

Water Quality Highlights -- Napa Marsh Ponds 2007-2008

Department of Fish and Game
Bay Delta Region
Tim Stevens
November 10, 2009

11/10/2009



[home](#)

[back](#)

[next](#)

Additional SRB Turbidity Results -- Effluent Limitations

- Turbidity (increases allowed) @ >100 feet from discharge point:
 - < 50 NTU: ≤ 5 NTU above ambient
 - ≥ 50 NTU: $\leq 10\%$ of ambient
- Salinity:
 - daily maximum ≤ 100 g/L (ppt)
 - monthly average ≤ 50 g/L

11/10/2009



[home](#)

[back](#)

[next](#)

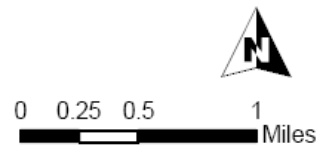


Primary Salinity Reduction Breach Monitoring Sites).



Sampling Location Types

- Initial Salinity Reduction Breach
- Monthly Water Quality
- Hourly Water Quality



Results

- salinity, turbidity, temperature, pH, and DO all tracked well with River values

11/10/2009



[home](#)

[back](#)

[next](#)

Figure & Table 3-1. 2007 and 2008 Salt Reduction Breach Salinity

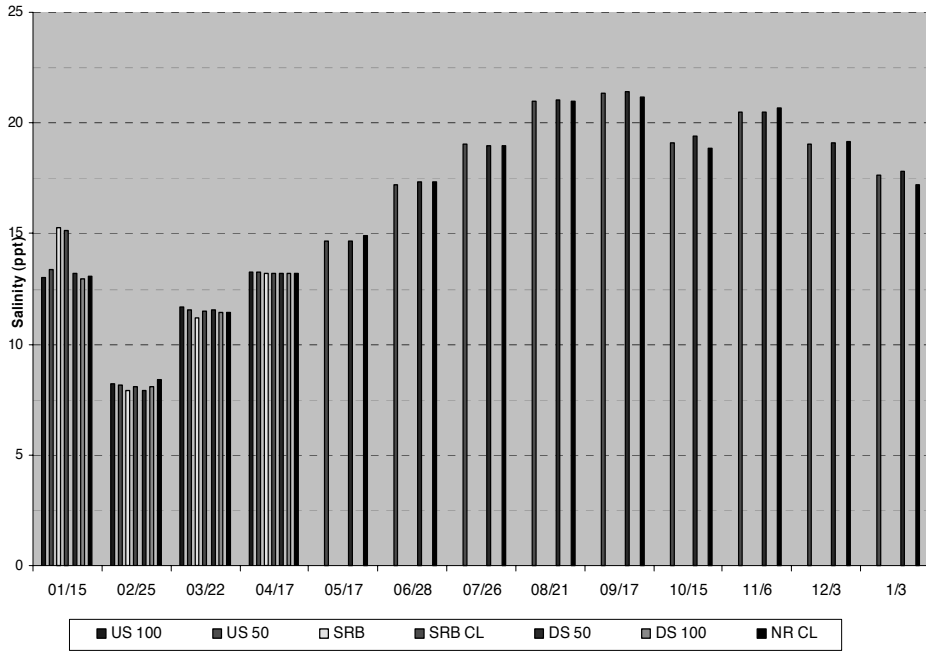


Figure & Table 3-2. 2007 and 2008 Salt Reduction Breach Turbidity (NTU)

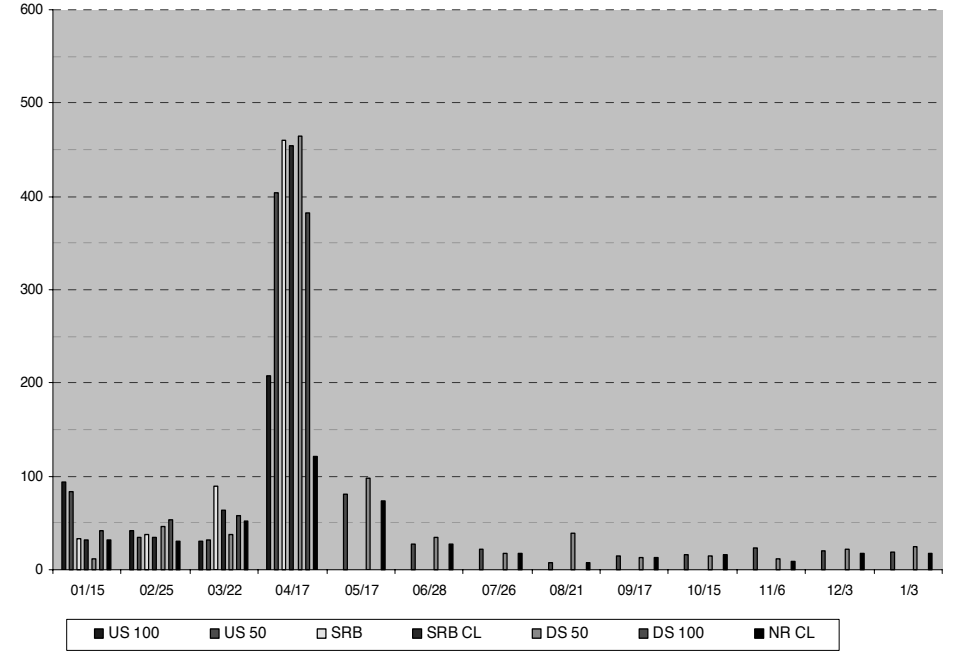


Figure & Table 3-3. 2007 and 2008 Salt Reduction Breach Water Temperature

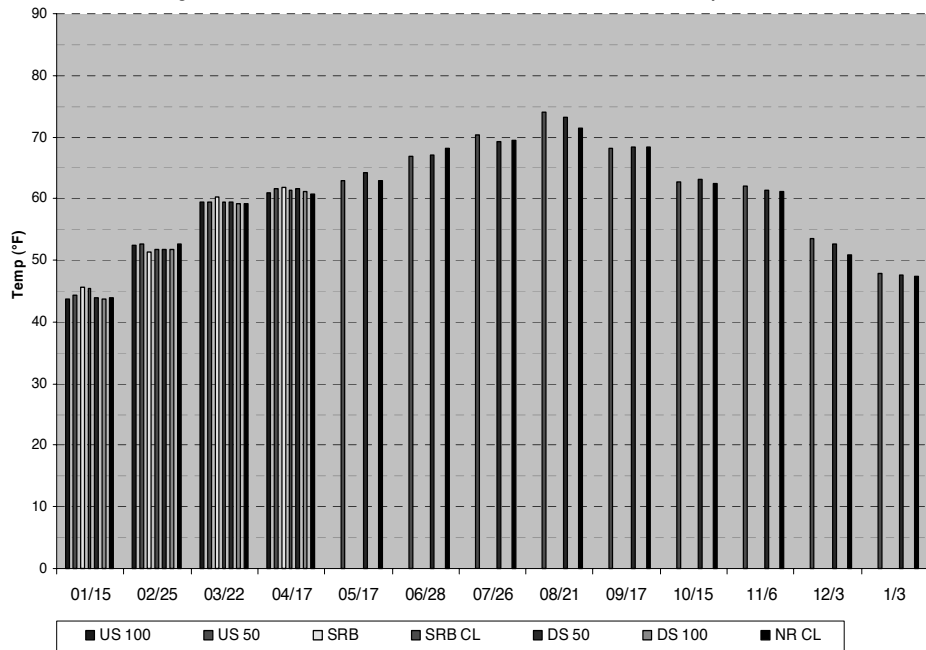
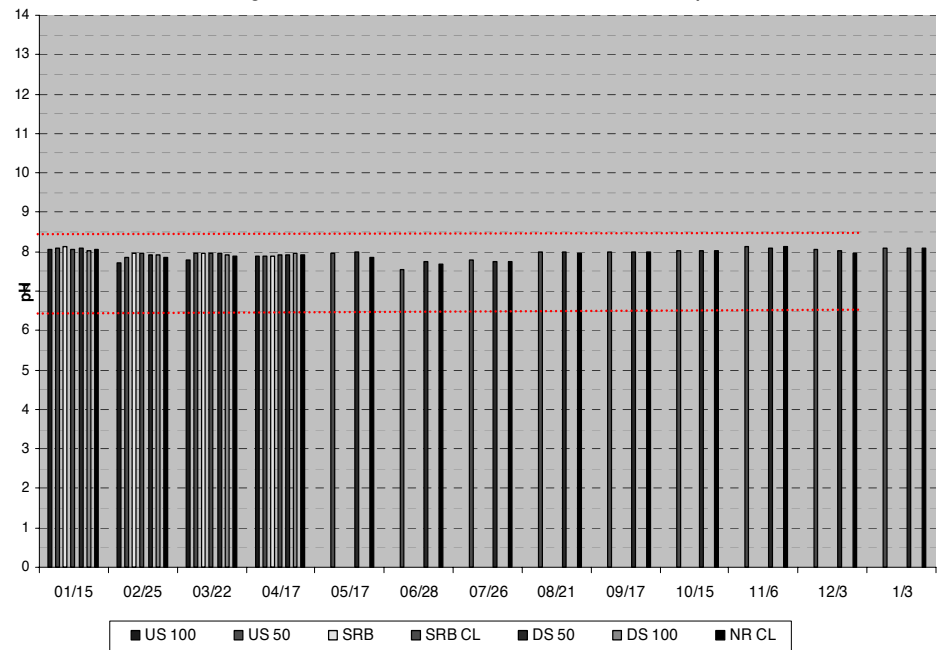


