

Cooperative Monitoring Program

nutrient monitoring results



Nutrient Water Quality Symposium, Santa Maria

Central Coast Water Quality Preservation, Inc.

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Water Quality Constituents



Hydrolab instrument

(image from www.hydrolab.com)

- Water temperature
- pH
- Dissolved Oxygen
- Conductivity
- Salinity
- Turbidity
- Chlorophyll
- Dissolved Solids



Water samples to lab

(image from www.co.water.usgs.gov)

- Nitrogen
 - Nitrate
 - Ammonia
 - Ammonium
- Phosphorus
 - Orthophosphate
- Toxicity
 - Water (4x/yr)
 - Sediment (1x/yr)
- Organophosphate pesticides
 - Lower Salinas & Santa Maria only
 - 4x only

Components of Ag Runoff

- Fertilizer (*nitrate, ammonium, phosphate*)
 - Pesticides (*toxicity*)
 - Sediment (*turbidity*)
-

Effects of Ag Runoff

- Algae growth (*Chlorophyll, % algal cover*)
- Low oxygen (*dissolved oxygen*)

San Luis Obispo Area Sites

● = core CMP, monthly since 2005

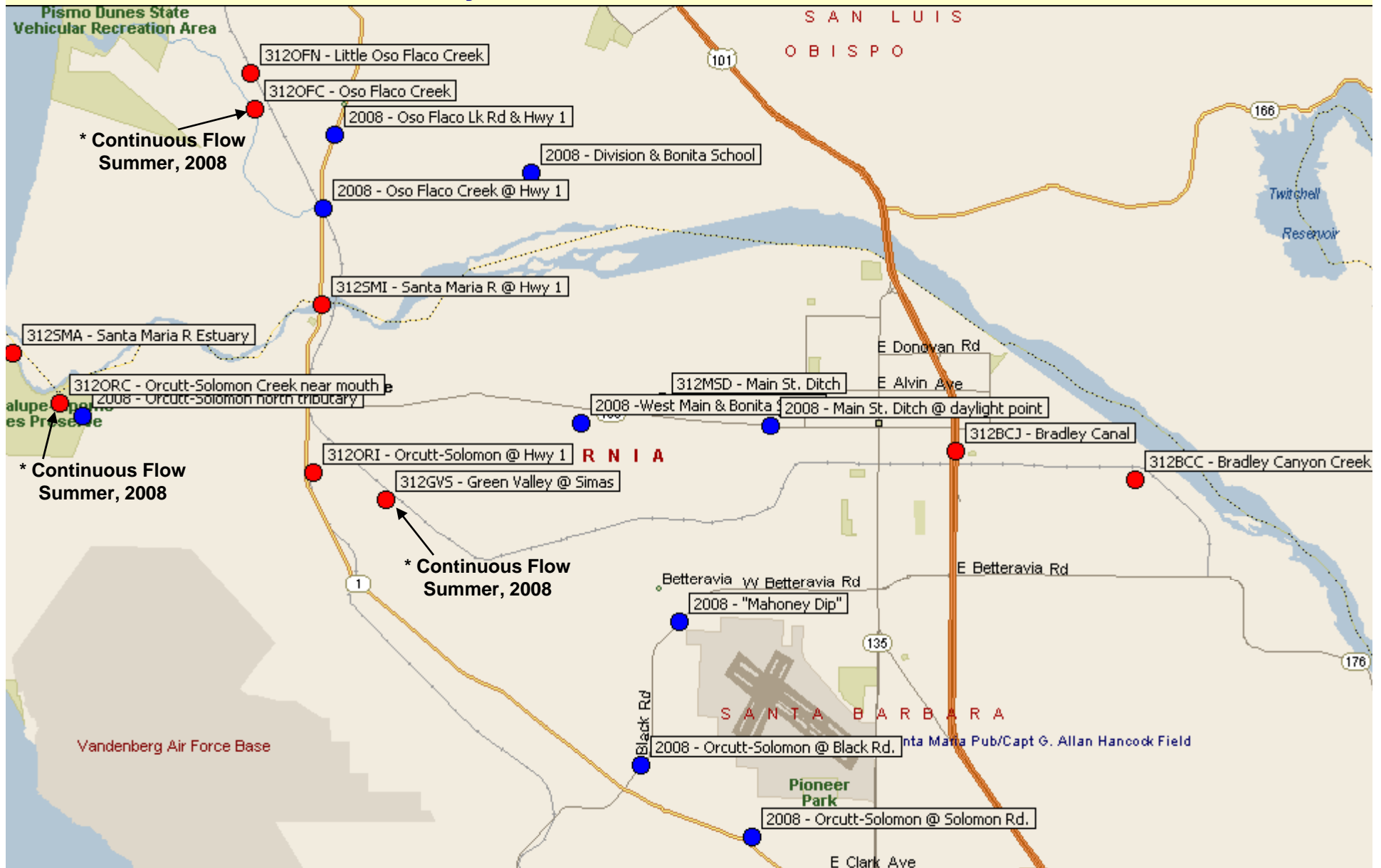
No 2008 Follow-up sites



Santa Maria Watershed Sites

● = core CMP, monthly since 2005

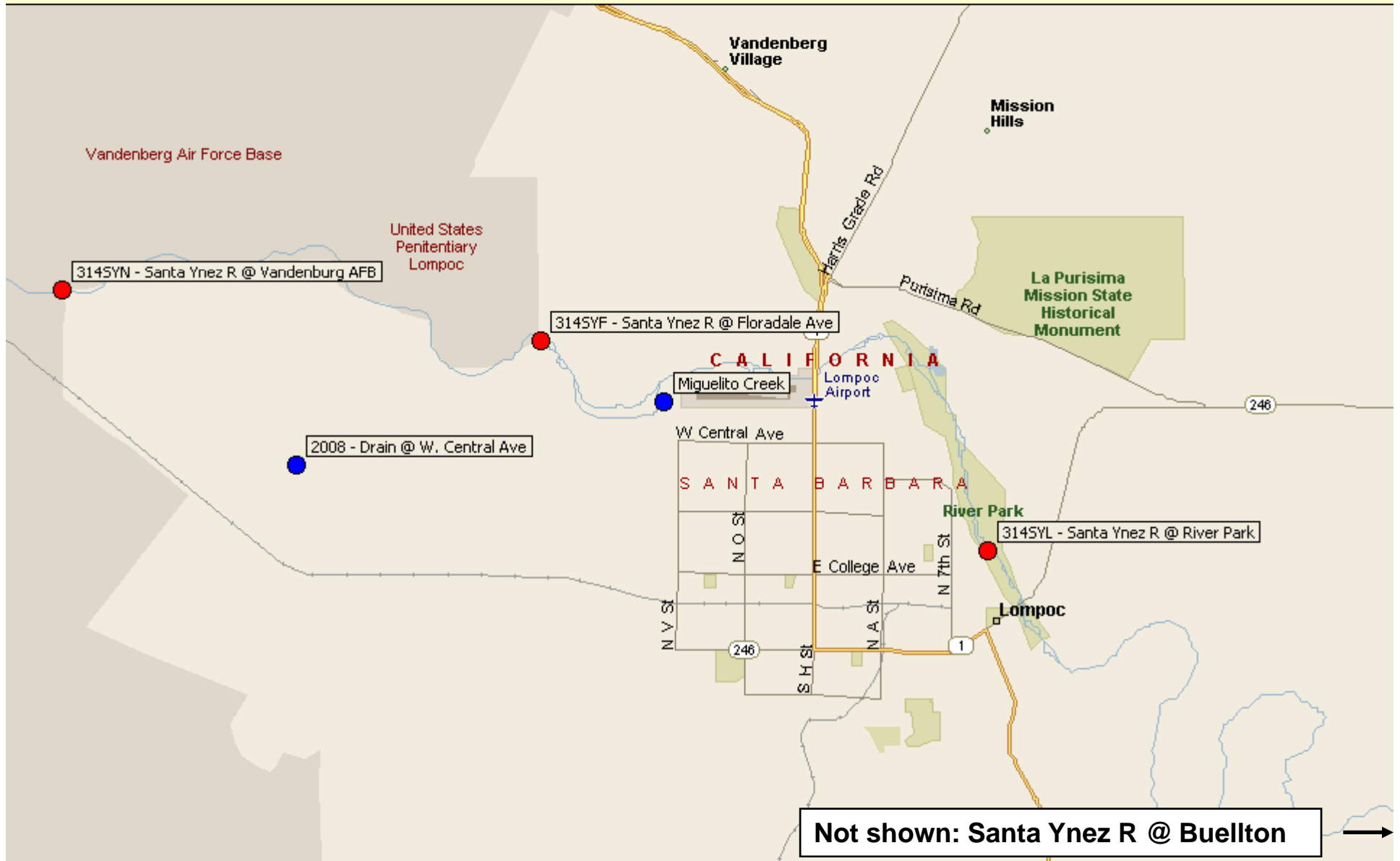
● = 2008 Follow-up, monthly in '08



Santa Ynez River

● = core CMP, monthly since 2006

● = 2008 Follow-up, monthly in '08



