

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*)
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Effects of Ag Runoff

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

San Luis Obispo Area Sites

● = core CMP, monthly since 2005

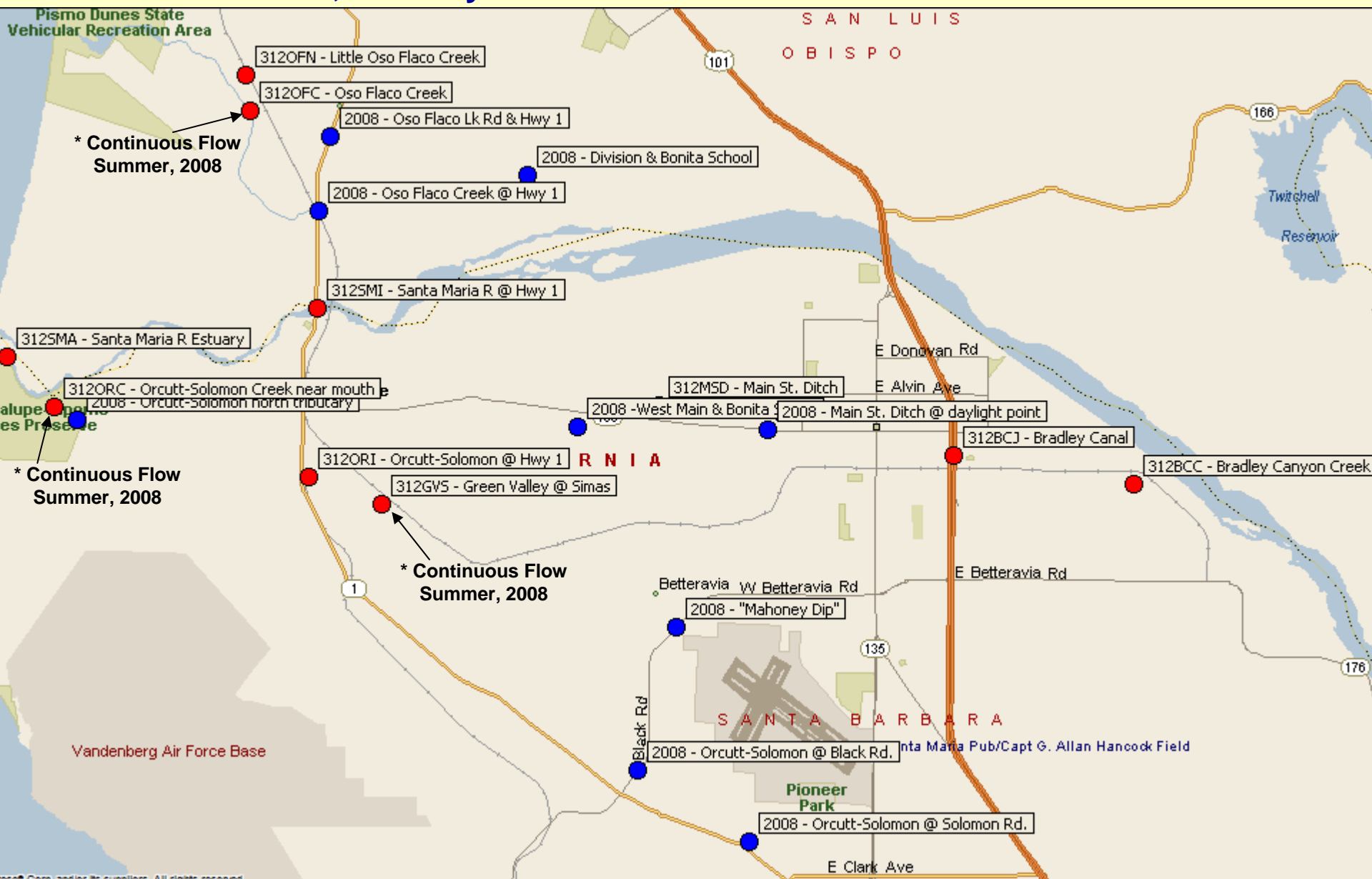
No 2008 Follow-up sites



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*