Figure & Table 3-4. 2007 and 2008 Salt Reduction Breach pH



Ammonia

- Total ammonia =
 - Un-ionized (un-disassociated), “Free,” toxic Ammonia (NH_3) – proportion increases with temperature and pH
 - Ionized (charged), less toxic Ammonium (NH_4^+)

11/10/2009



[home](#)

[back](#)

[next](#)

Effluent Limitation

- Annual median: 0.025 mg/L (ppm) as N, un-ionized ammonia
- Maximum: 0.16 mg/L (ppm) as N

11/10/2009

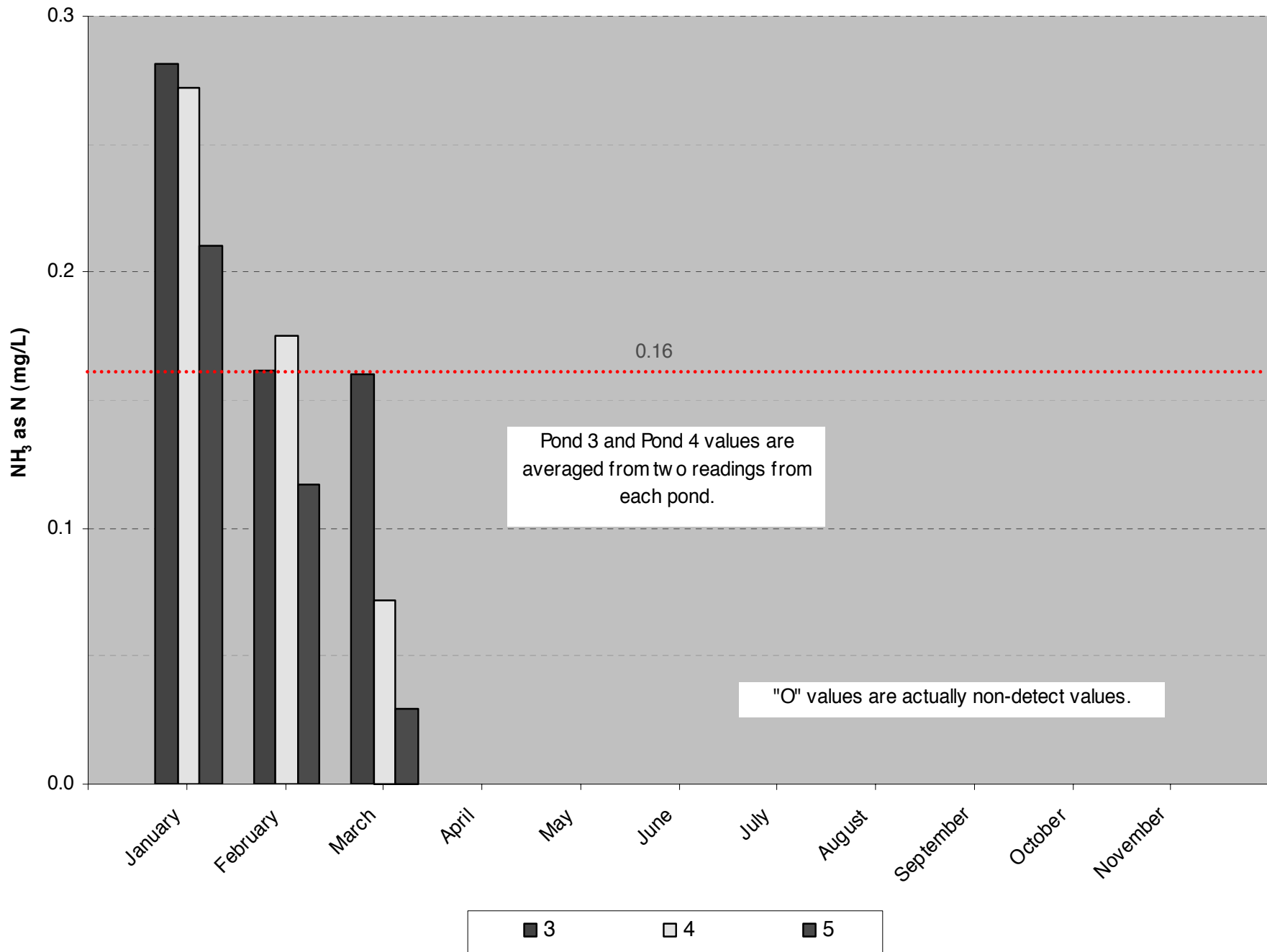


[home](#)

[back](#)

[next](#)

Figure and Table 3-7. 2007 Average Unionized Ammonia in Ponds 3, 4, and 5



Pond Water Quality Results -- Effluent Limitations

- DO: 5.0 mg/L minimum
- Salinity:
 - daily maximum ≤ 100 g/L (ppt)
 - monthly average ≤ 50 g/L
- $6.6 \leq \text{pH} \leq 8.5$
 - ≤ 0.5 above or below ambient
- Temperature: $\leq 5^\circ$ F above ambient



11/10/2009

[home](#)

[back](#)

[next](#)

Pond Salinity, Temperature, and pH

- Tracked well seasonally with River salinity

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[home](#)

[back](#)

[next](#)