Santa Barbara Creeks

● = core CMP, monthly since 2006

● = 2008 Follow-up, monthly in '08





*Bradley Canal,
Santa Maria*

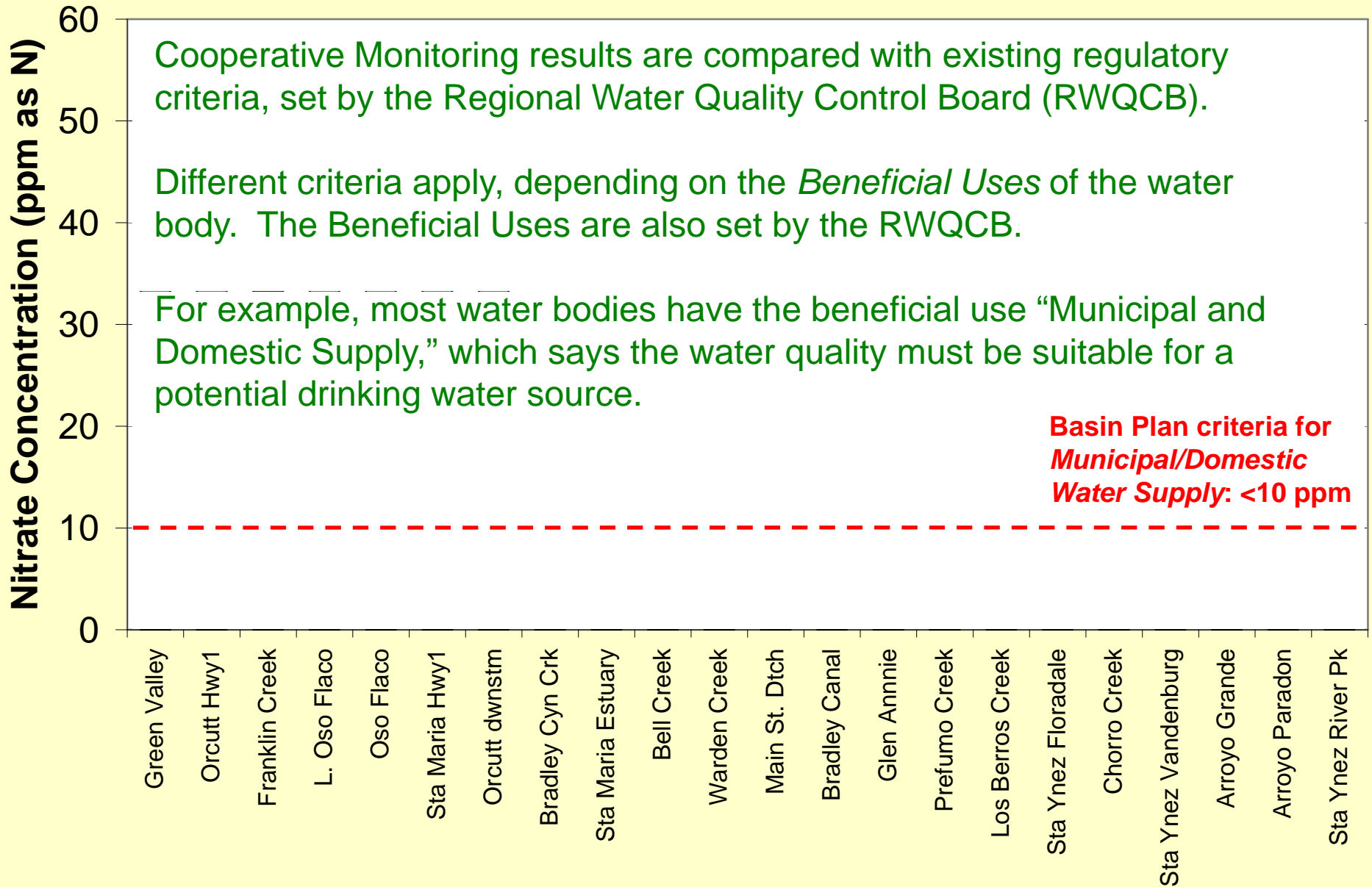


*Santa Ynez River,
Lompoc*



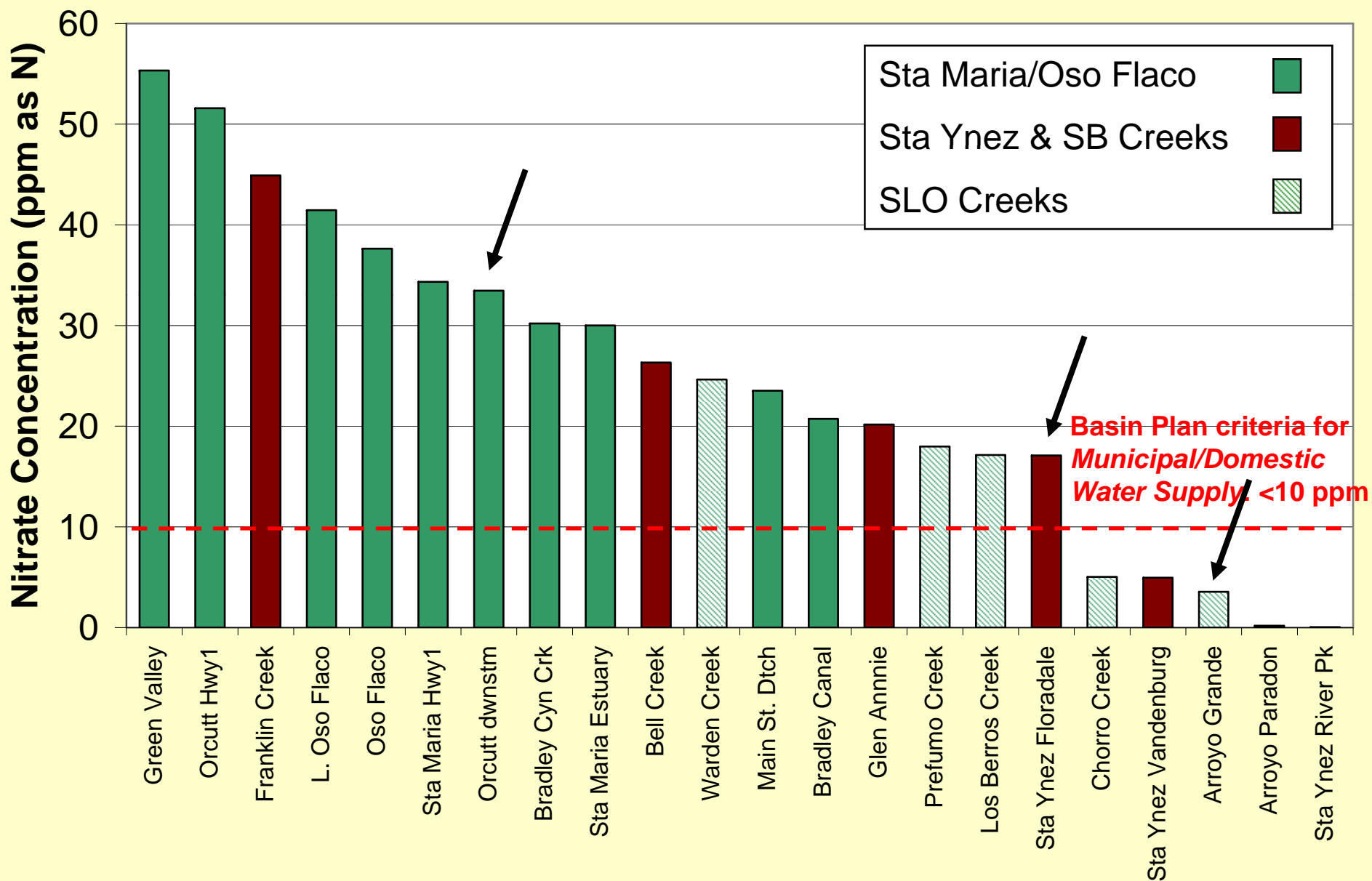
*Oso Flaco
Creek*

Water Quality Objectives

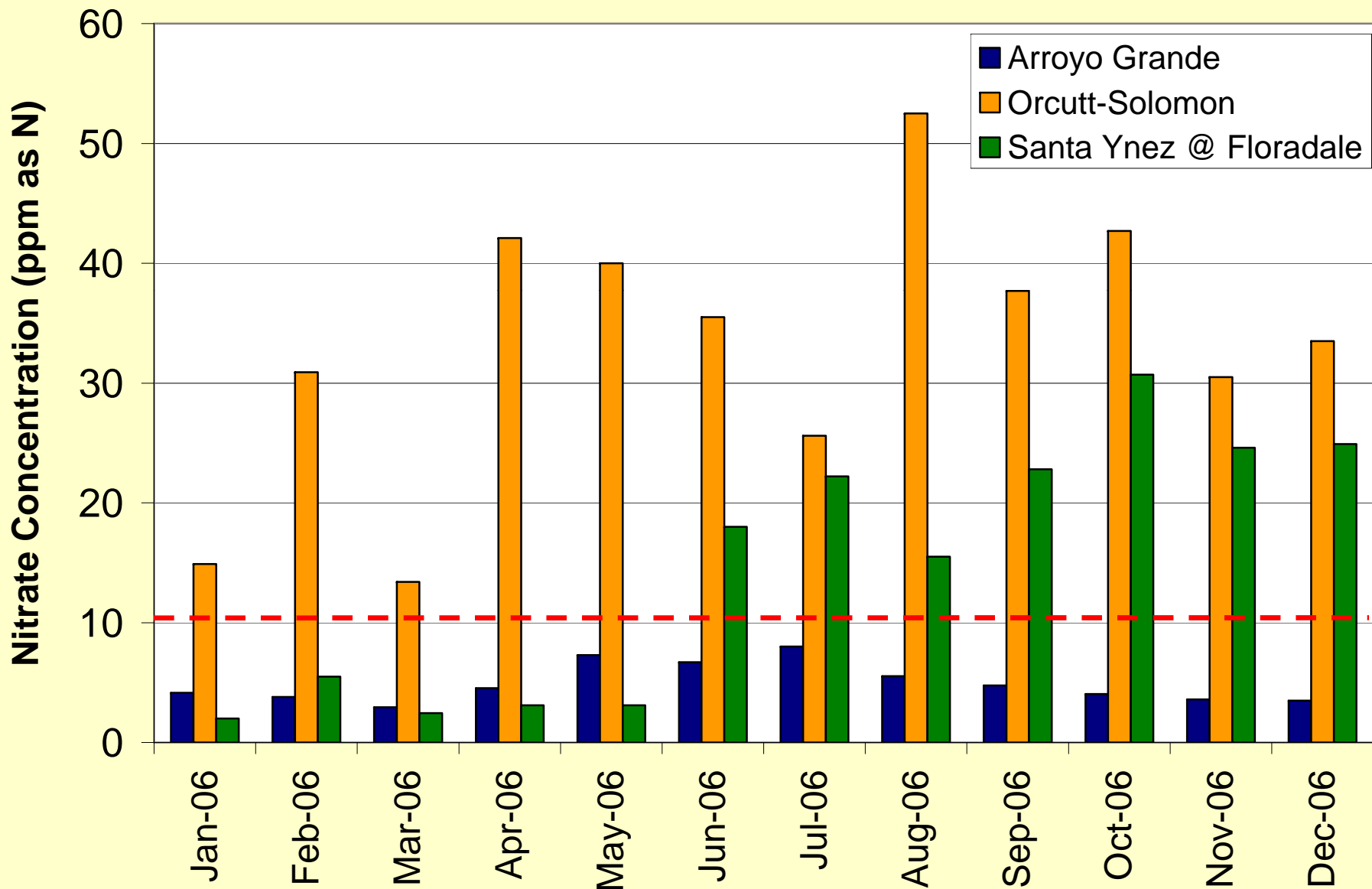


Nitrate Results for Southern Sites

(averages of all monthly samples, Jan '05 or '06 – Dec '07)