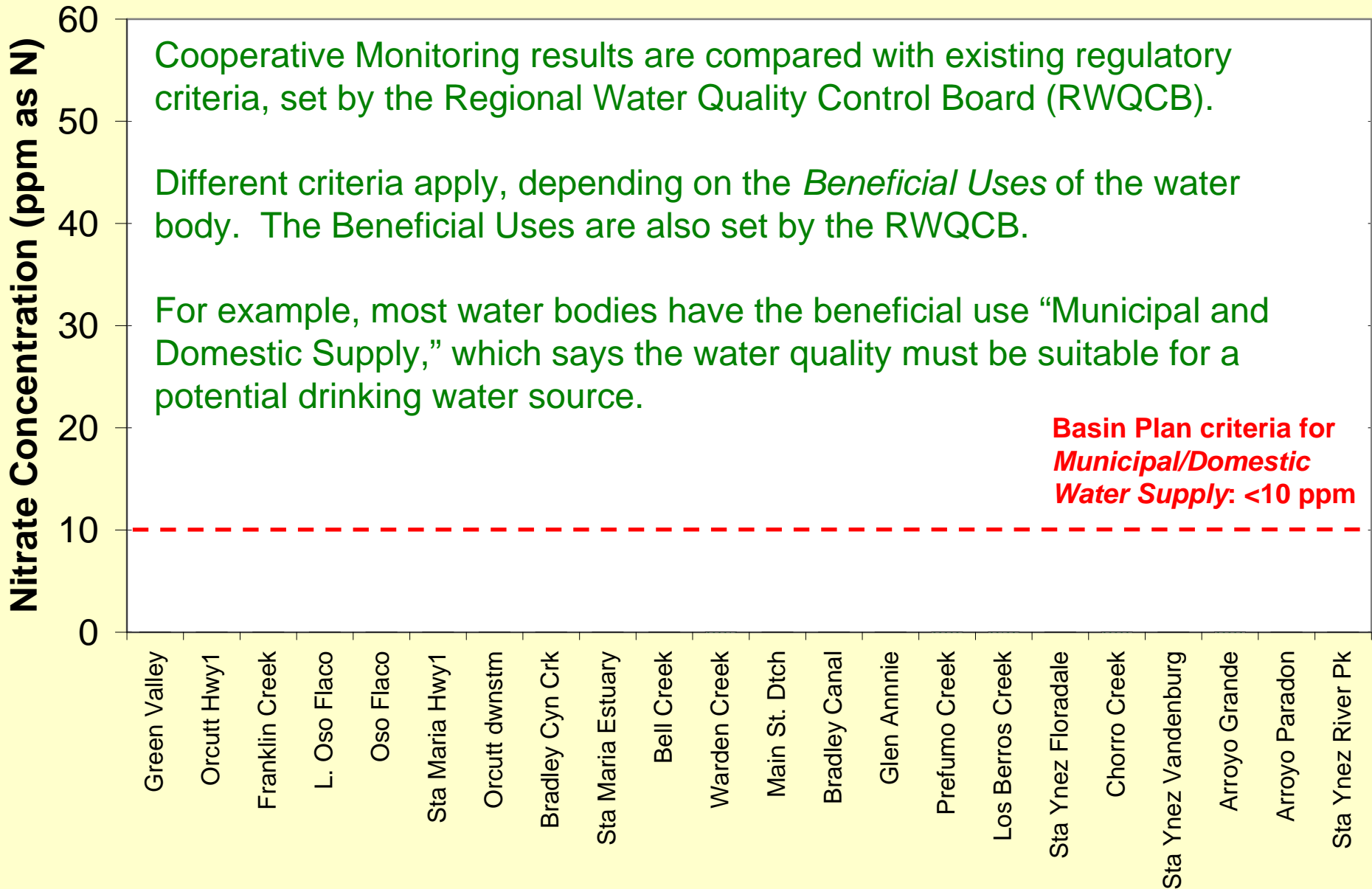
Water Quality Objectives

Cooperative Monitoring results are compared with existing regulatory criteria, set by the Regional Water Quality Control Board (RWQCB).

Different criteria apply, depending on the *Beneficial Uses* of the water body. The Beneficial Uses are also set by the RWQCB.

