

Regulatory Challenges of Protecting Aquatic Life and Controlling Contaminants

Tessa Fojut

Central Valley Regional Water Quality
Control Board



Water Boards

- Mission: To preserve and enhance the quality of California's water resources for the benefit of present and future generations
- Protect beneficial uses of water
 - Aquatic life
 - Drinking water
 - Recreation
 - Etc.
- **It's all about the BENEFICIAL USES!**

Water Boards

- Water Boards authority
 - Clean Water Act
 - Porter-Cologne Water Quality Control Act
- Water Quality Control Plans (Basin Plans)
 - Beneficial uses
 - Water quality objectives
 - Implementation programs

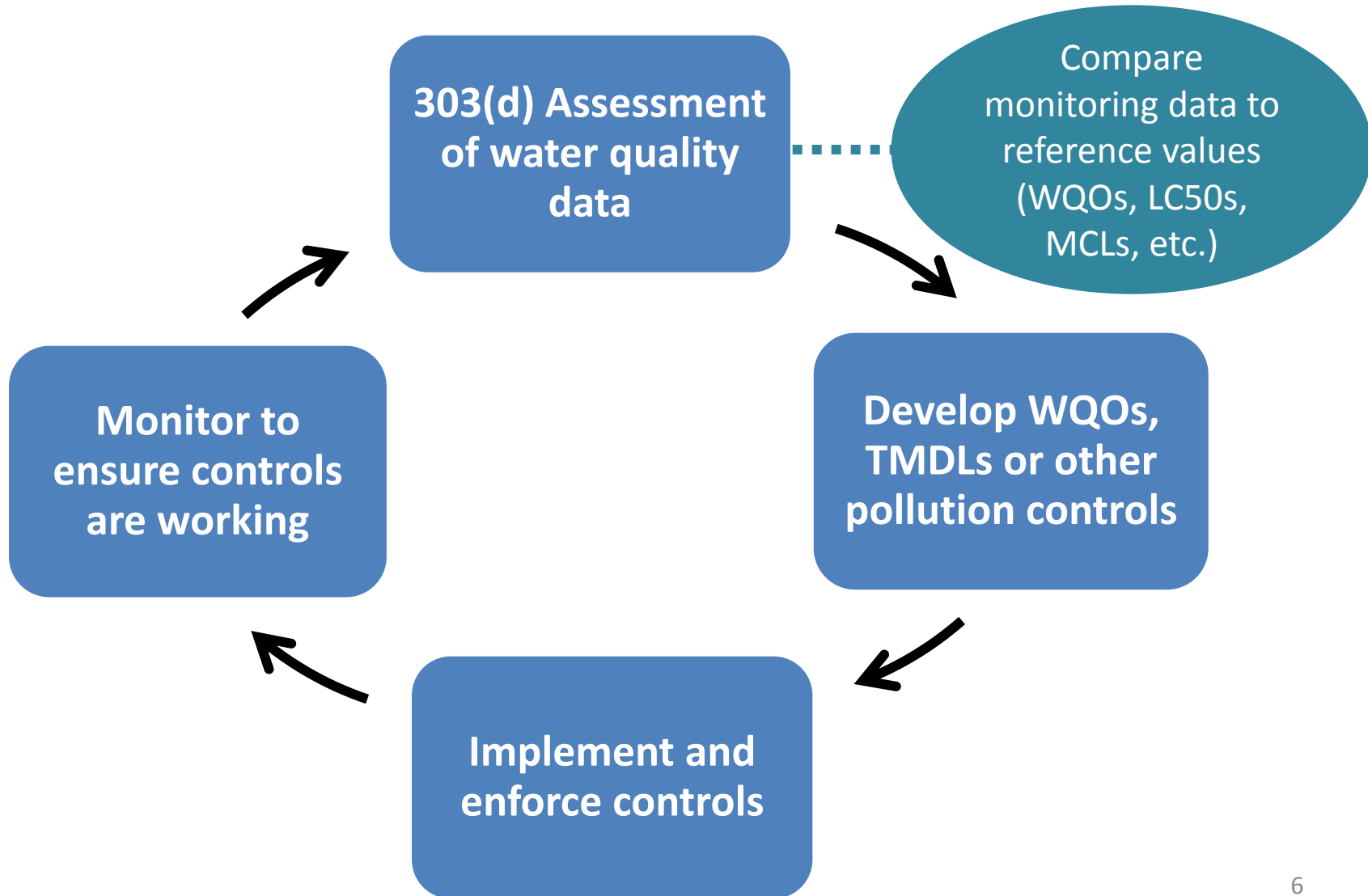
Contaminants

- **Pesticides**
- Metals (e.g., Cu, Hg)
- Industrial chemicals (PCB's, PAH's, PBDE's)
- Pharmaceuticals & Personal Care Products
- Nutrients
- Sediments
- Degradates, metabolites, “inert” ingredients
- Others (pathogens, cyanotoxins, EDC's, etc.)
- **MIXTURES of ALL of the above**

Contaminant Controls

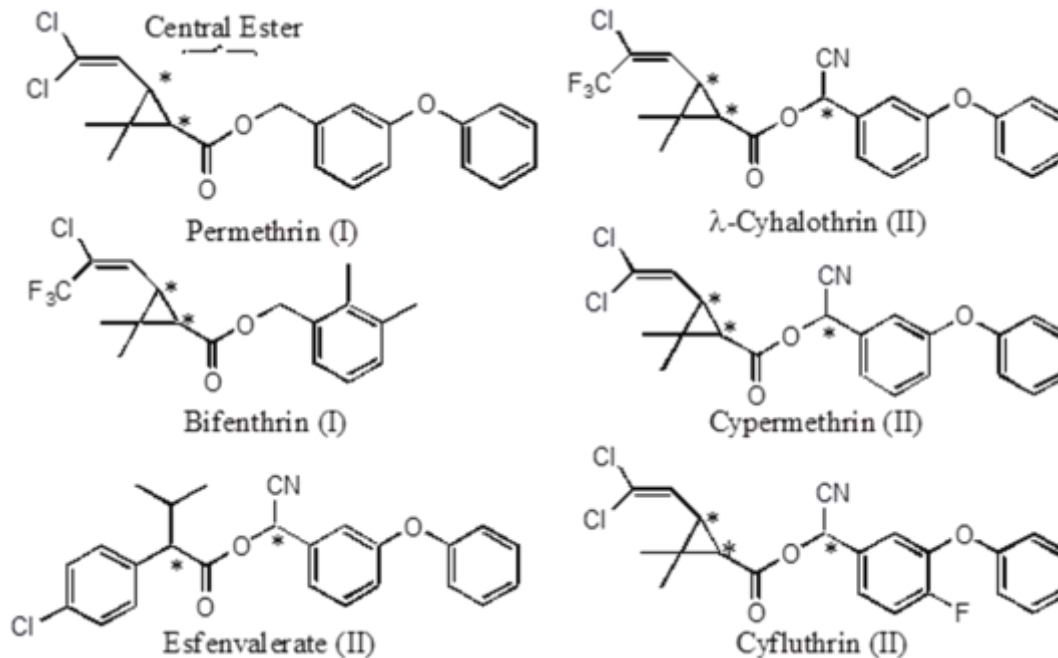
- Amend the Basin Plan
 - Water quality objectives
 - Total maximum daily loads (TMDLs)
- Regulatory programs & permits
 - Irrigated lands regulatory program
 - NPDES permits
 - Wastewater
 - Municipal storm water
- Coordination with other agencies