Monthly nitrate results from three SLO/SB sites in 2006



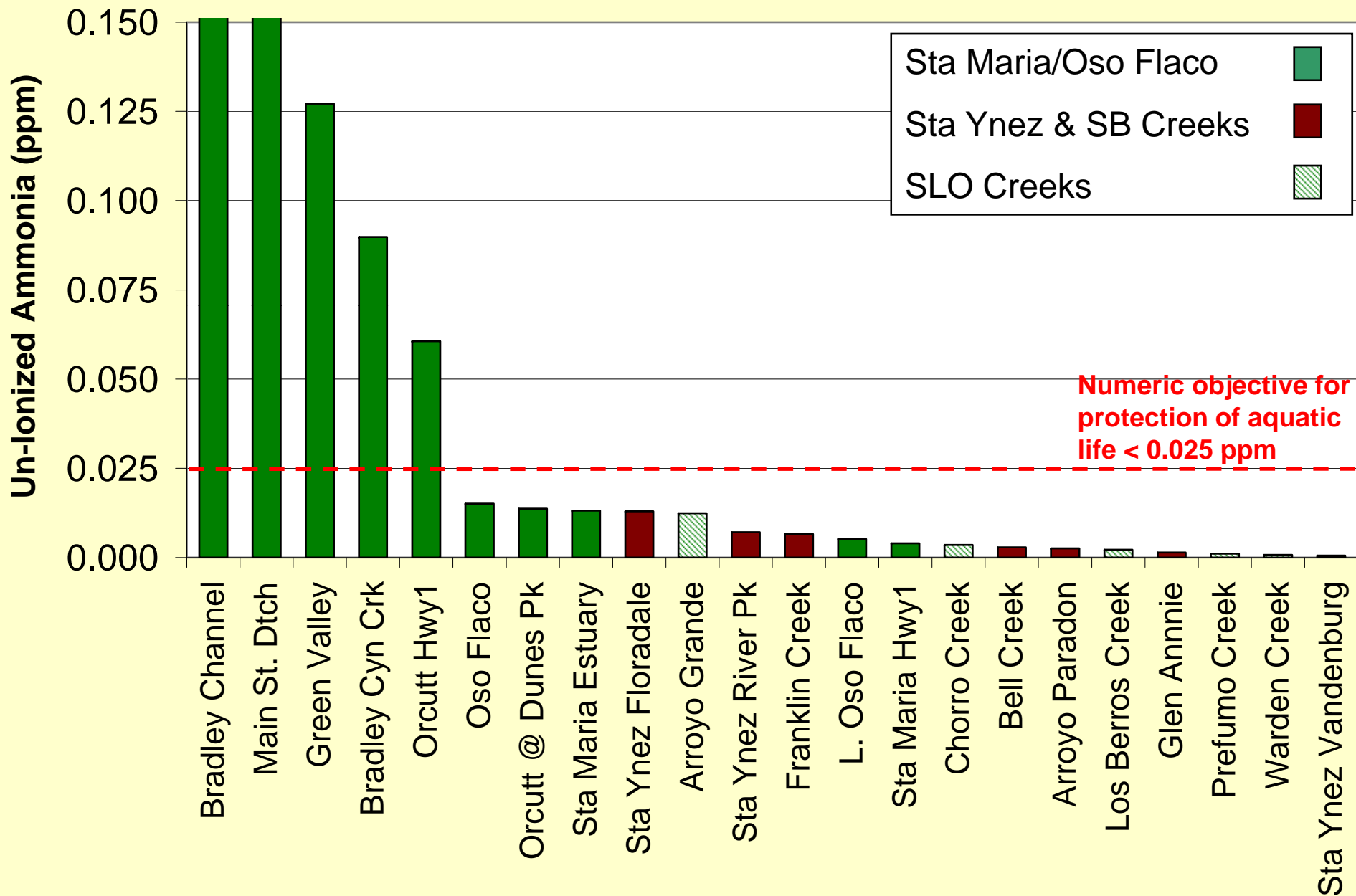
End Part I:
Intro to CMP and Nitrate Monitoring

... Questions?

**Begin Part II:
Ammonia, Phosphate, and
Indirect Effects**

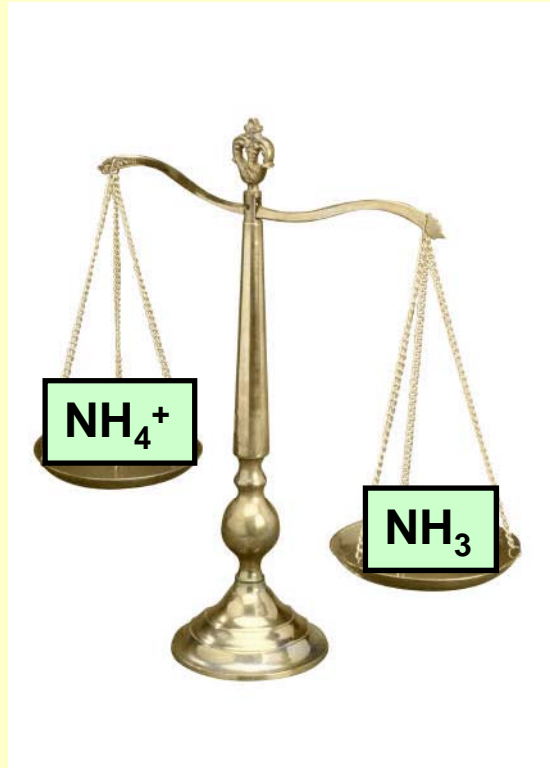
Un-Ionized Ammonia Results, SLO & SB Sites

(averages of all monthly samples, Jan '05 or '06 – Dec '07)



