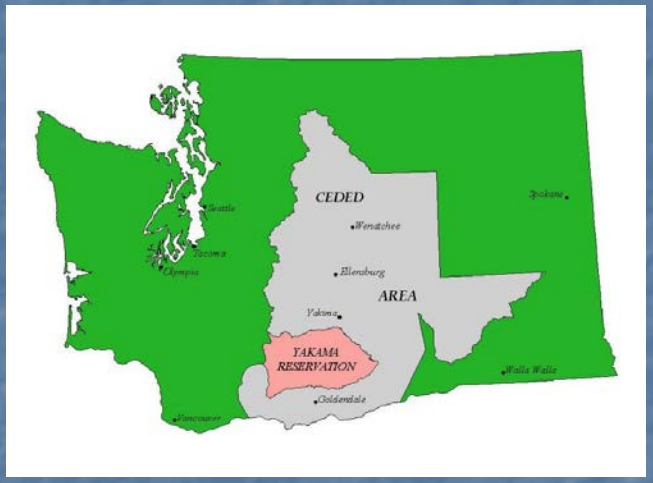
Water Quality in Lower Yakima River Tributary Streams and Irrigation Return Drains



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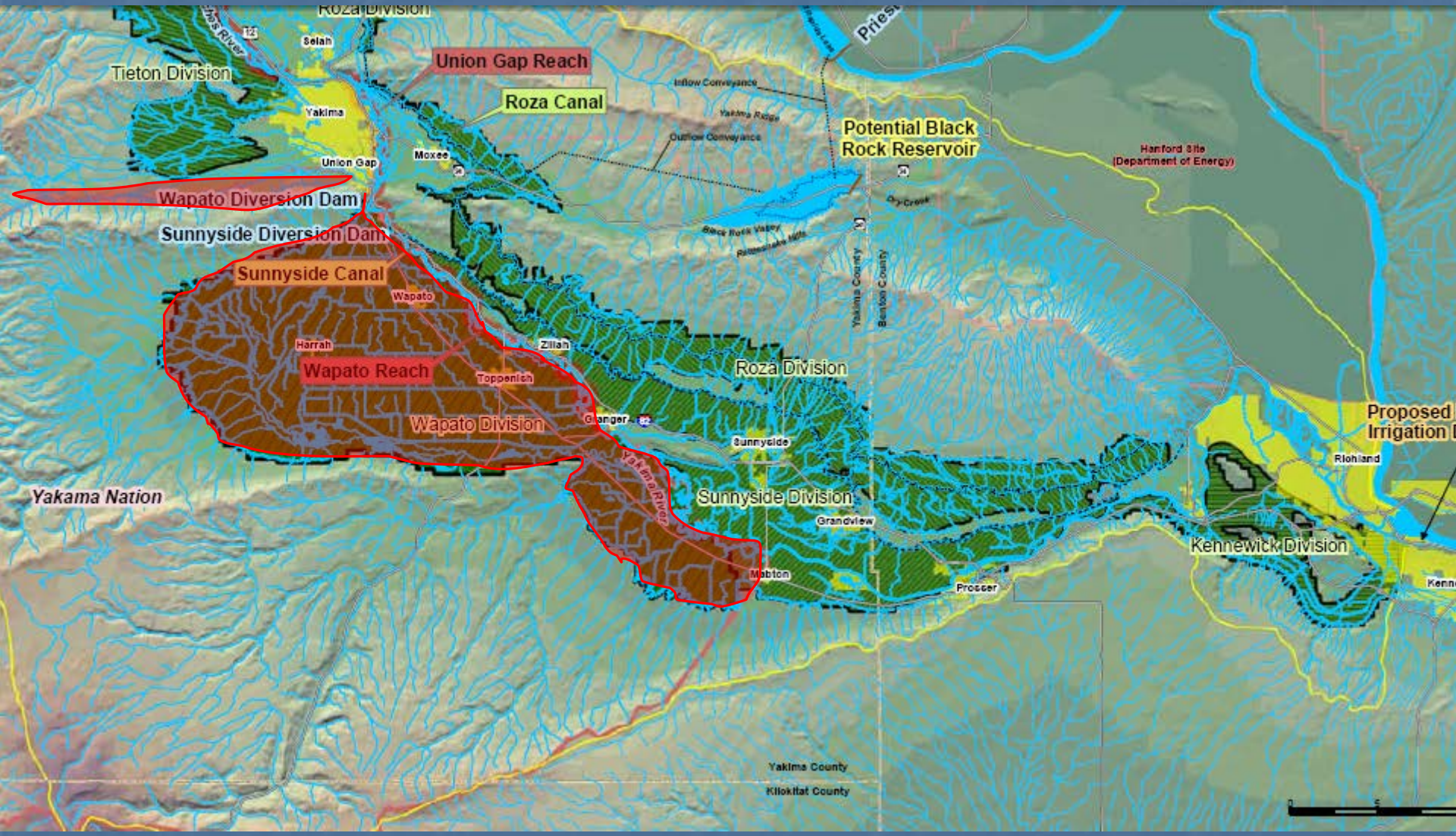
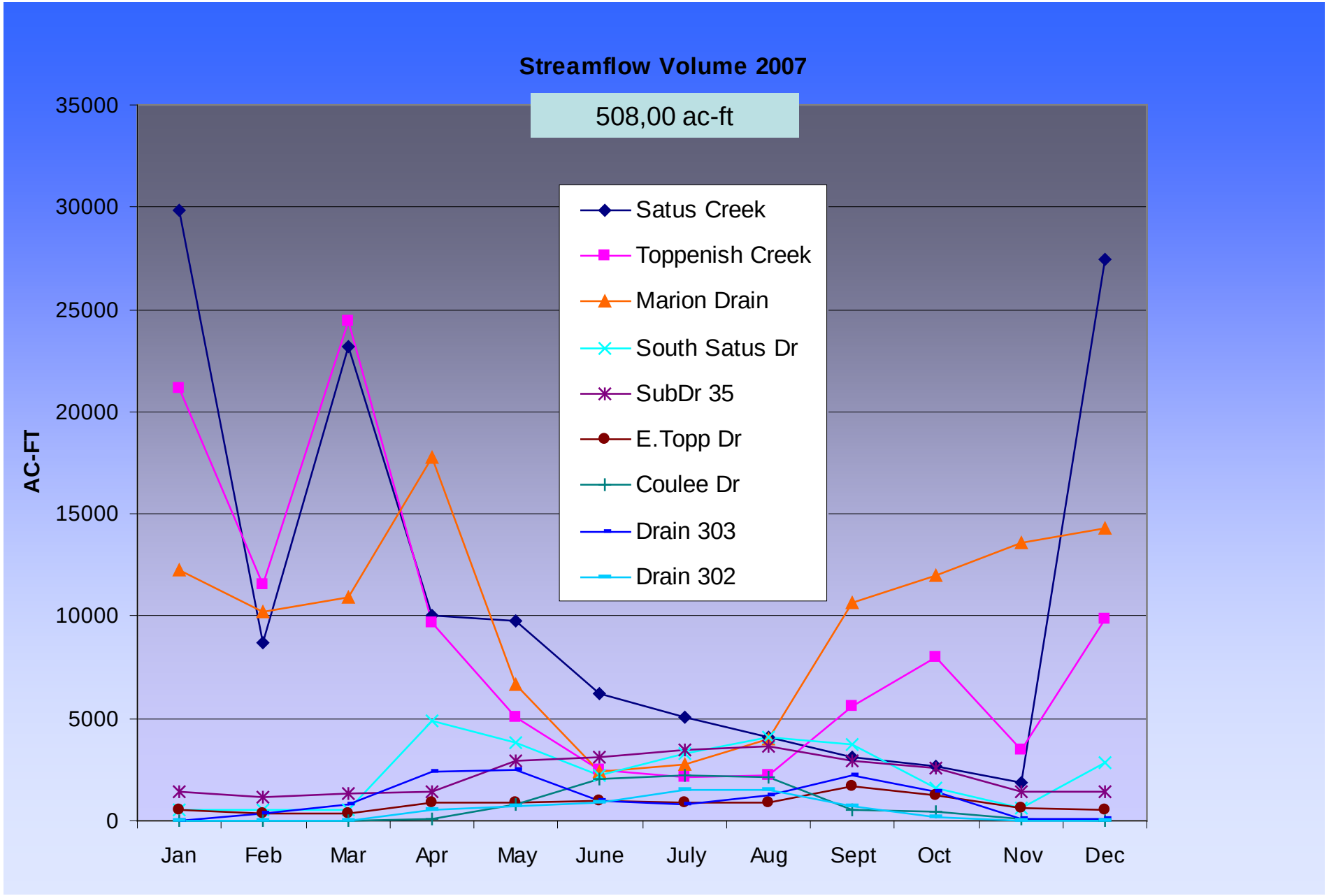