Figure & Table 3-8. 2007 Pond Salinity

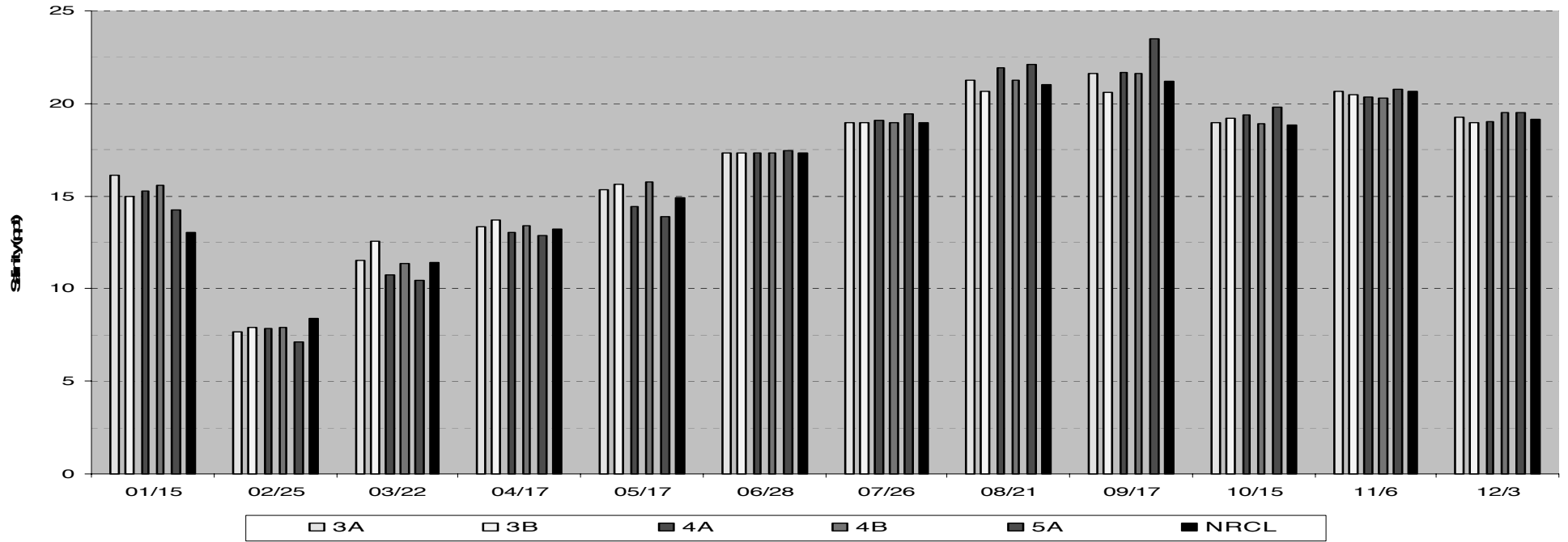


Figure & Table 3-9. 2008 Pond Salinity

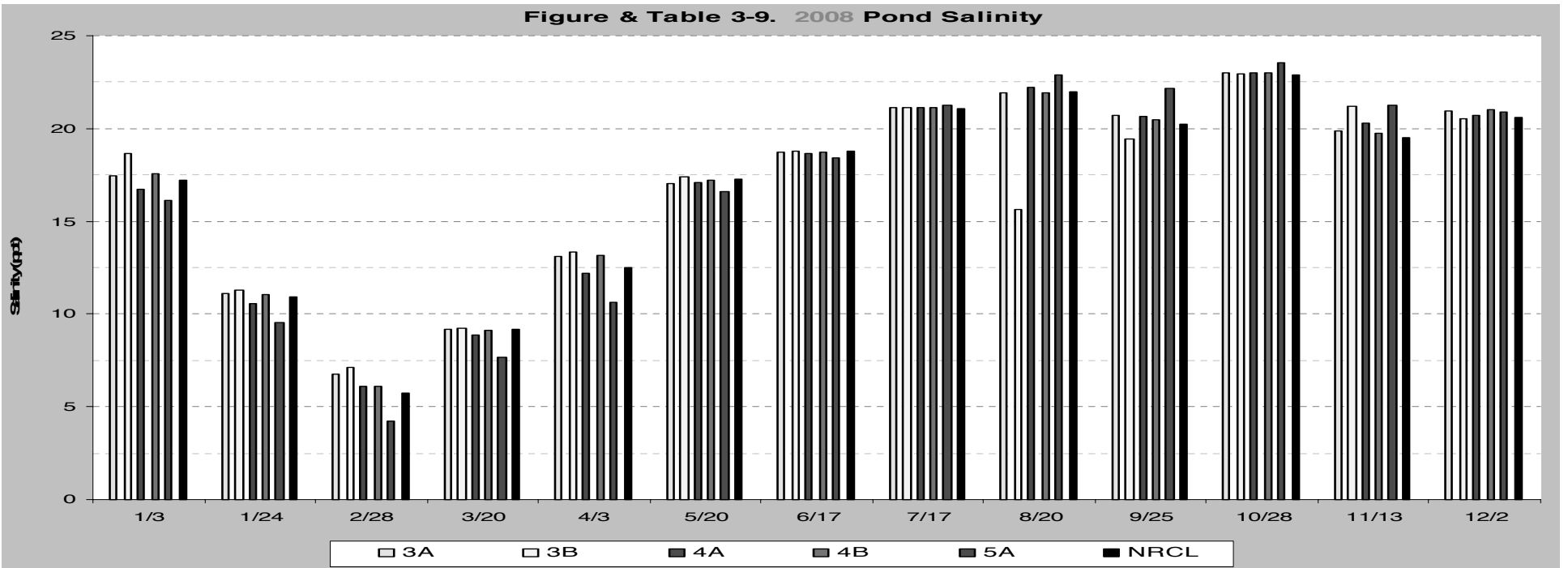


Figure & Table 3-11. 2007 Water Temperature in Ponds 3, 4, and 5

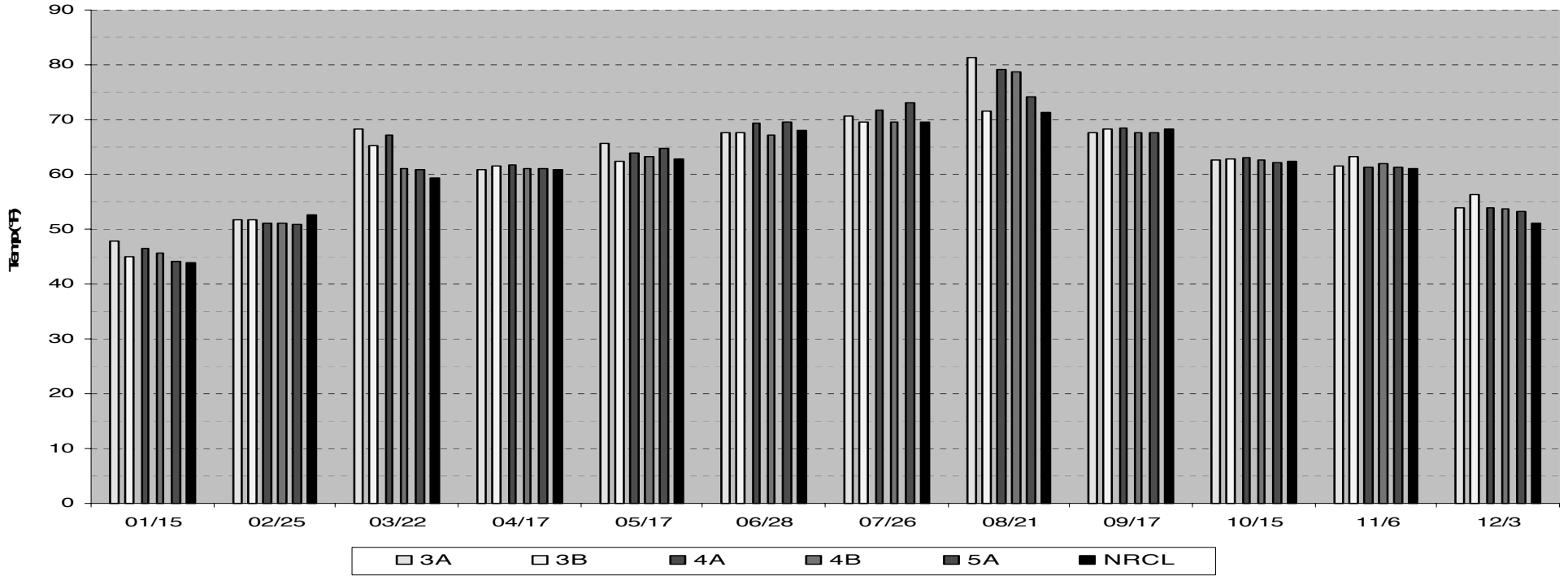