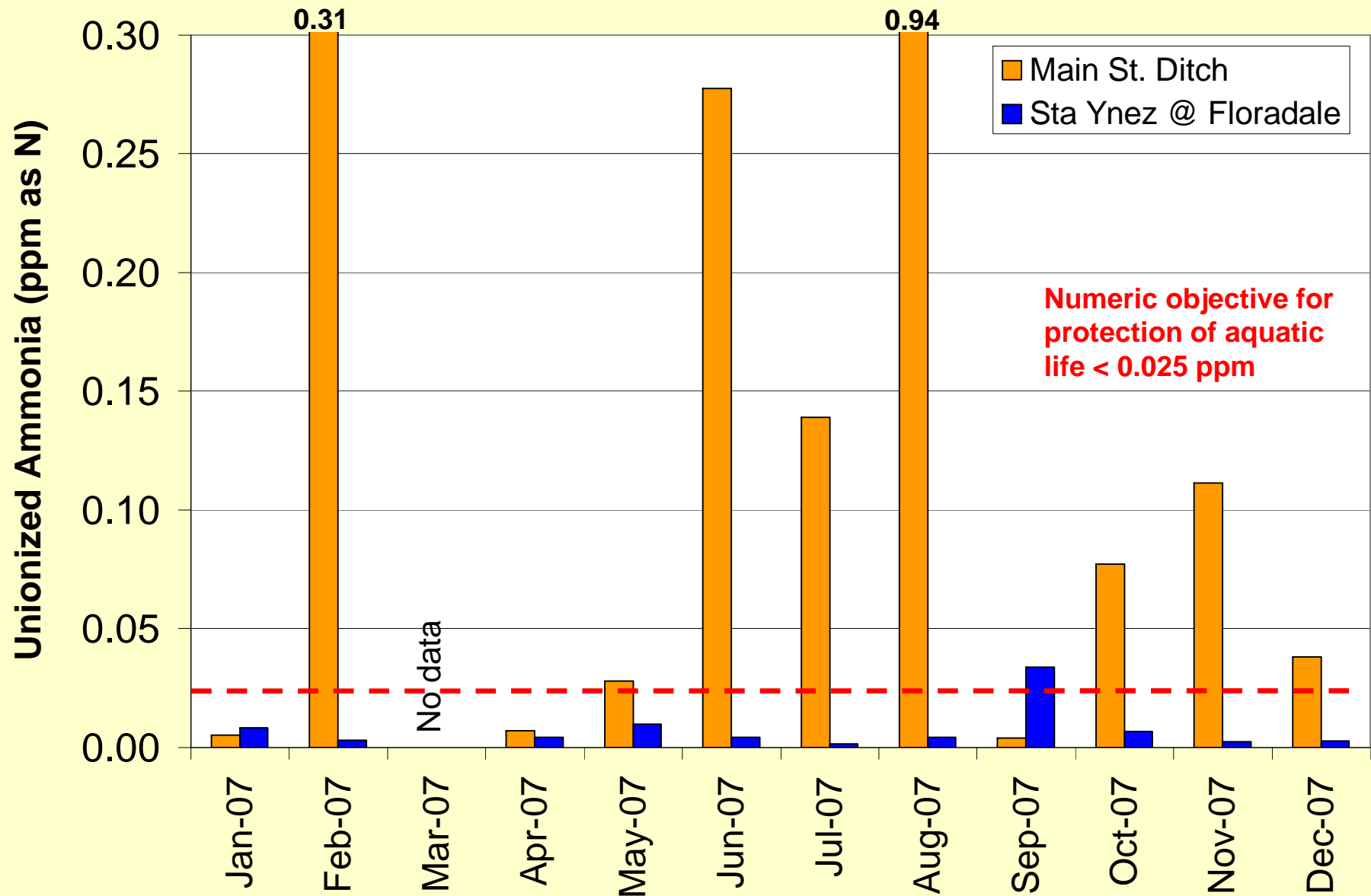
“Un-ionized” Ammonia

Ammonia is found in water in several forms. The water's pH and temperature affect the balance between ionized (NH_4^+) and un-ionized ammonia (NH_3), which are both dissolved, inorganic forms of ammonia.