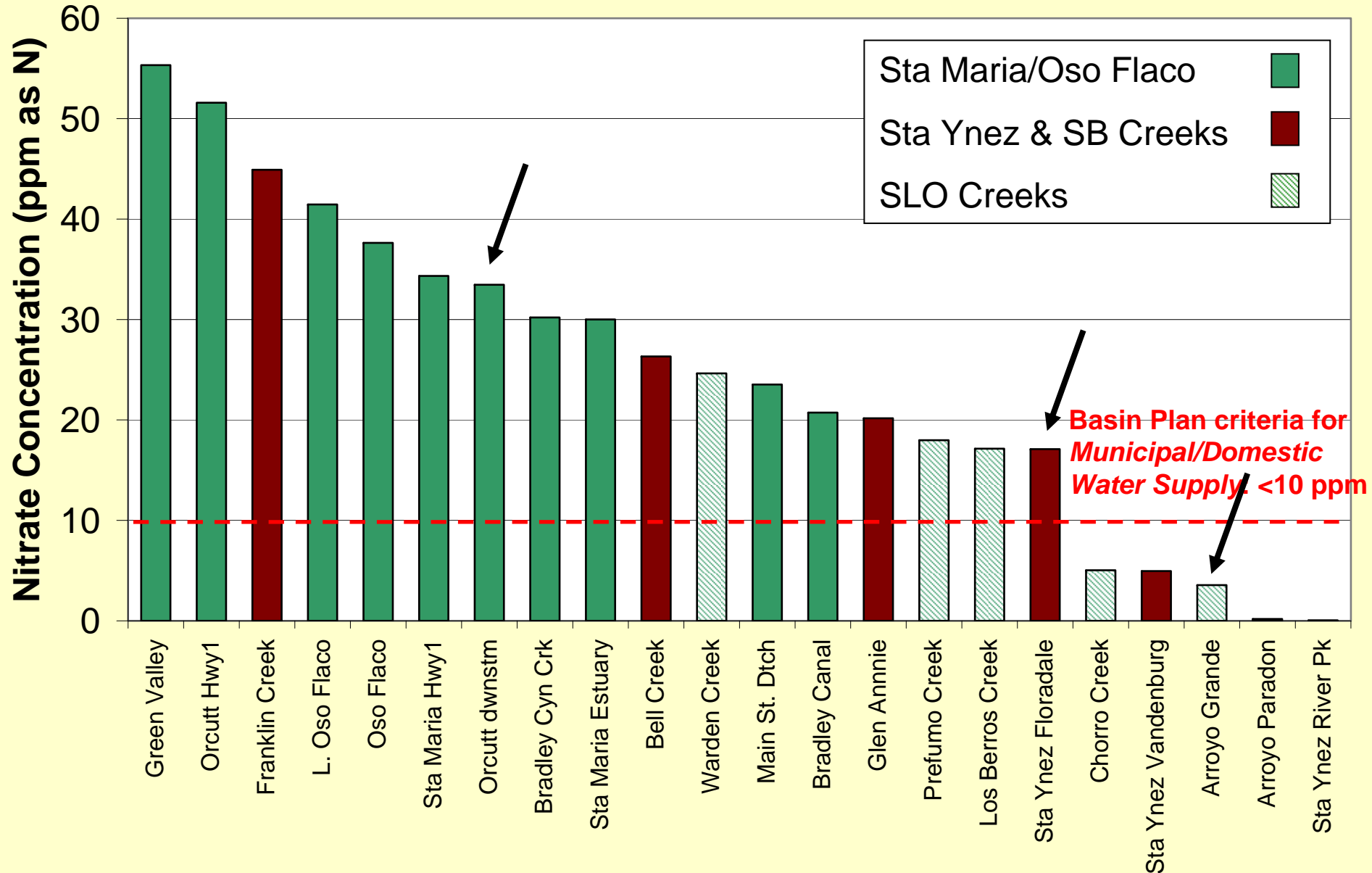
For example, most water bodies have the beneficial use “Municipal and Domestic Supply,” which says the water quality must be suitable for a potential drinking water source.