Water Board's Regulatory Process



Case Study: Pyrethroids

- Broad spectrum insecticides
- ~25 compounds
- Hydrophobic



Case Study: Pyrethroids

Toxic to aquatic organisms at very low concentrations



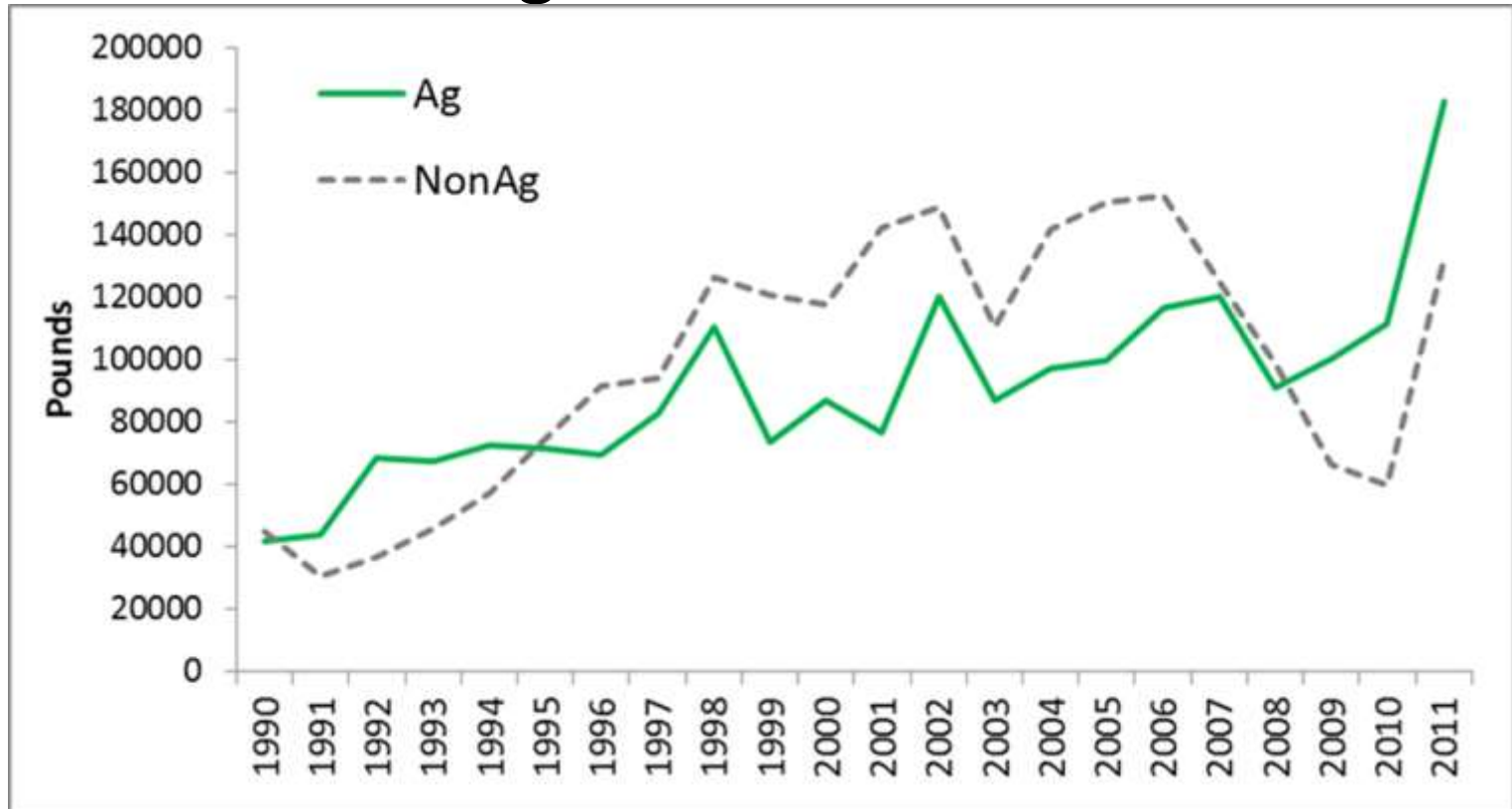
Salmonid
reproductive
effects 4-28 ng/L



Hyalella azteca
LC₅₀s: 2.1 - 21 ng/L

Case Study: Pyrethroids