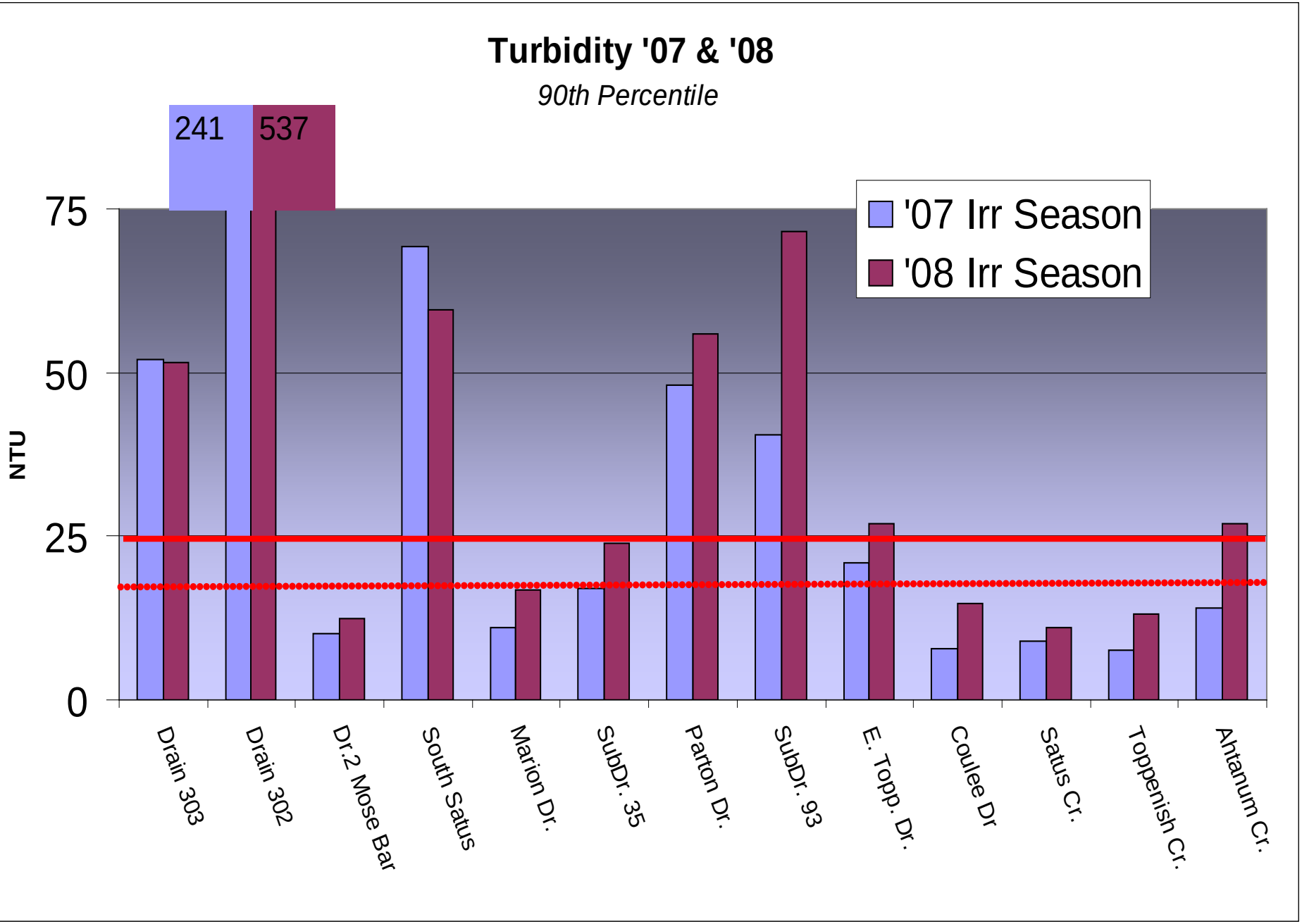
Partners/Contributors: Dept of Ecology; BIA-Wapato Irrigation Project, Bureau of Reclamation

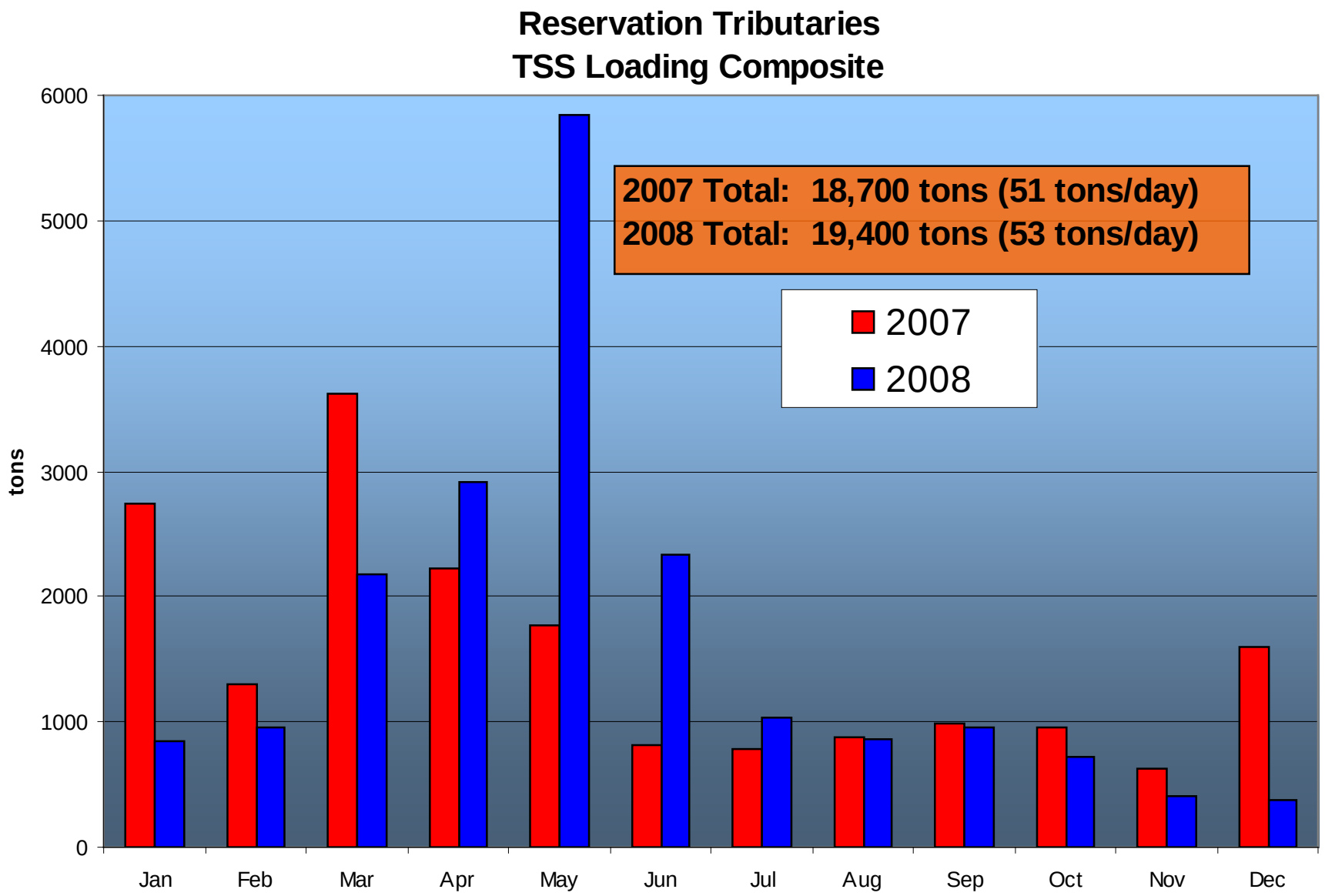
Lower Yakima River Basin & Irrigation Divisions




Streamflow Volume 2007
508,00 ac-ft
