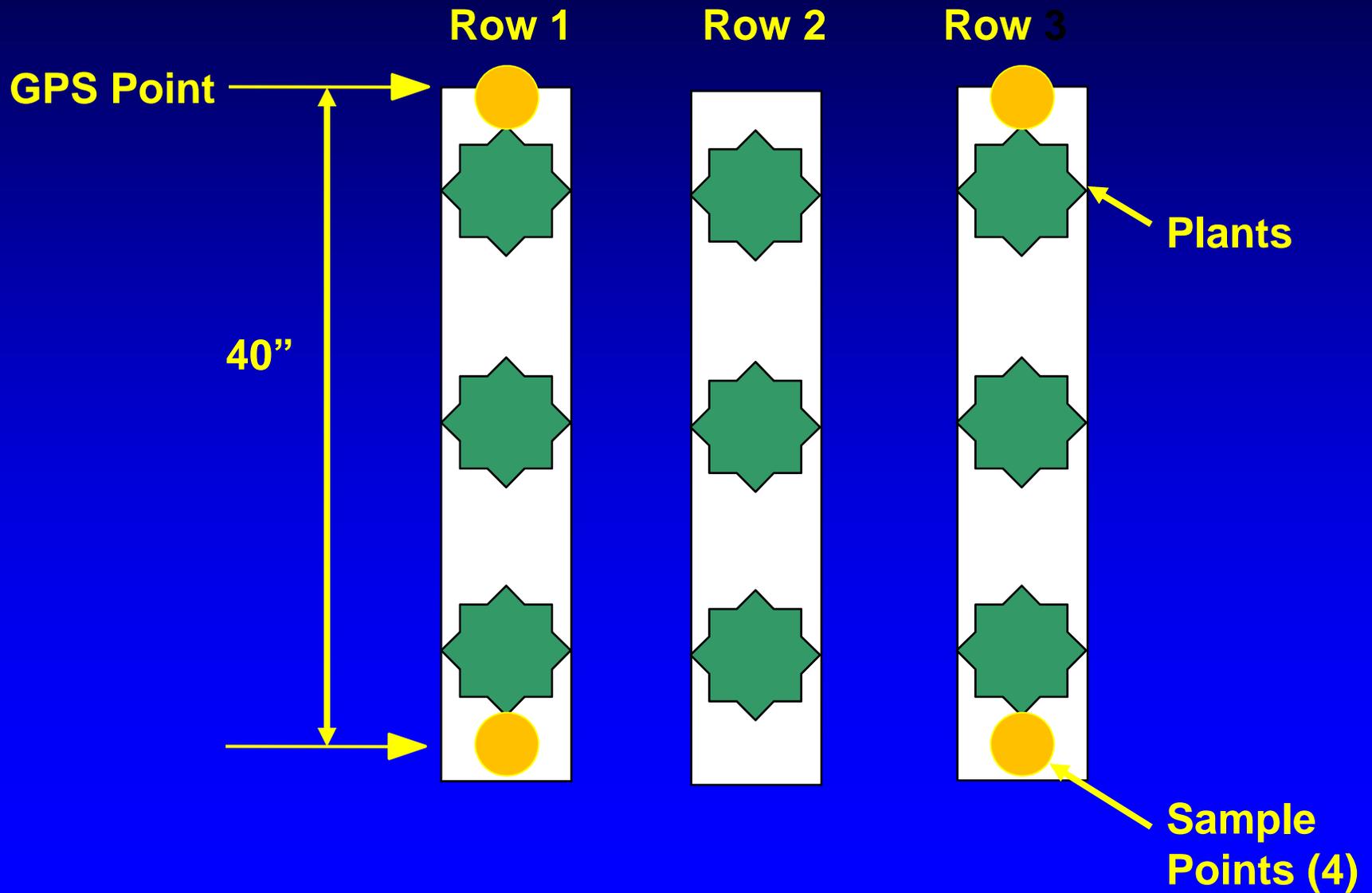
TDS	807 mg/L
SAR	4.8
pH	7.1
Chloride	262 mg/L
Sodium	172 mg/L
Total Nitrogen	42 mg/L
Total Phosphorous	3.2 mg/L
Potassium	19 mg/L