Figure & Table 3-12. 2008 Water Temperature in Ponds 3, 4, and 5

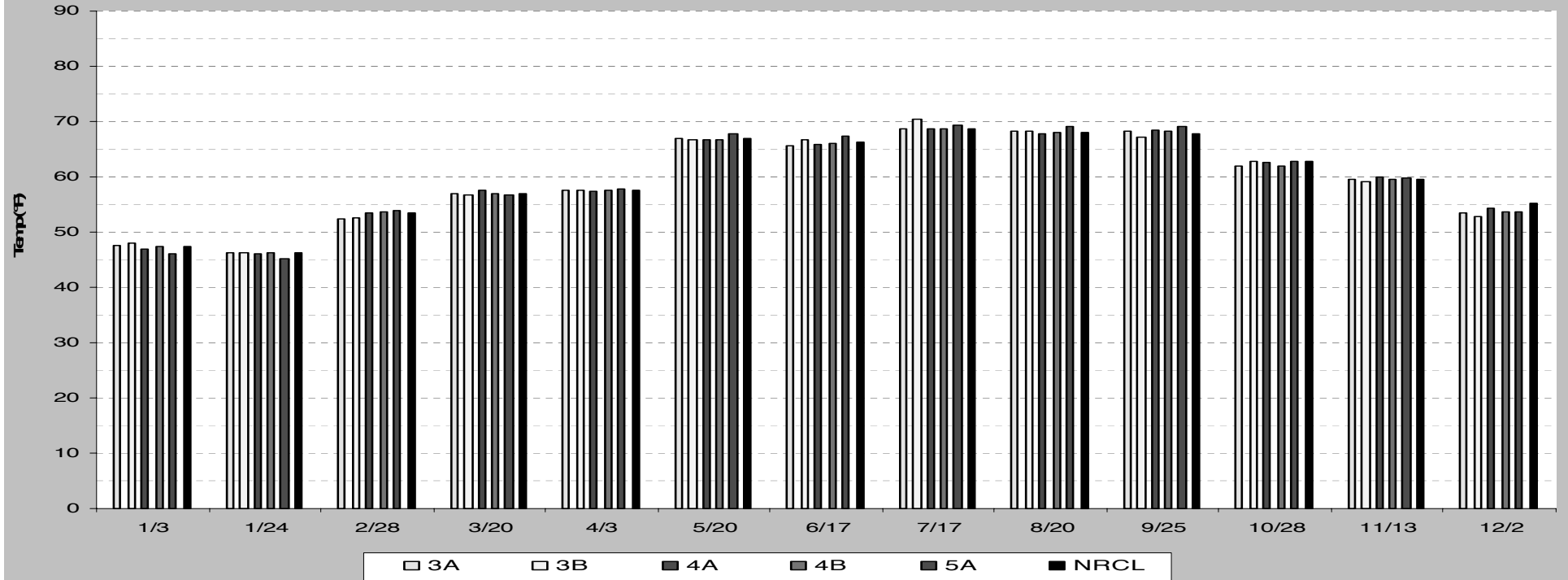


Figure & Table 3-13. 2007 pH in Ponds 3, 4, and 5

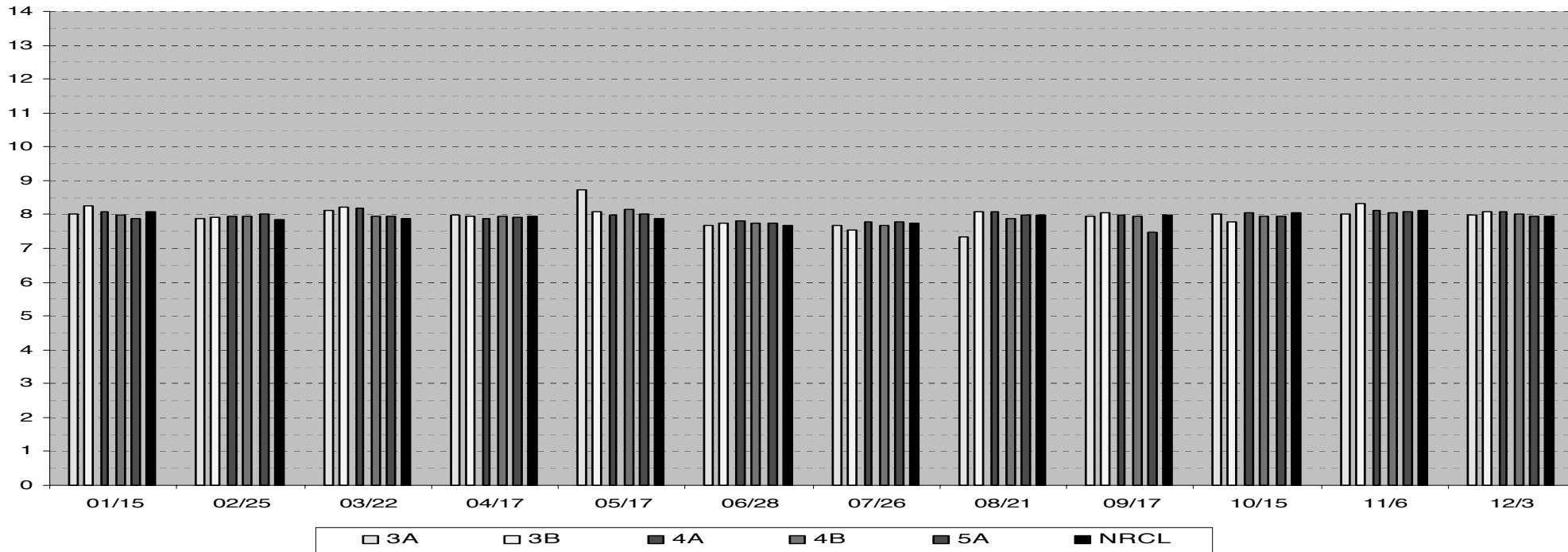
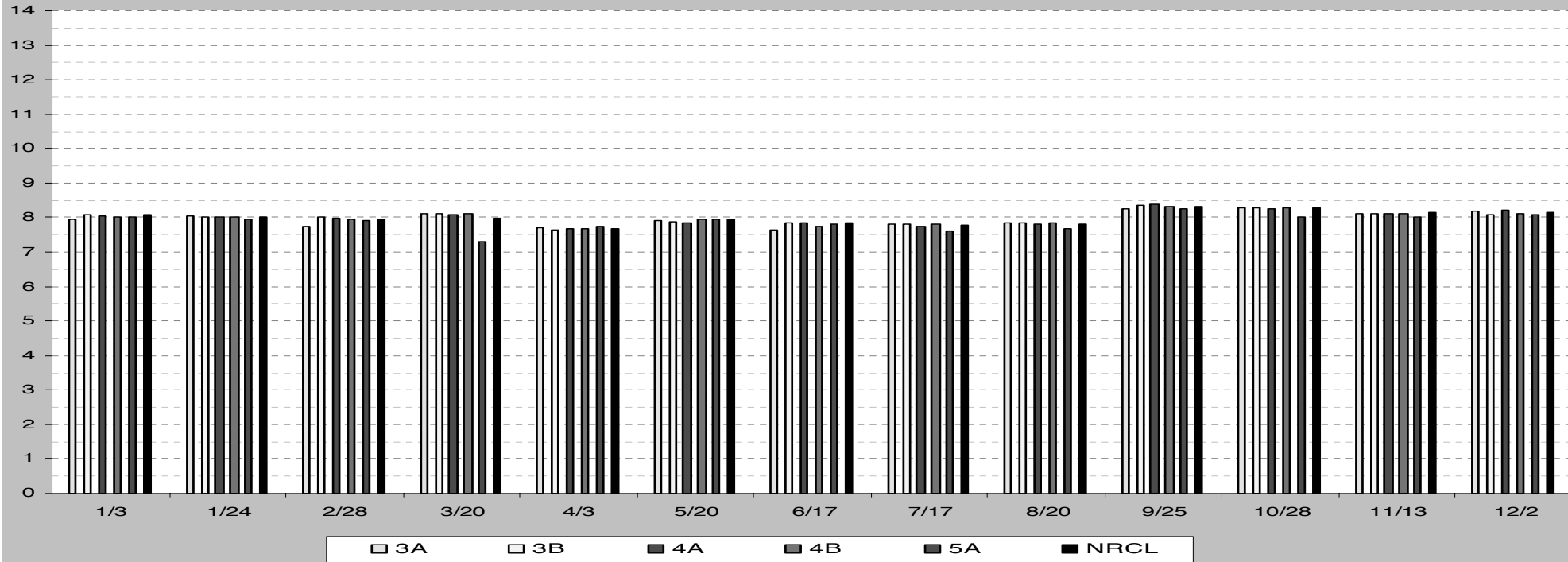