**Basin Plan criteria for
Municipal/Domestic
Water Supply: <10 ppm**

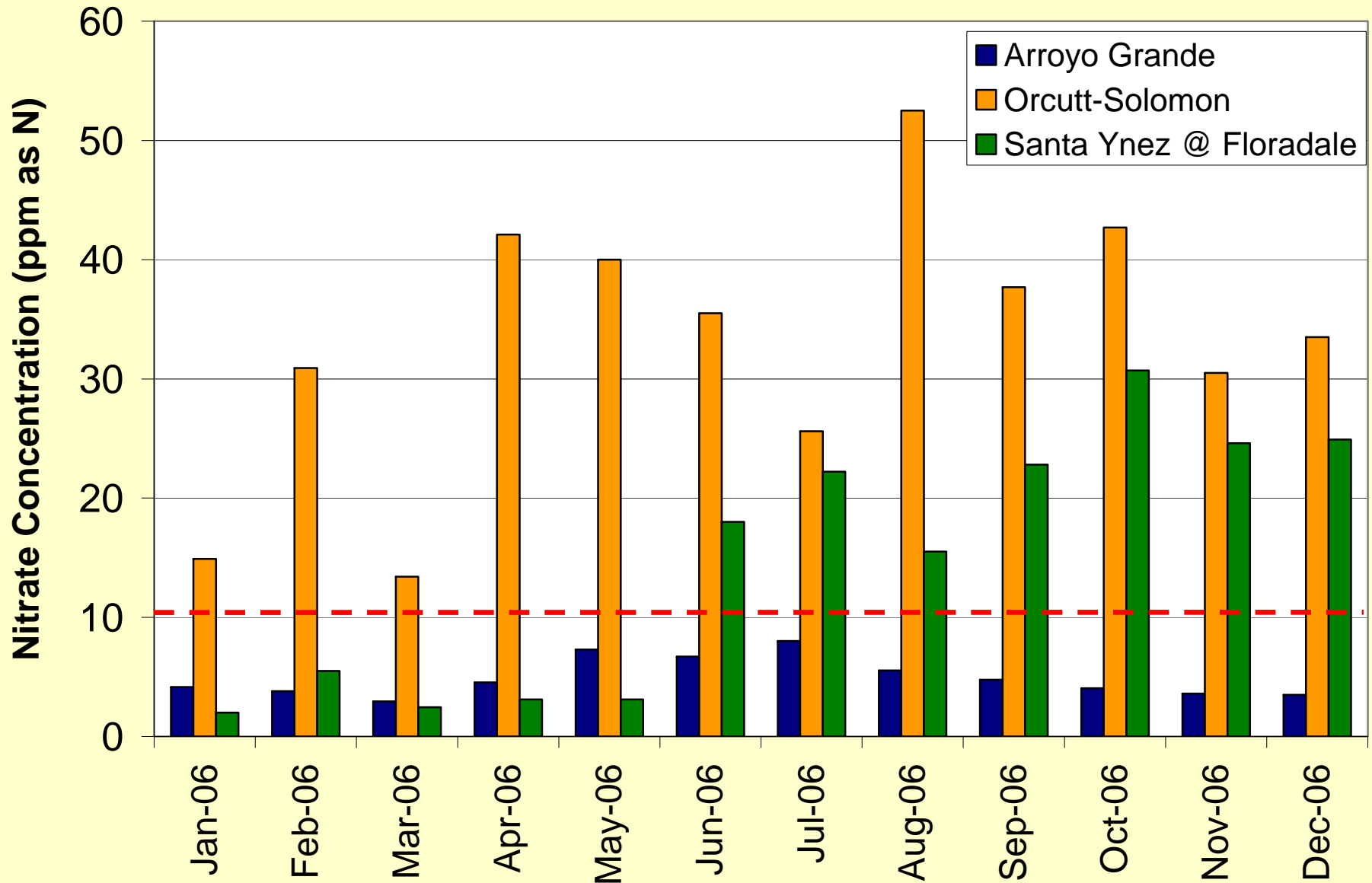


Nitrate Results for Southern Sites

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