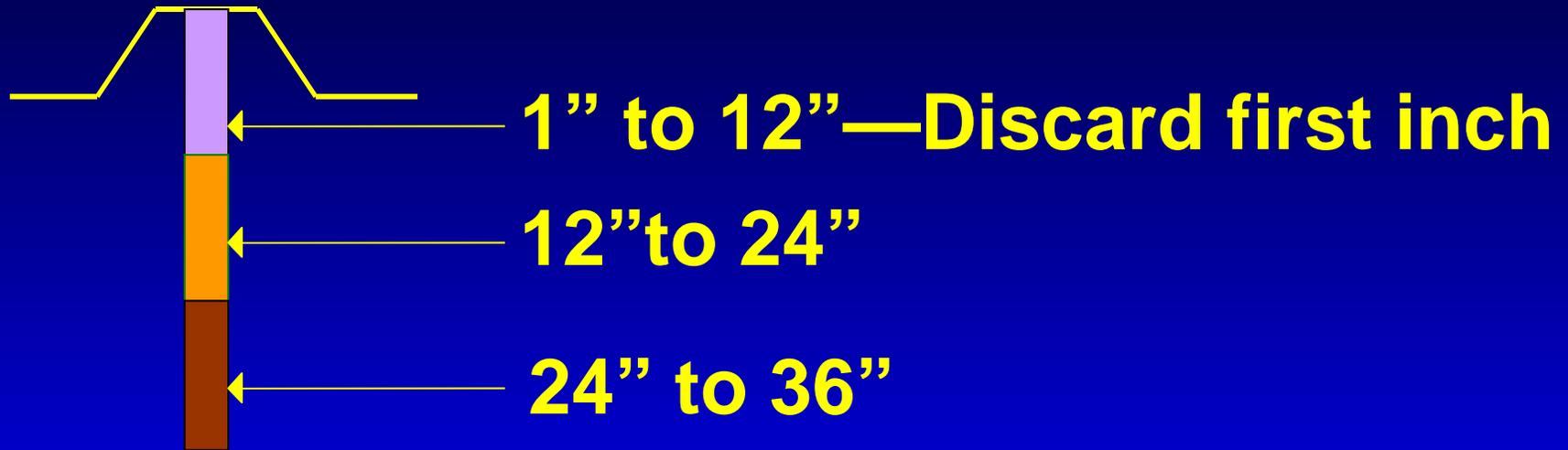
Soil Salinity Study 2000 to Present

Monterey County Water Recycling Projects Soil Map

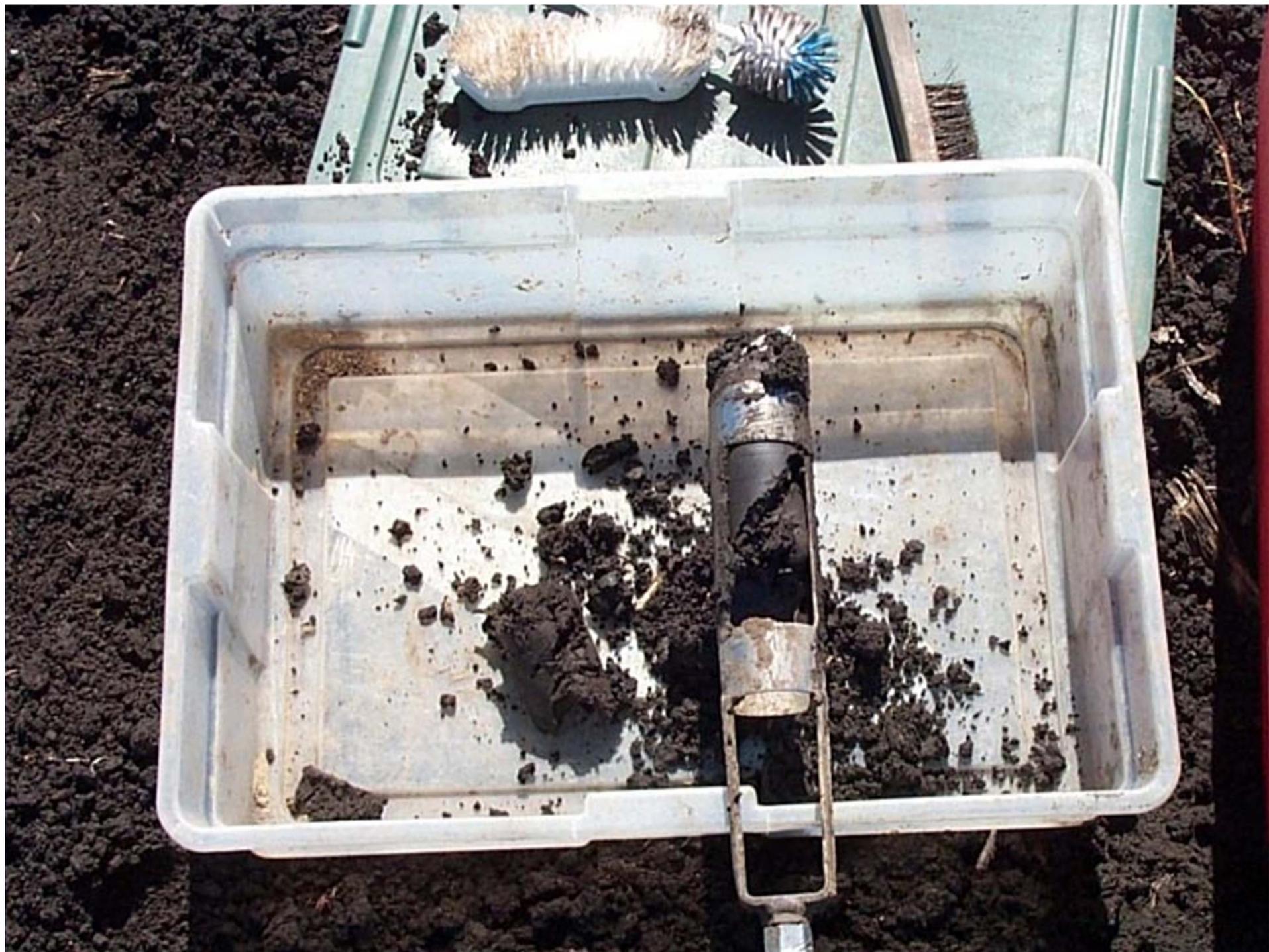


Field Plan View