Figure & Table 3-14. 2008 pH in Ponds 3, 4, and 5



Pond Dissolved Oxygen

- Looks good
- Monthly samples all above 6 mg/L
- Tracks well with River DO

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Figure & Table 3-15. 2007 Dissolved Oxygen in Ponds 3, 4, and 5

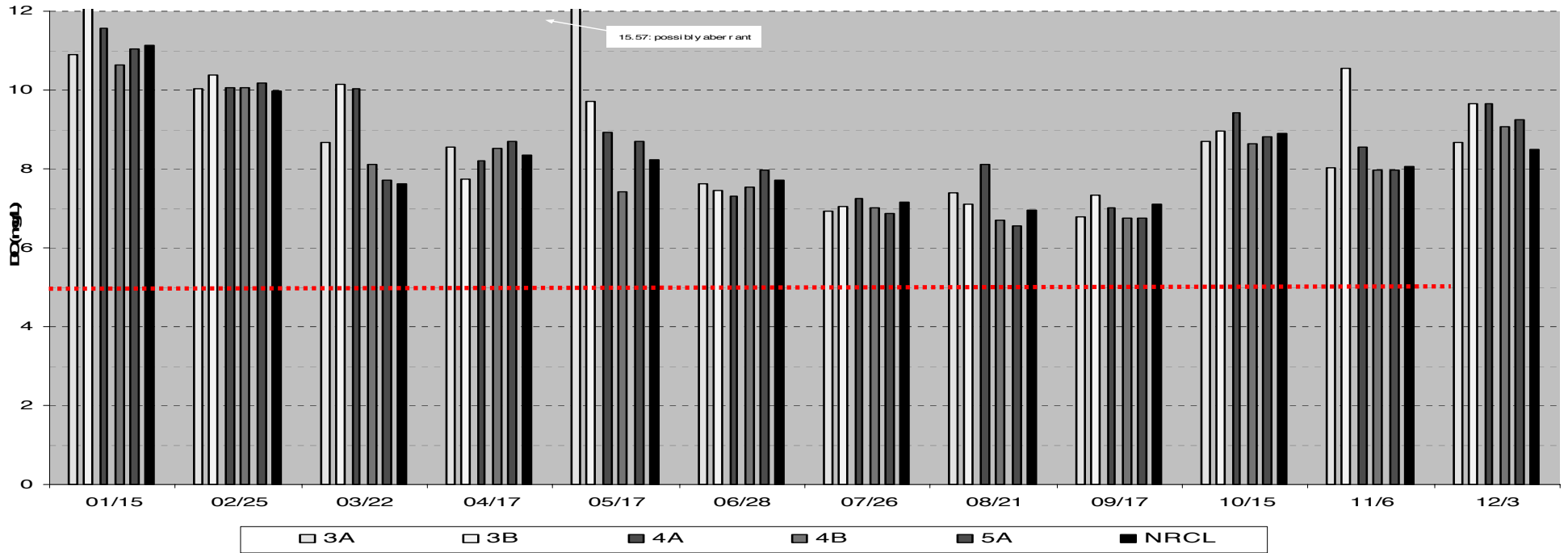
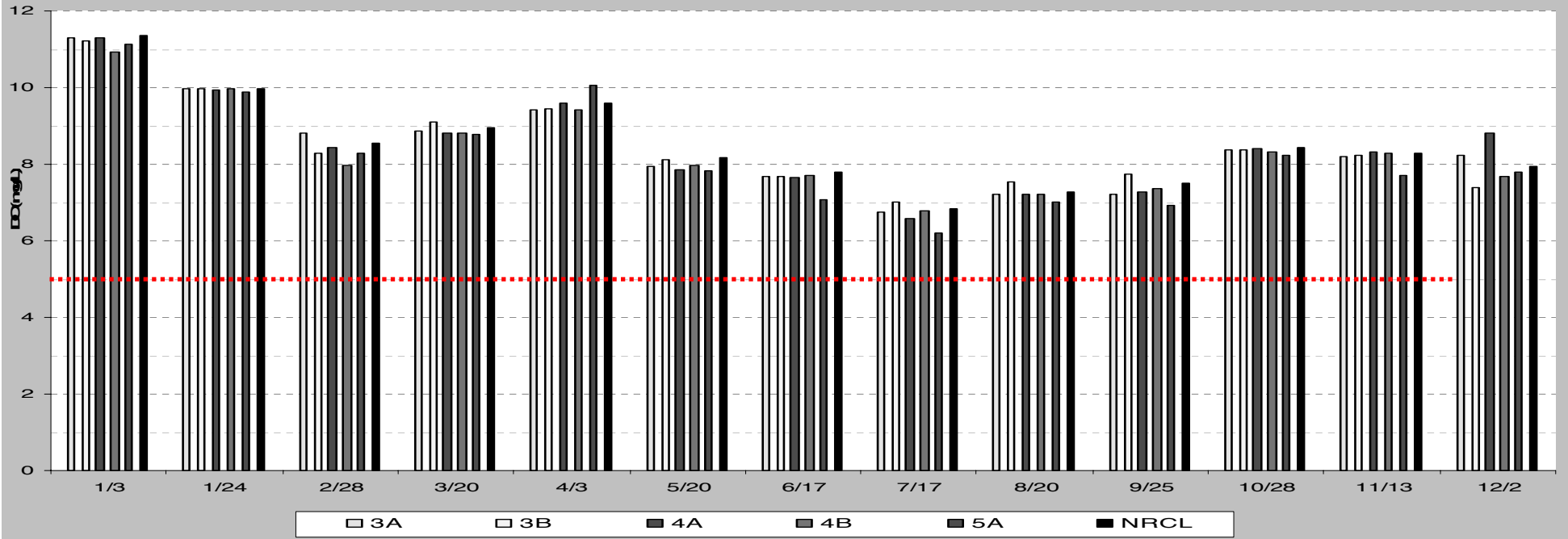