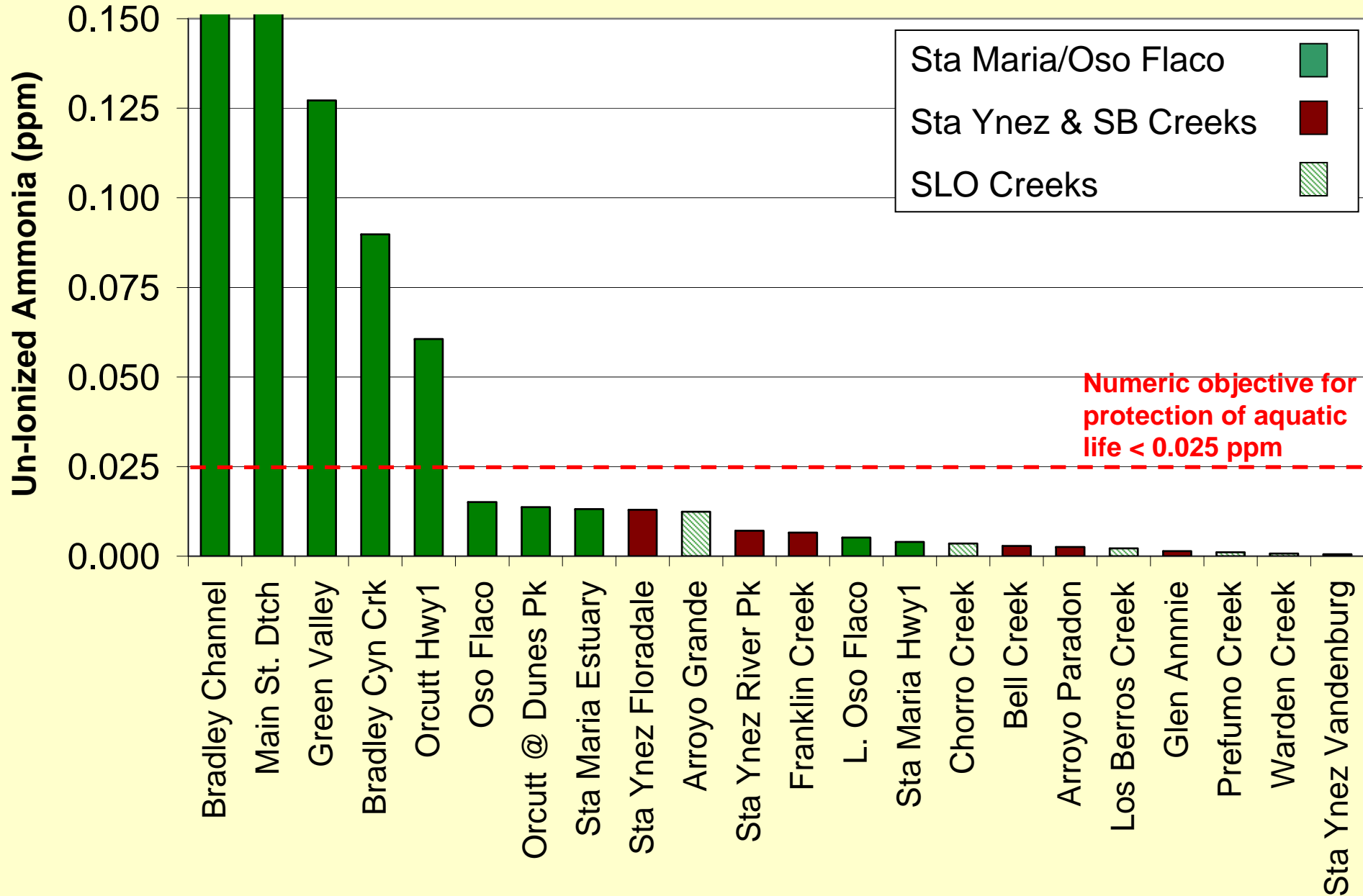


Monthly nitrate results from three SLO/SB sites in 2006



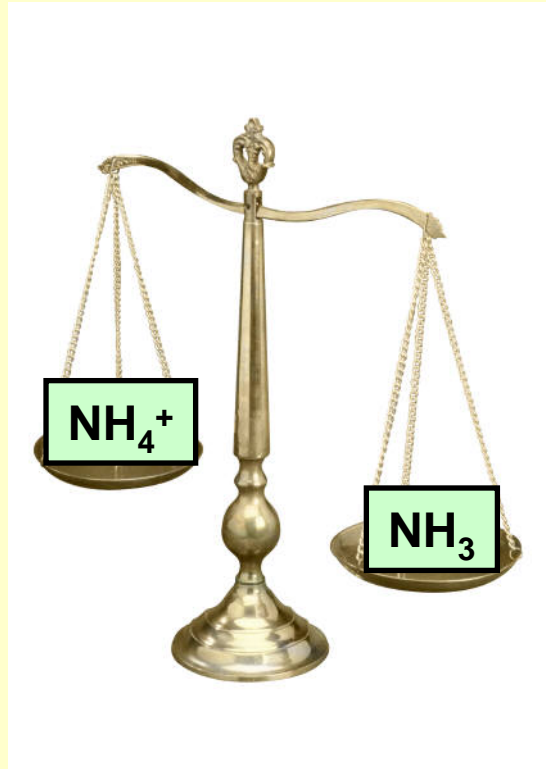
Un-Ionized Ammonia Results, SLO & SB Sites