Soil Core Sample Profile



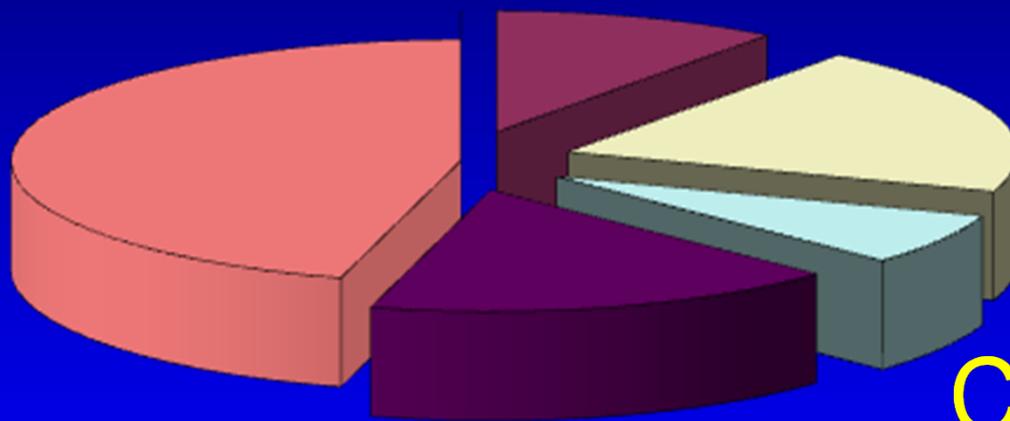


Sewage Sodium Sources

Potable

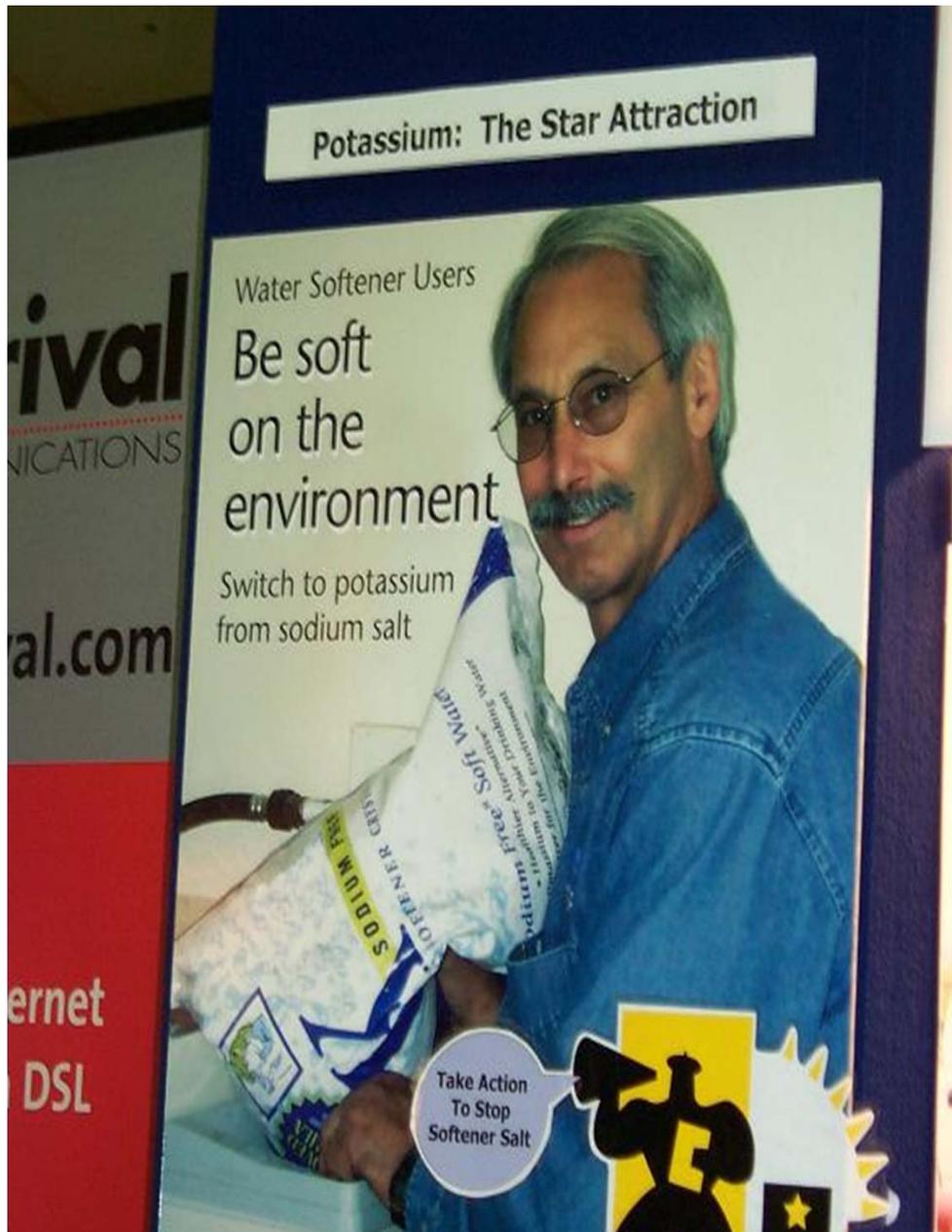
Major Users

Residential



Commercial

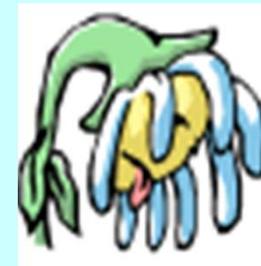
Uncontrollable
Sources



If you use a water softener...

Be Soft on the Environment! Use Potassium

Sodium softener salt is very hard on the plants that are irrigated with recycled water.