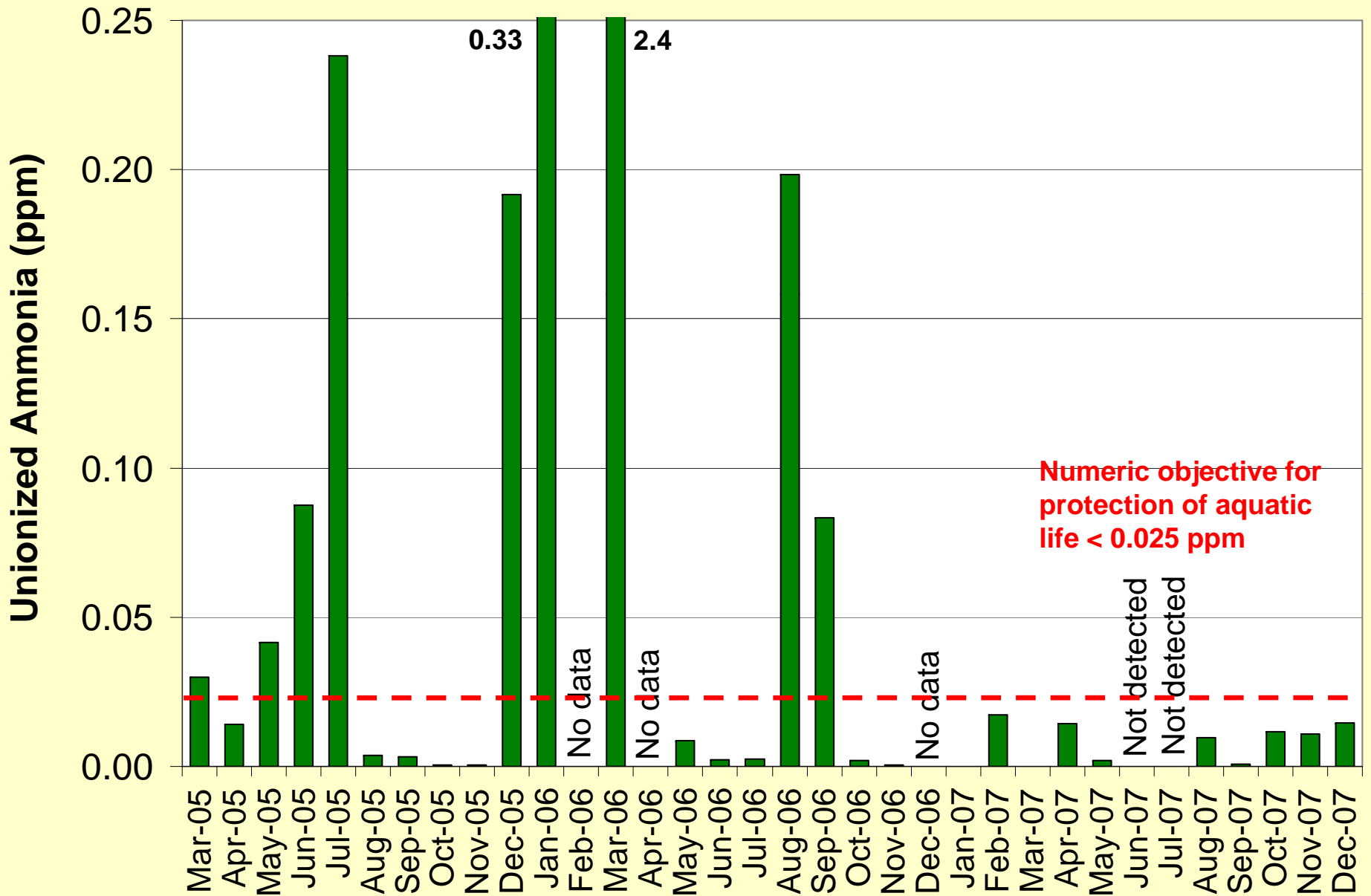


Higher pH = More un-ionized ammonia (NH_3), which is toxic to fish. Water quality objective is < 0.025 ppm $\text{NH}_3\text{-N}$.

Monthly un-ionized ammonia results from two SLO/SB sites in 2007

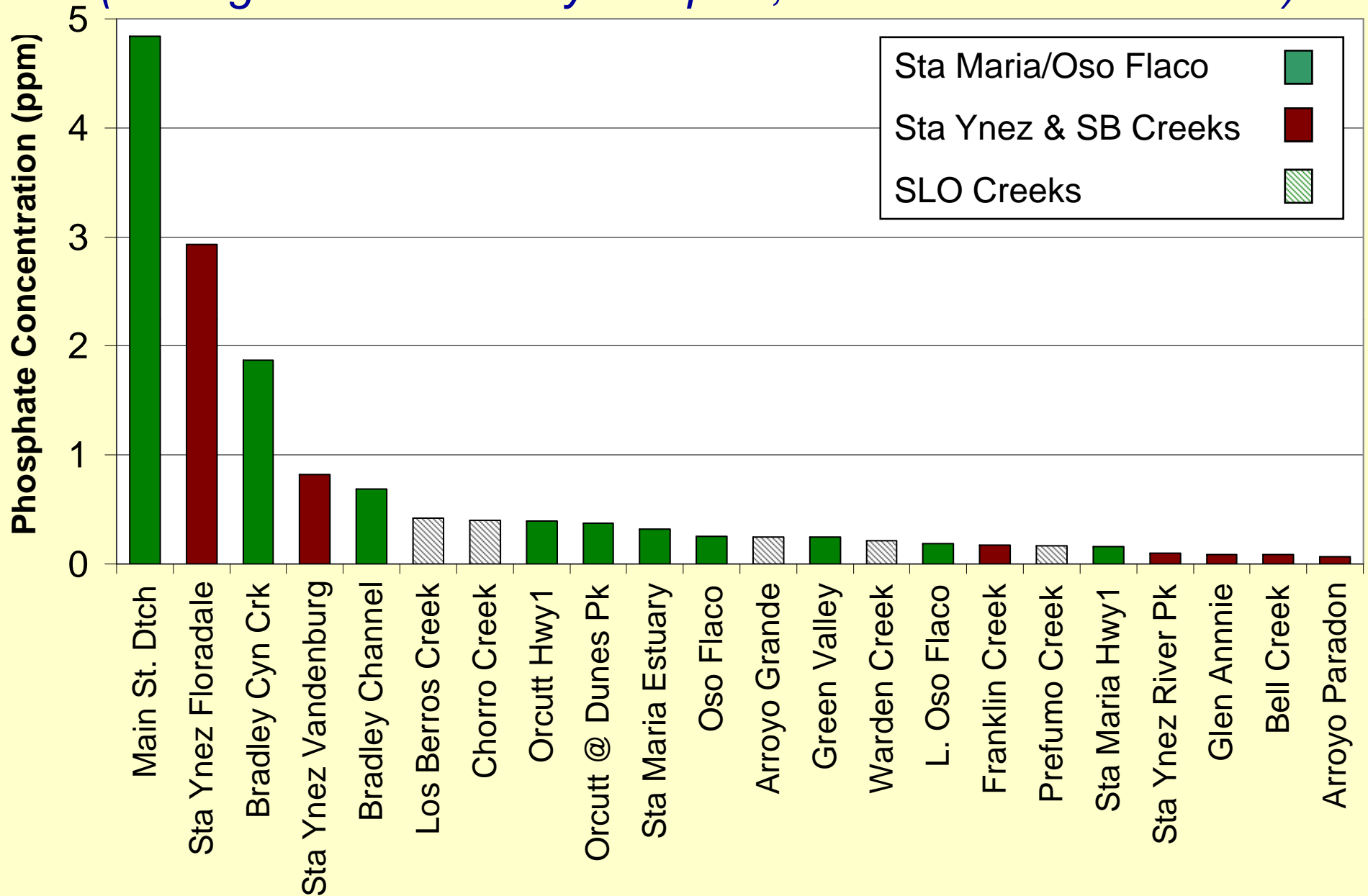


Monthly un-ionized ammonia results from Green Valley (Green Canyon) at Simas, 2005-2007