Pyrethroids are widely used in both urban and agricultural areas



Case Study: Pyrethroids

Transported to water mainly via

Urban runoff

Agricultural runoff

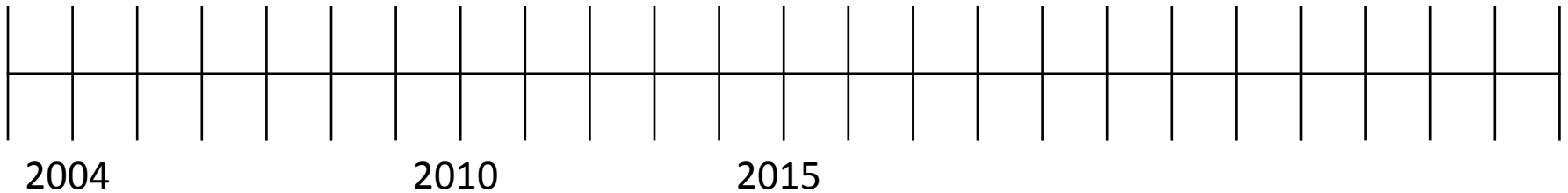


Wastewater
treatment
plants

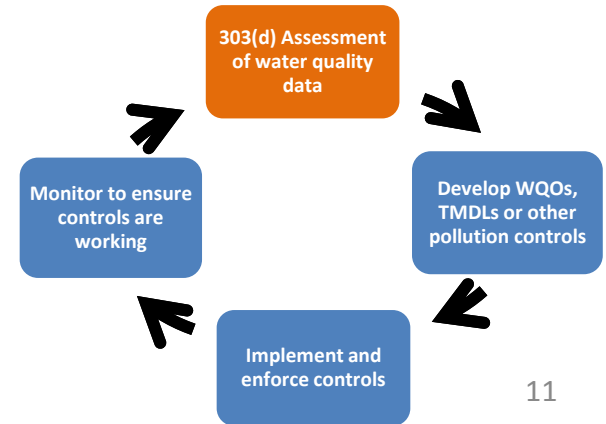


Pyrethroids Timeline

Pyrethroid toxicity detected in CA sediments (Weston et al)