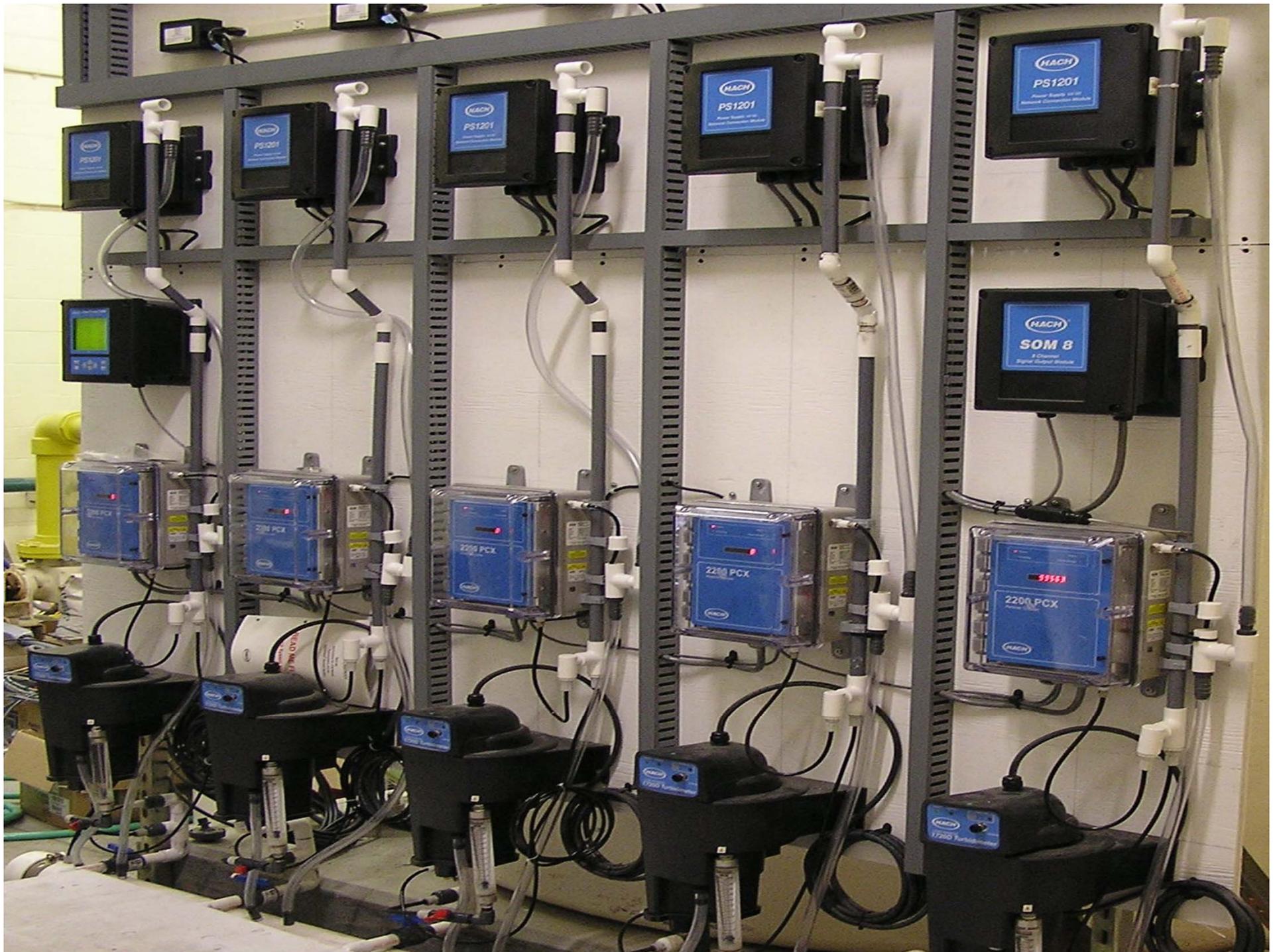
If you use a water softener consider using potassium instead of sodium salt. Ask for it next time you shop for softener salt. Improving the quality of recycled water protects our water supply.