AC-FT
35000
30000
25000
20000
15000
10000
5000
0
Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
Oct
Nov
Dec
Satus Creek
Toppenish Creek
Marion Drain
South Satus Dr
SubDr 35
E.Topp Dr
Coulee Dr
Drain 303
Drain 302

Non-Point Source Pollutants…

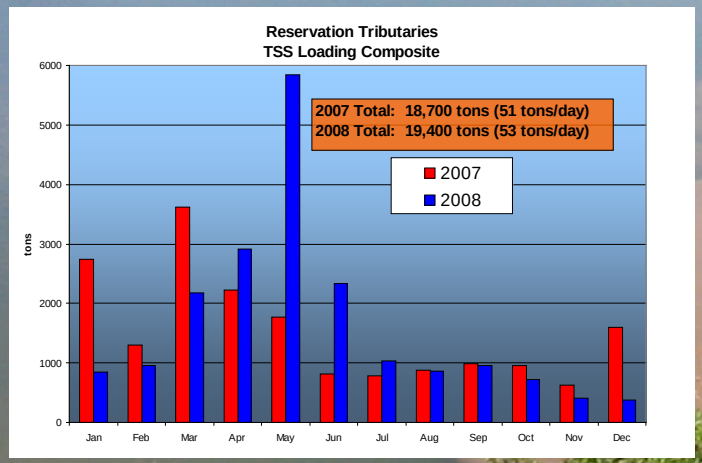

Turbidity '07 & '08
90th Percentile
241
537
75
50
25
0
NTU
'07 Irr Season
'08 Irr Season
Drain 303
Drain 302
Dr.2 Mose Bar
South Satus
Marion Dr.
SubDr. 35
Parton Dr.
SubDr. 93
E. Topp. Dr.
Coulee Dr
Satus Cr.
Toppenish Cr.
Ahtanum Cr.