Figure & Table 3-16. 2008 Dissolved Oxygen in Ponds 3, 4, and 5



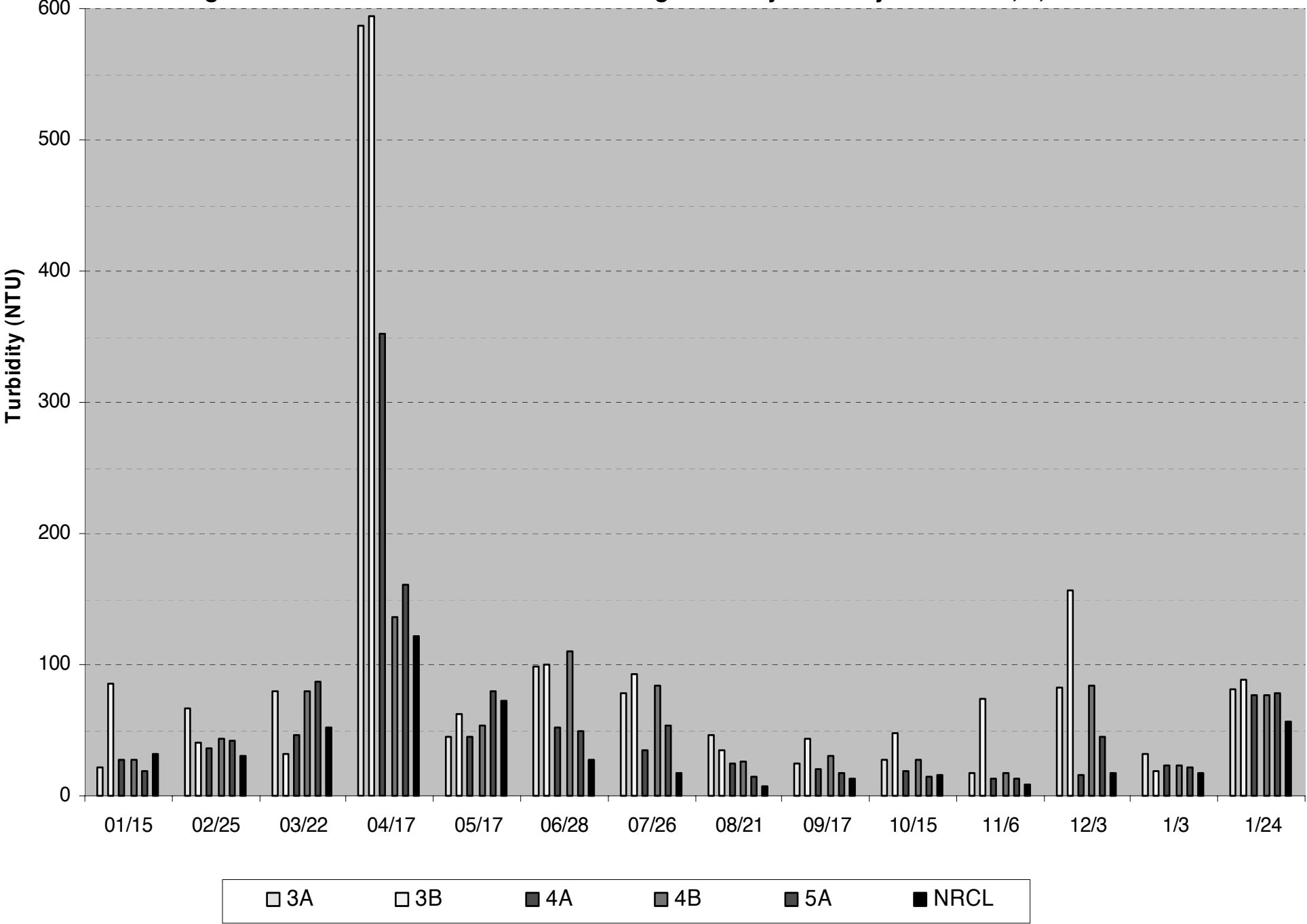
Pond Turbidity

- higher than center-line River values
- but data were not necessarily (ever?) collected where ELs apply

11/10/2009



Figure & Table 3-10. 2007 and 2008 Average Monthly Turbidity in Ponds 3, 4, and 5



Mercury Results – Comparable Magnitude Ranges

- Sediment (benthic) (2006 -2007)
 - 100 – 600 ppb Total Mercury
 - 0.5 - 3.5 ppb Methylmercury
- Water (unfiltered) (2006 -2007)
 - 0.01 – 0.04 ppb Total Mercury
 - 0.0001 – 0.002 ppb Methylmercury
- Comparison: RWQCB TMDL goal for total mercury in suspended sediment in SF Bay is 200 ppb (dry weight).

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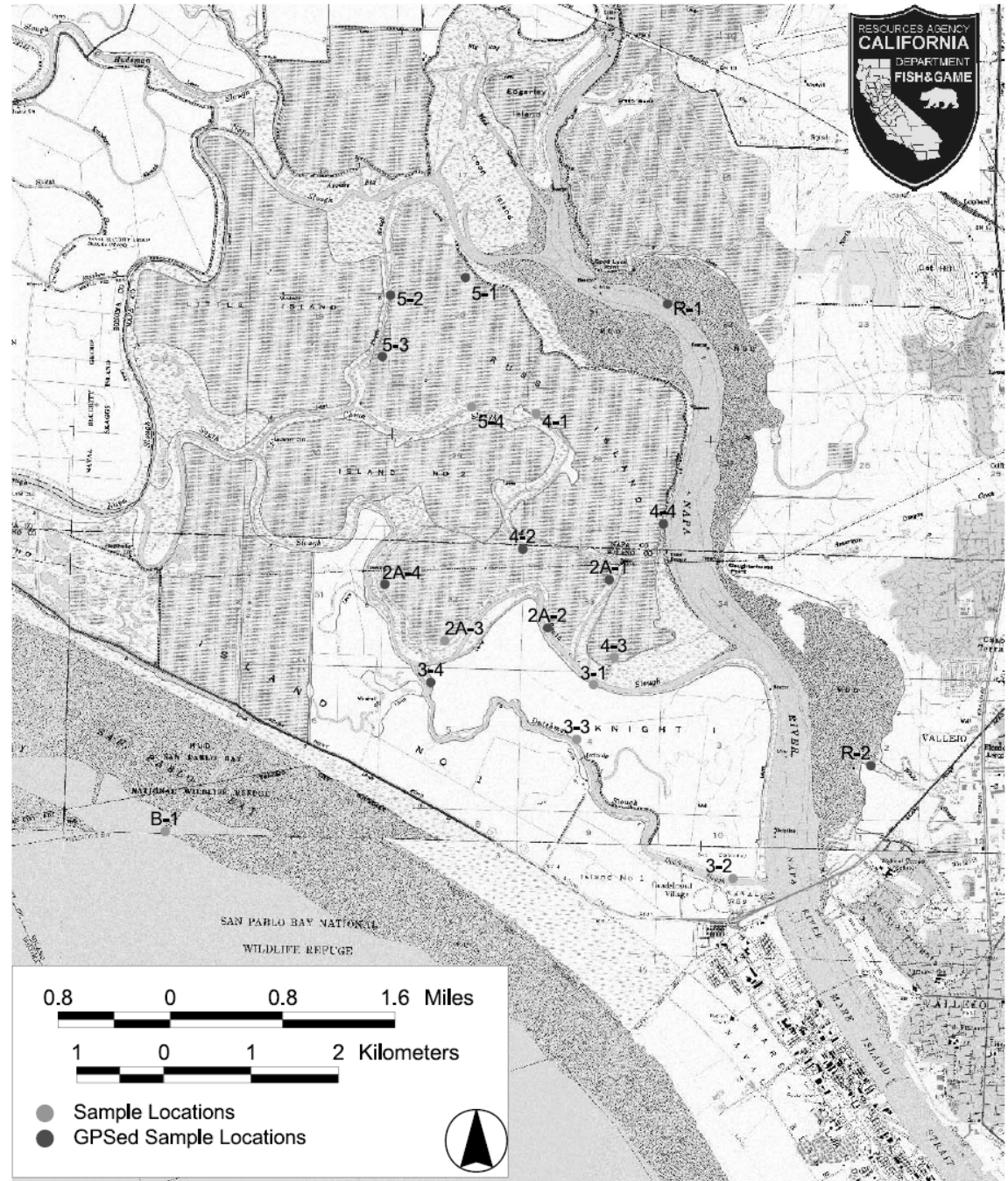


[home](#)

[back](#)

[next](#)

Methyl-Mercury Sample Sites.