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



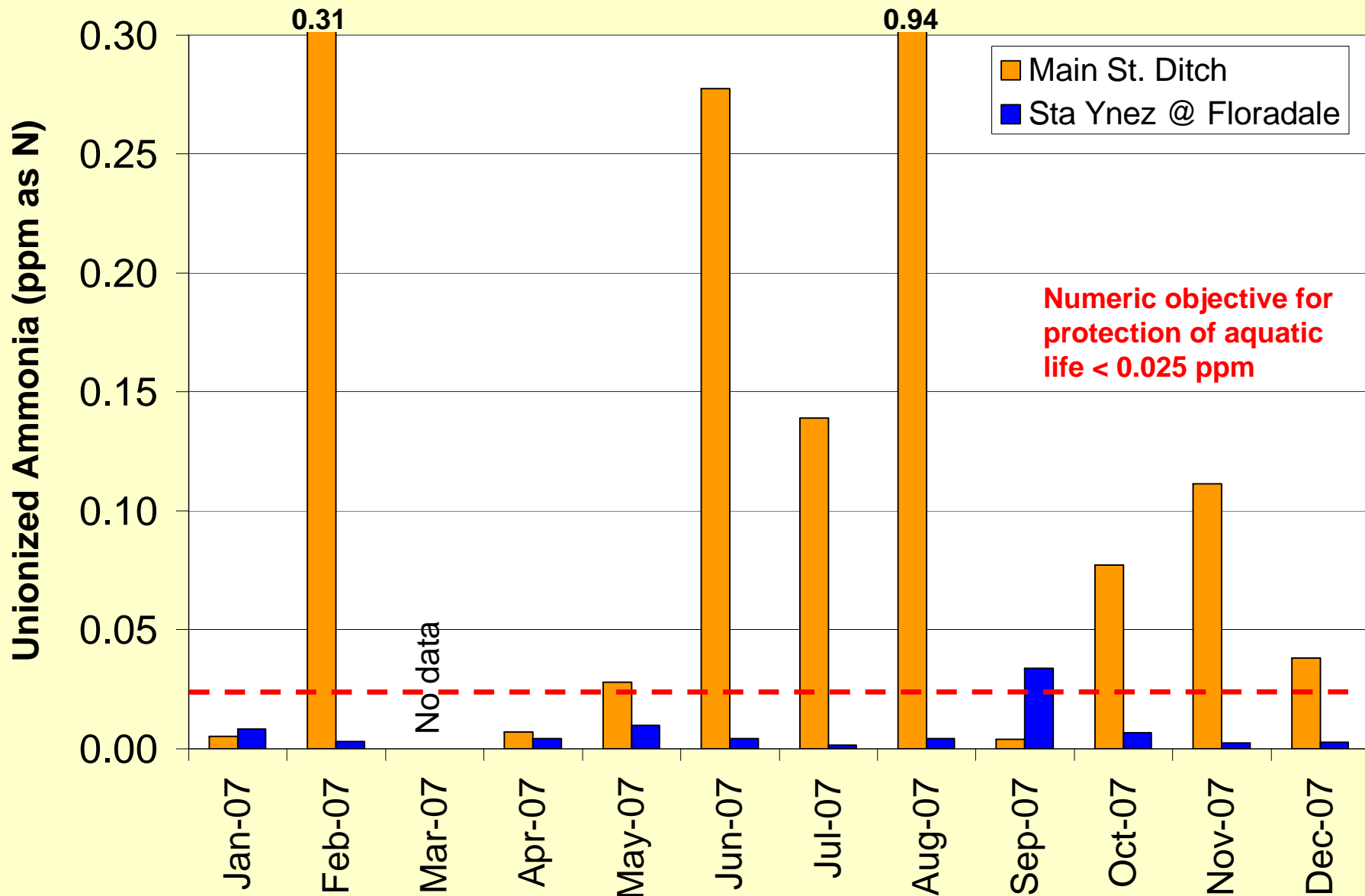
“Un-ionized” Ammonia

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.