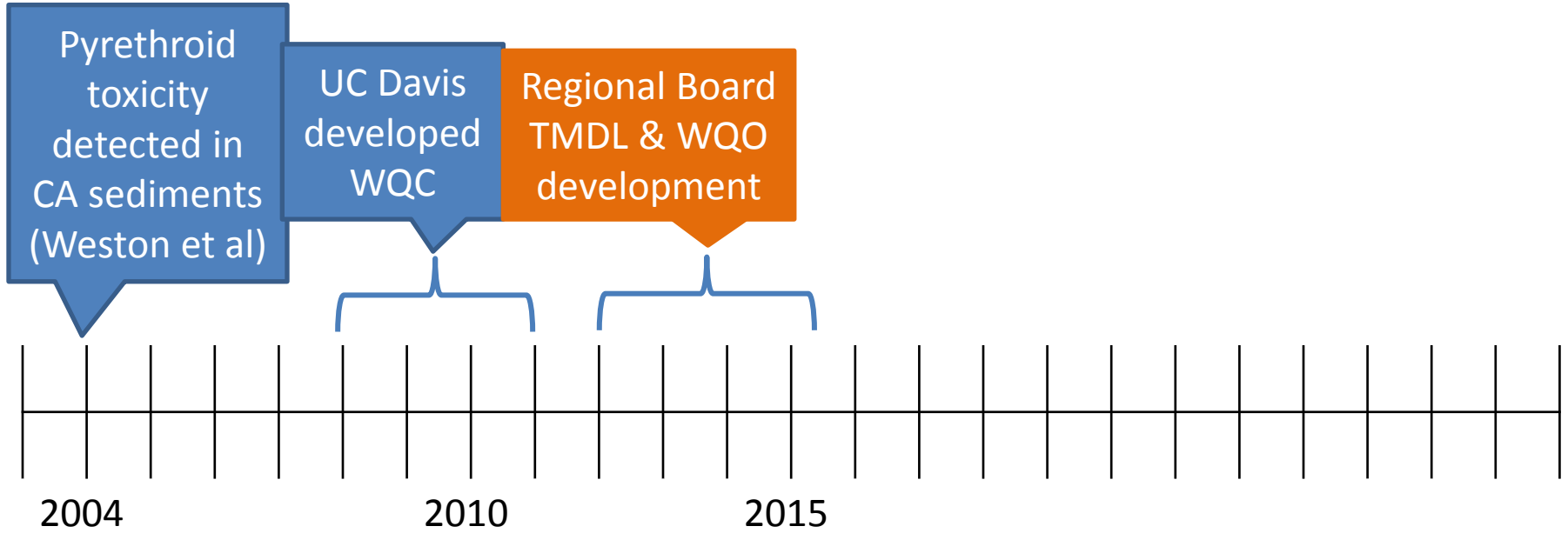
15 pyrethroids 303(d) listings



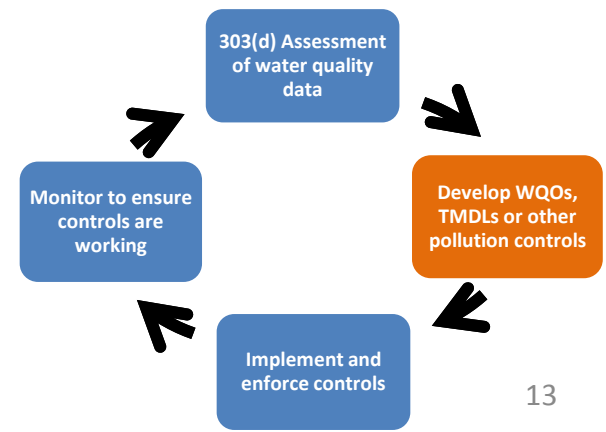
Challenges - Assessing pesticides

- Limited reference values
 - Few objectives & criteria, often use LC50s
 - Chronic sublethal effects understudied
- Limited monitoring data
 - May not represent peak concentrations, duration of exposures, spatial/temporal occurrence
 - Need for environmentally relevant reporting limits
 - Limited standard EPA analytical methods
 - \$\$\$: many compounds at trace levels