Salt Reduction Outreach Program

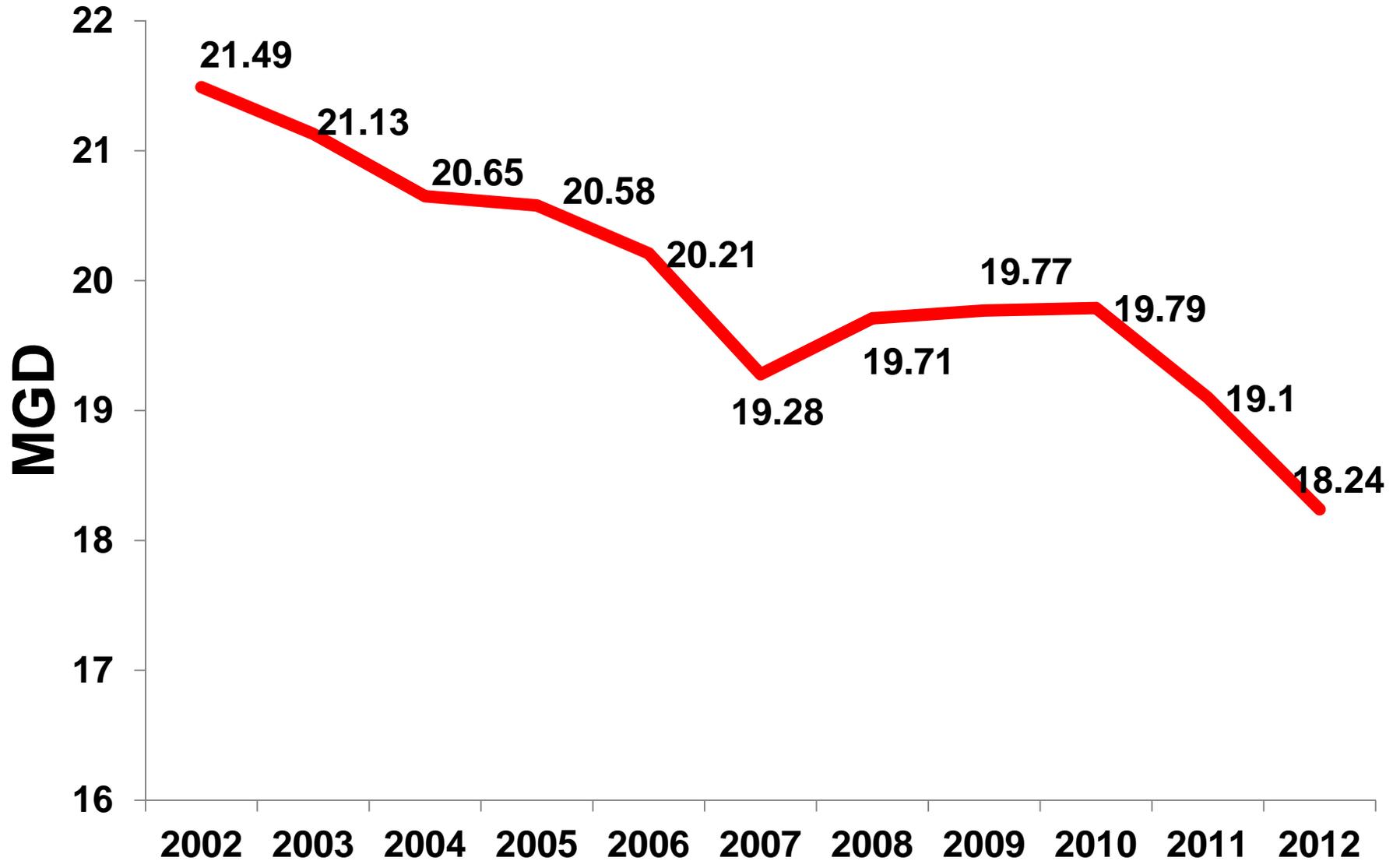


Brine Removal and Disposal





Annual Average Sewage Influent





Groundwater Replenishment Water Sources

- Industrial (Produce Wash Water) Waste
- Agricultural Tile Drain Water
- Stormwater
- Secondary Effluent

Board Goal = Zero Discharge

A Little Help Here, Please!





Reclaimed Water

**Successful
Sustainable**

Reliable

“New” Water

Reuse

Safe



Questions?

***“Changing Wastewater
To Safe Water”***

Bob Holden

831-645-4634

bobh@mrwpc.com