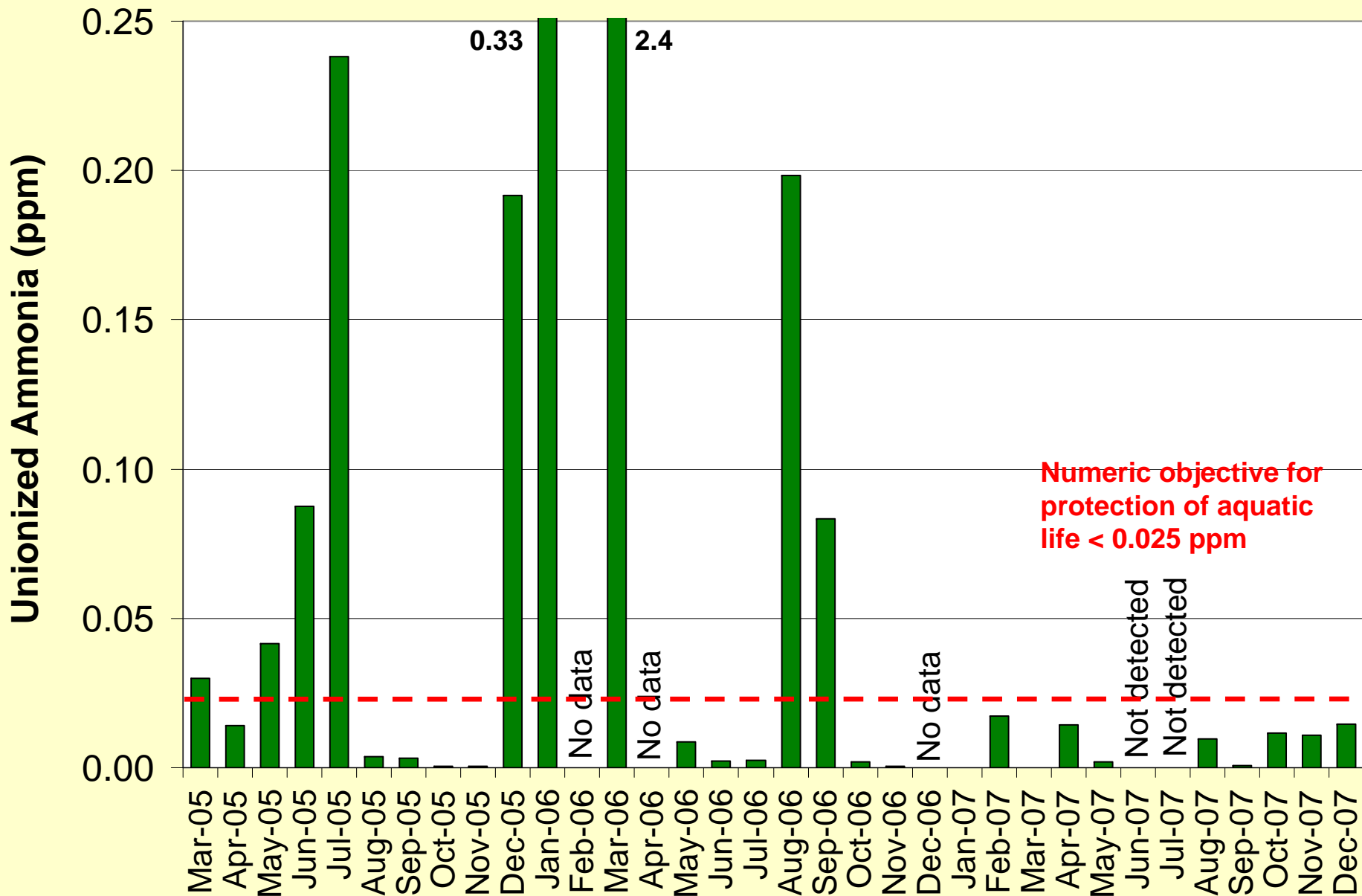


Higher pH = More un-ionized ammonia (NH_3), which is toxic to fish. Water quality objective is < 0.025 ppm $\text{NH}_3\text{-N}$.