Pyrethroids Timeline



15 pyrethroids
303(d) listings



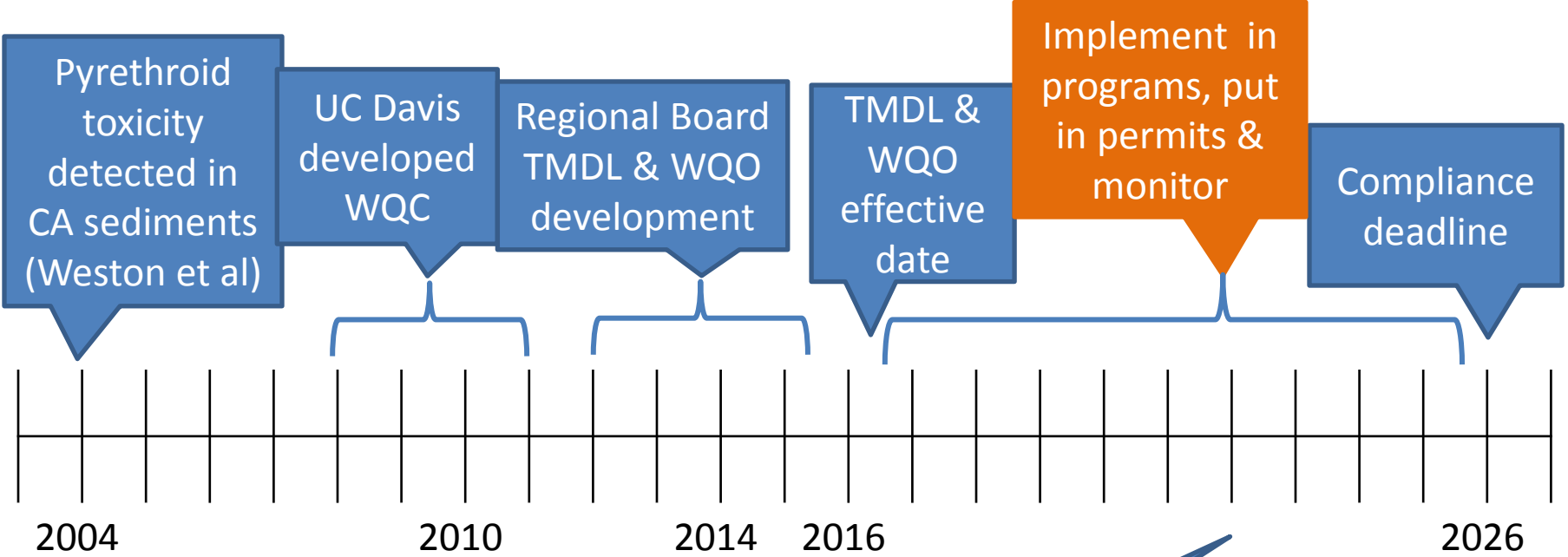
Development of TMDLs & WQOs

- 303(d) list impairments
 - Urban waters → TMDLs implemented through MS4 NPDES permits
 - Ag waters → Controls implemented through Irrigated Lands Regulatory Program
- To prevent future impairments
 - Numeric water quality objectives for 6 pyrethroids
 - Apply in all waters with aquatic life beneficial uses

Regulatory Challenges

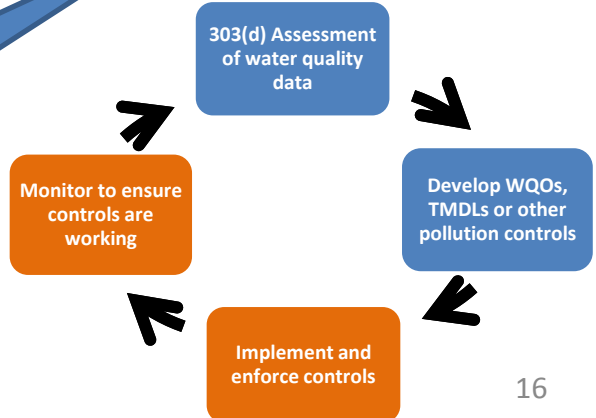
- Technical Challenges
 - How to account for bioavailability in compliance determination and assessing monitoring data?
 - Method detection limits are above some proposed water quality objectives
- Implementation Challenges
 - Lack of effective treatment for pyrethroids in wastewater
 - Difficulty in controlling homeowner uses of pyrethroids – lack of authority