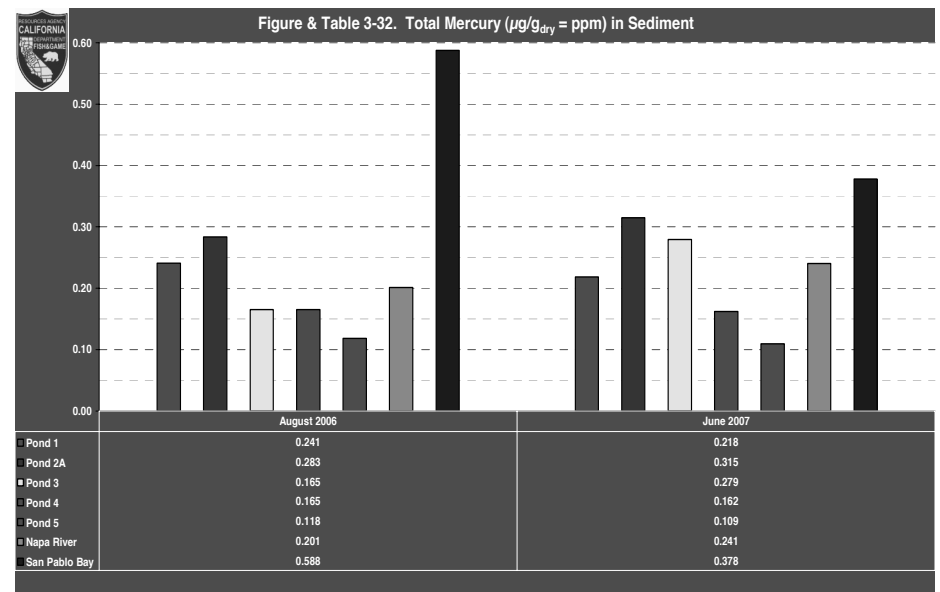
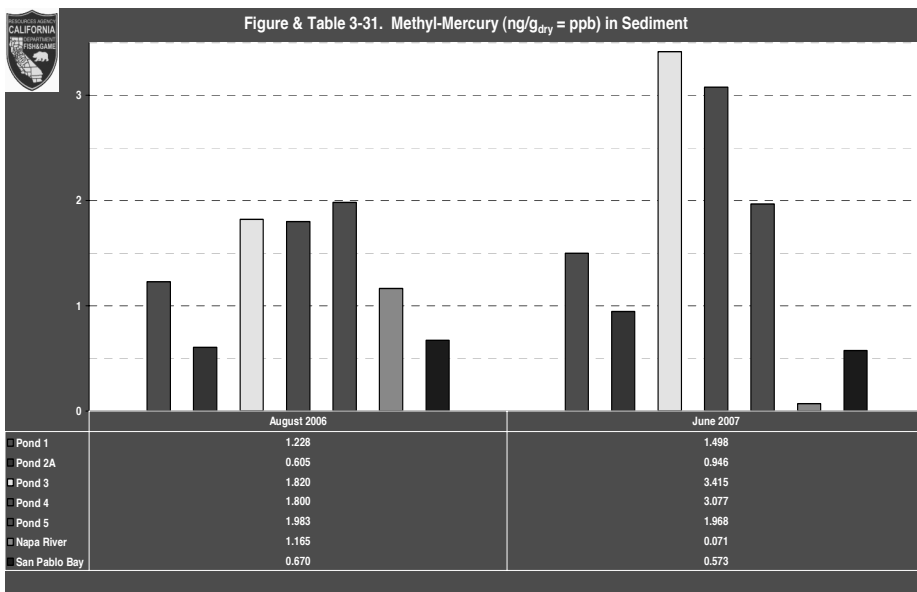
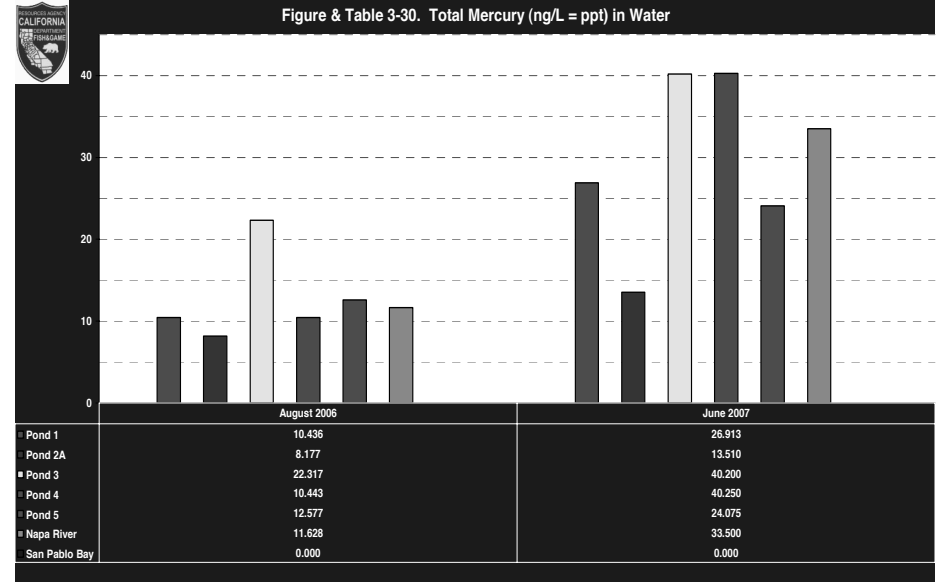
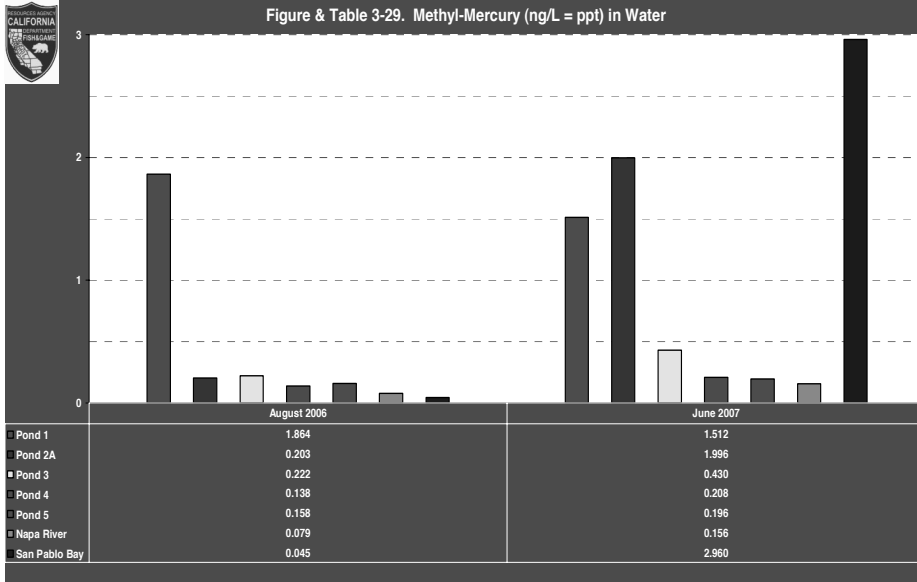
Napa-Sonoma Marshes Wildlife Area,
Napa River Salt Marsh Restoration Project
Methyl Mercury Sample Locations

Mercury Data Highlights

- highest total Hg in San Pablo Bay sediment
- highest m-Hg in Ponds 3 and 4 sediment
- pond & River total Hg data relatively similar
- River, Ponds 1 & 2 m-Hg data highest