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

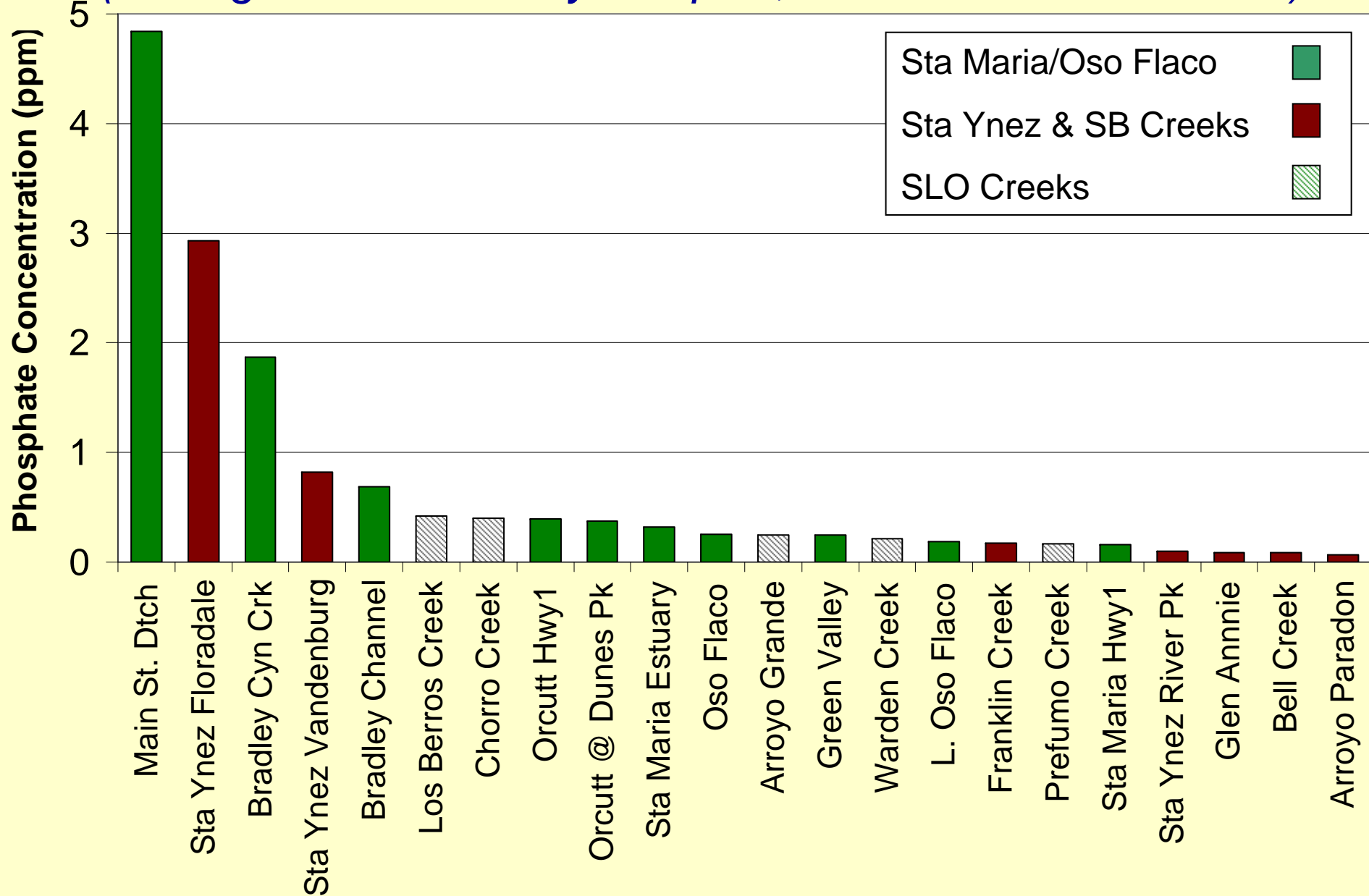


Monthly un-ionized ammonia results from Green Valley (Green Canyon) at Simas, 2005-2007

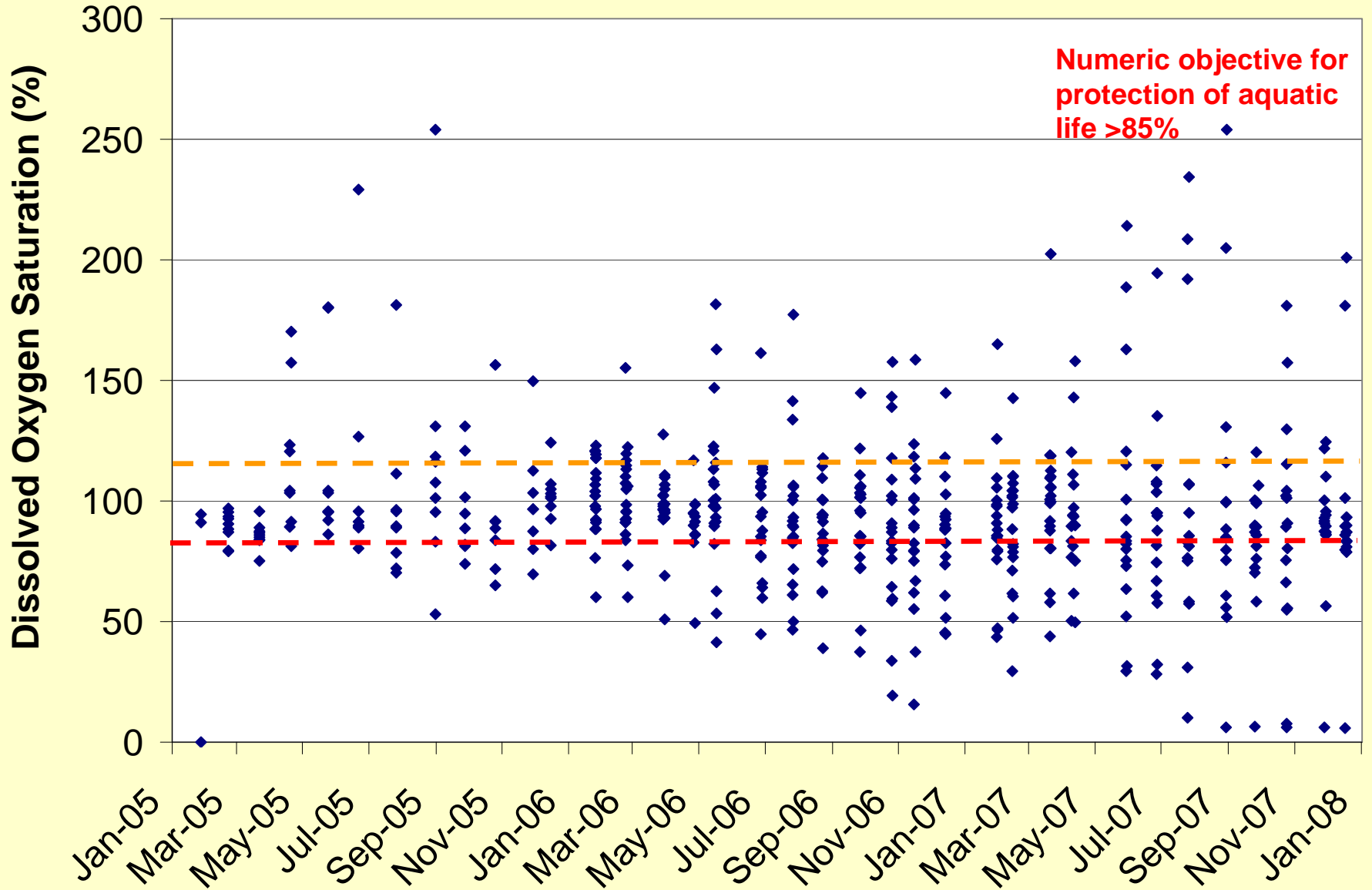


Phosphate Results, SLO & SB Sites

(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.*