Pyrethroids Timeline



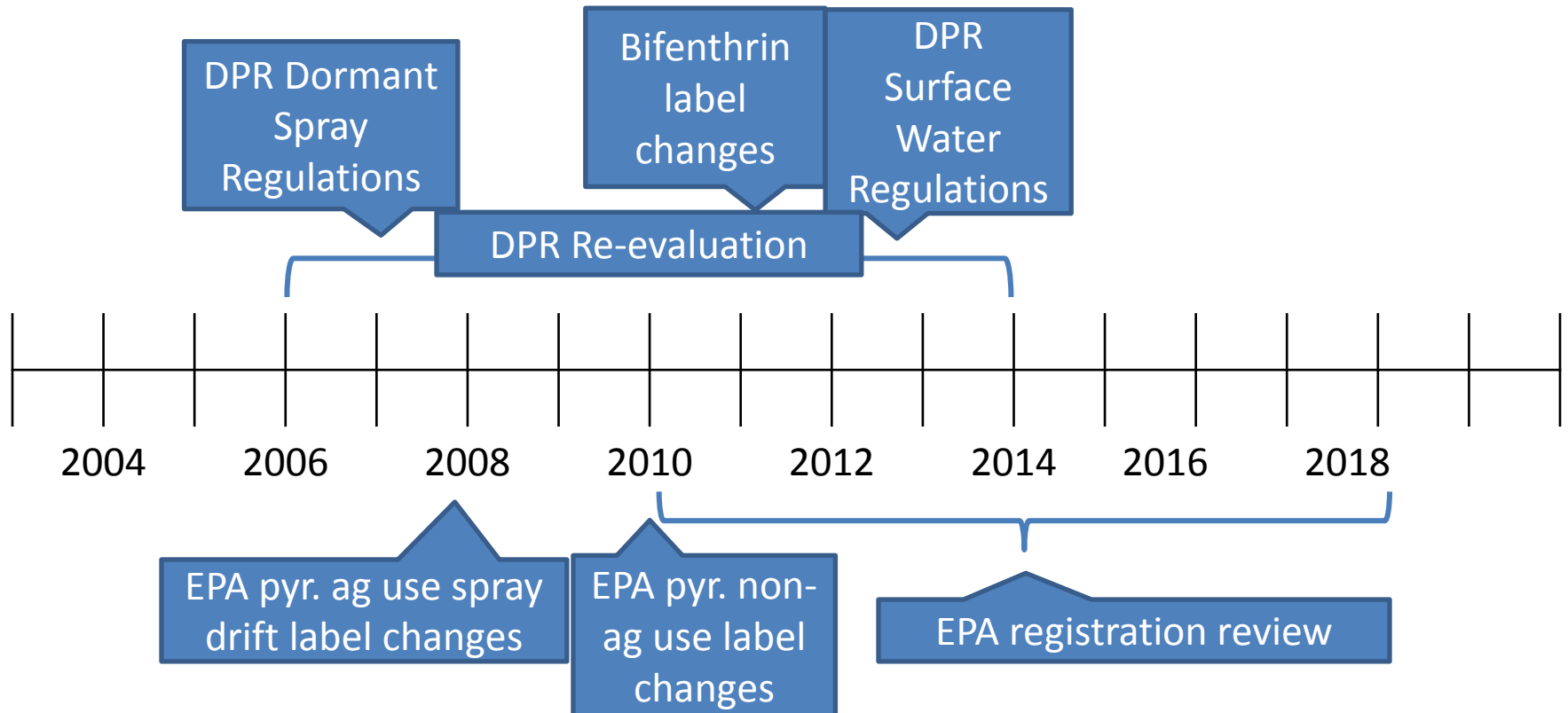
15 pyrethroids 303(d) listings

Projected 303(d) assessment



Agency Cooperation

- Pesticide use and conditions of use are regulated by U.S. EPA and DPR



Pesticide Treadmill

- When one pesticide decreases in use, another one increases → next water quality issue
- OC's → OP's → Pyrethroids → Fipronil, neonic's
- **Goal:** Develop a management framework to **prevent** pesticide impairments
 - Get off the treadmill!

Measuring Success

Can we do better monitoring?

- Delta RMP collaborative approach
 - Monitoring of concentrations of specific contaminants
 - Monitoring of toxicity in a specific water

Can we measure recovery of populations?

Thank You

Tessa Fojut

Tessa.Fojut@waterboards.ca.gov

Project website

**Central Valley Pyrethroid Pesticides TMDL and Basin Plan
Amendment**

www.waterboards.ca.gov/centralvalley/