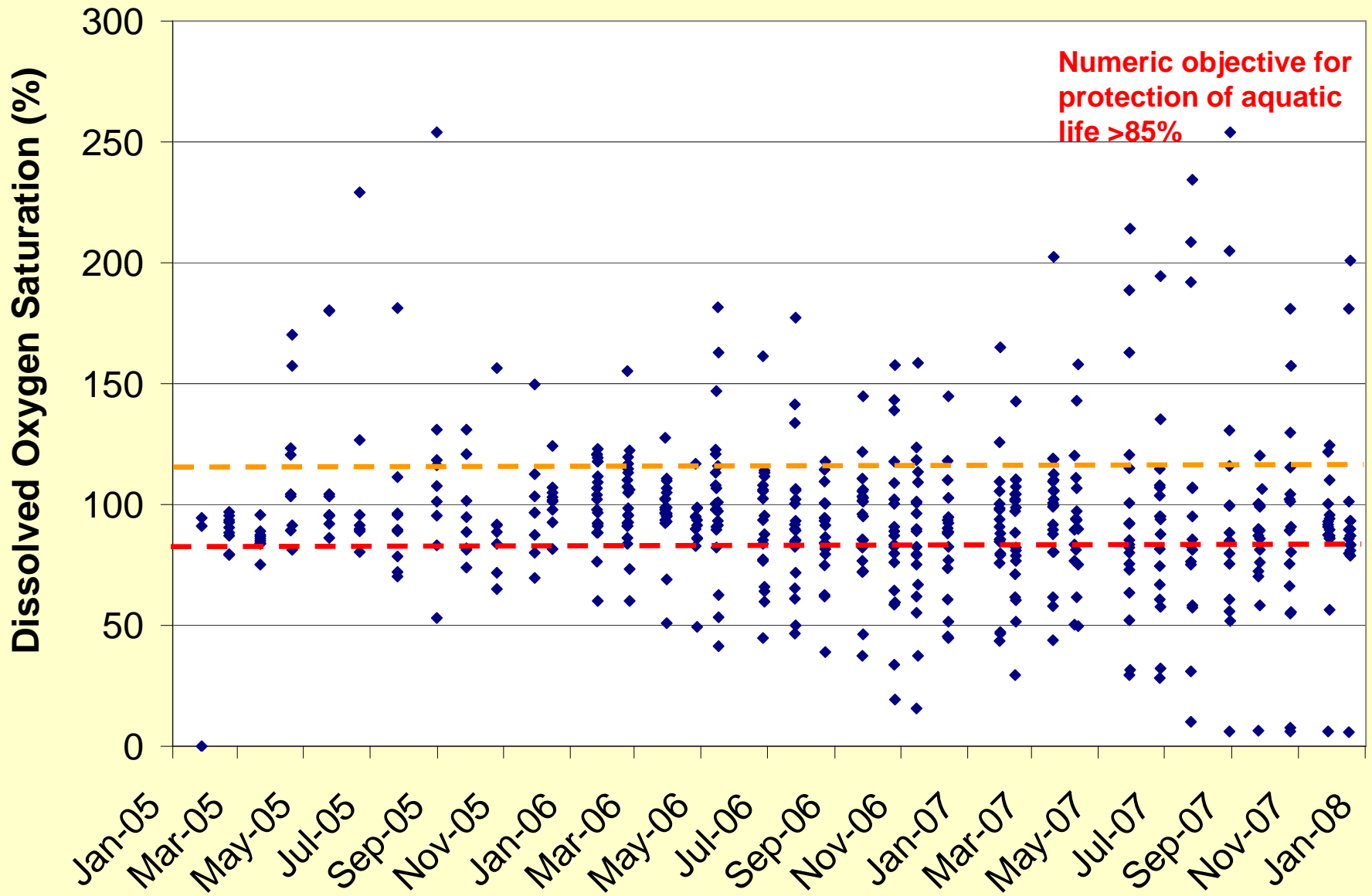


Phosphate Results, SLO & SB Sites

(averages of all monthly samples, Jan '05 or '06 – Dec '07)



Indirect Effects of Nutrients in Runoff: Low (and high) Dissolved Oxygen



Take Home Points

- Fertilizers in farm runoff can lead to high nitrate, phosphate, and/or ammonia levels in streams.
- Some Cooperative Monitoring sites have consistently high levels of nutrient-related constituents
 - Others do not.
- Direct effects of nutrients in streams:
 - Toxicity to fish from high un-ionized ammonia
 - Water not suitable as drinking water source, due to potential illness from high nitrates
- Indirect effects of nutrients in streams:
 - Stimulation of aquatic algae, which affects dissolved oxygen levels, which affects habitat for fish and other aquatic organisms
- All of these constituents can come from non-ag sources too.
 - *The only way to know if your operation is contributing is to test the runoff.*

END