11/10/2009

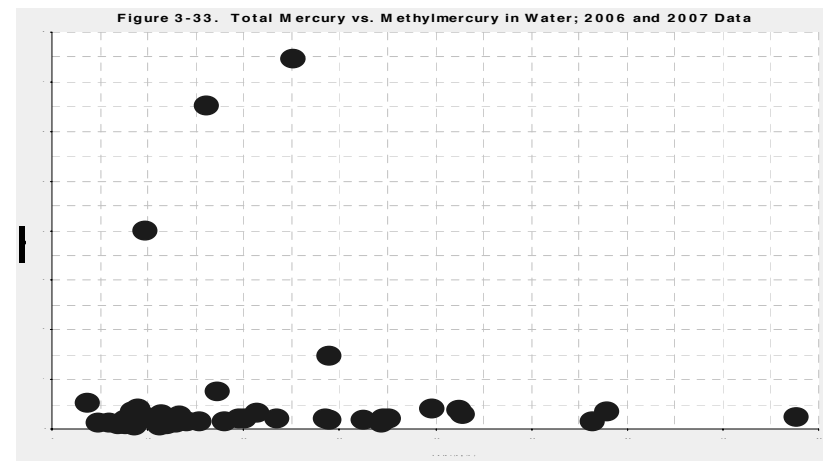
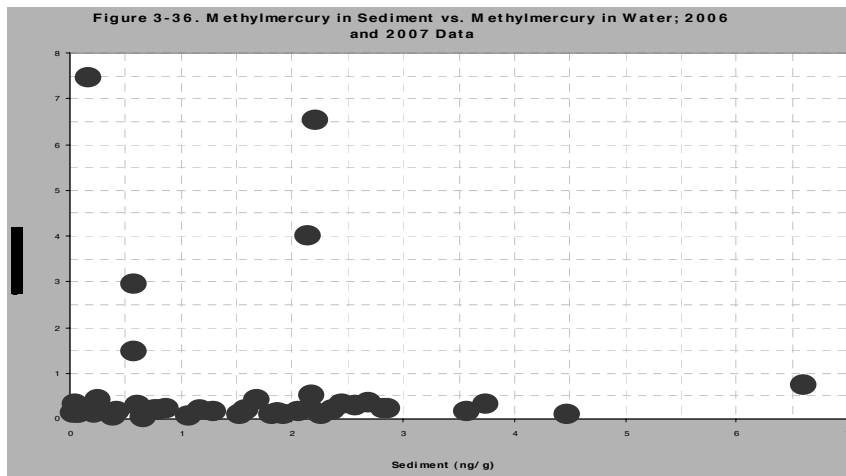
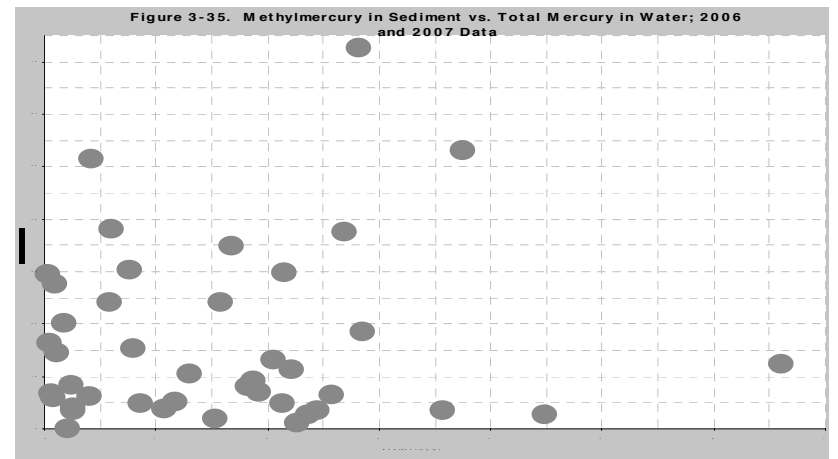
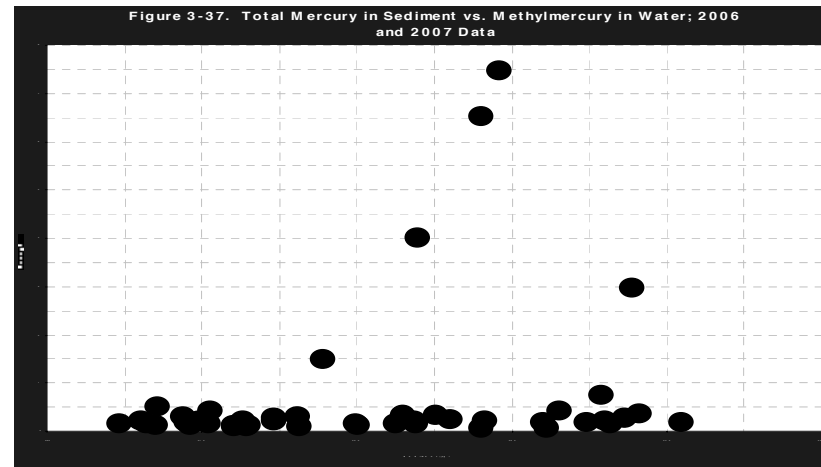
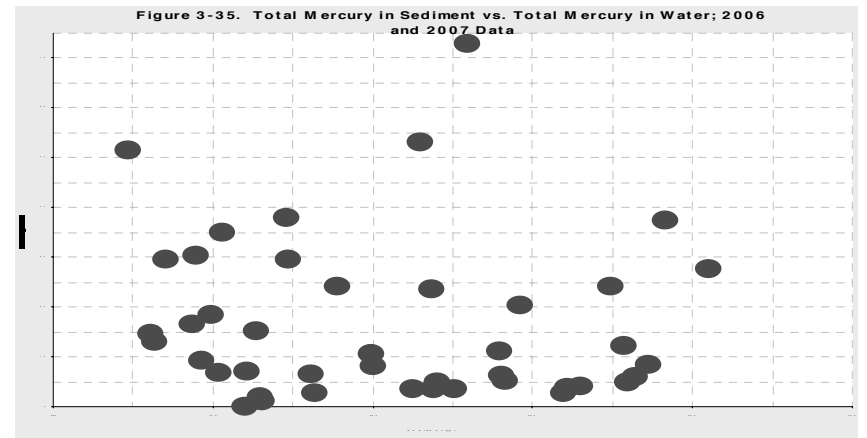
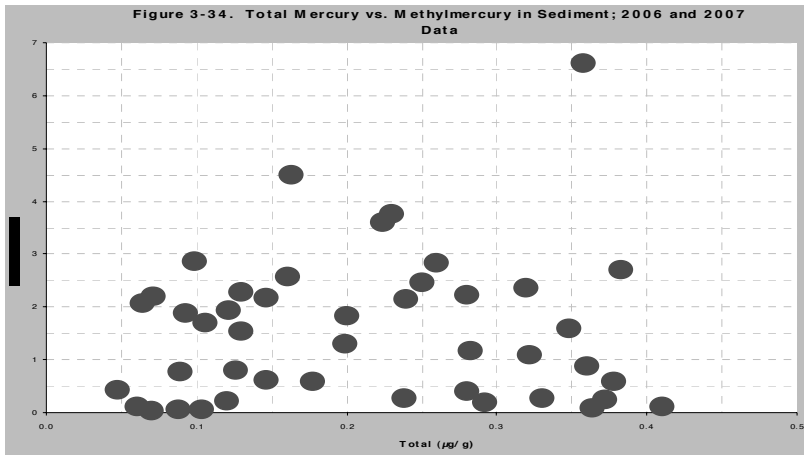




Possible Sediment/Water/Methyl/Total Comparisons

11/10/2009

<u>Total Mercury</u>	<u>Methyl-Mercury</u>	<u>Total Mercury</u>	<u>Methyl-Mercury</u>
1. sediment	sediment		
2. sediment		water	
3. sediment			water
4.	sediment	water	
5.	sediment		water
6.		water	water





A 10x10 grid of dashed lines is centered on a white background. A thick, solid dark gray border surrounds the grid. In the center of the grid, there is a large, bold, black question mark.

Summary -- Key Points:

- Ammonia results — no concern.
- Mercury data — need tissue, tissue, tissue.
- DO, salinity, pH results — no real concerns.
- SRB discharge = River WQ.
- turbidity tends to be higher — makes sense in dynamic tidal system.
- Monitoring is expensive — DFG urges a cautiously conservative approach to future regulation of restoration efforts (that are intended to improve or renew a wide range of beneficial uses of water).

11/10/2009





Thanks for Listening.

Any Questions?