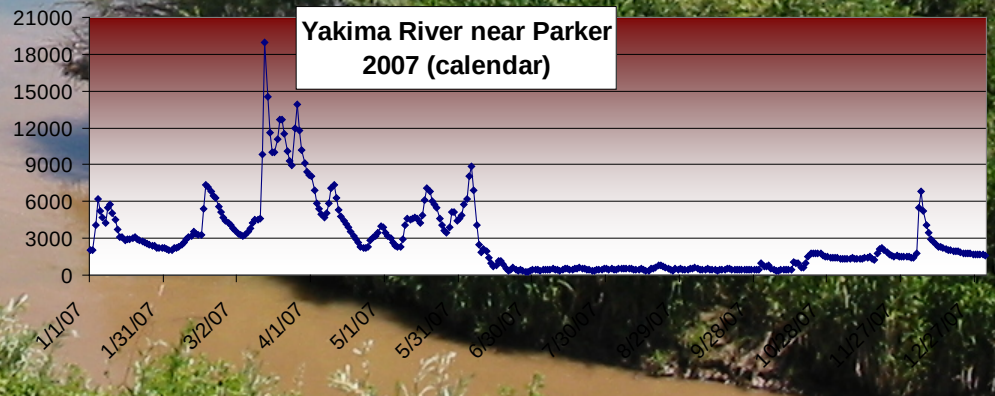

Reservation Tributaries
TSS Loading Composite
2007 Total: 18,700 tons (51 tons/day)
2008 Total: 19,400 tons (53 tons/day)
2007
2008
tons
6000
5000
4000
3000
2000
1000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

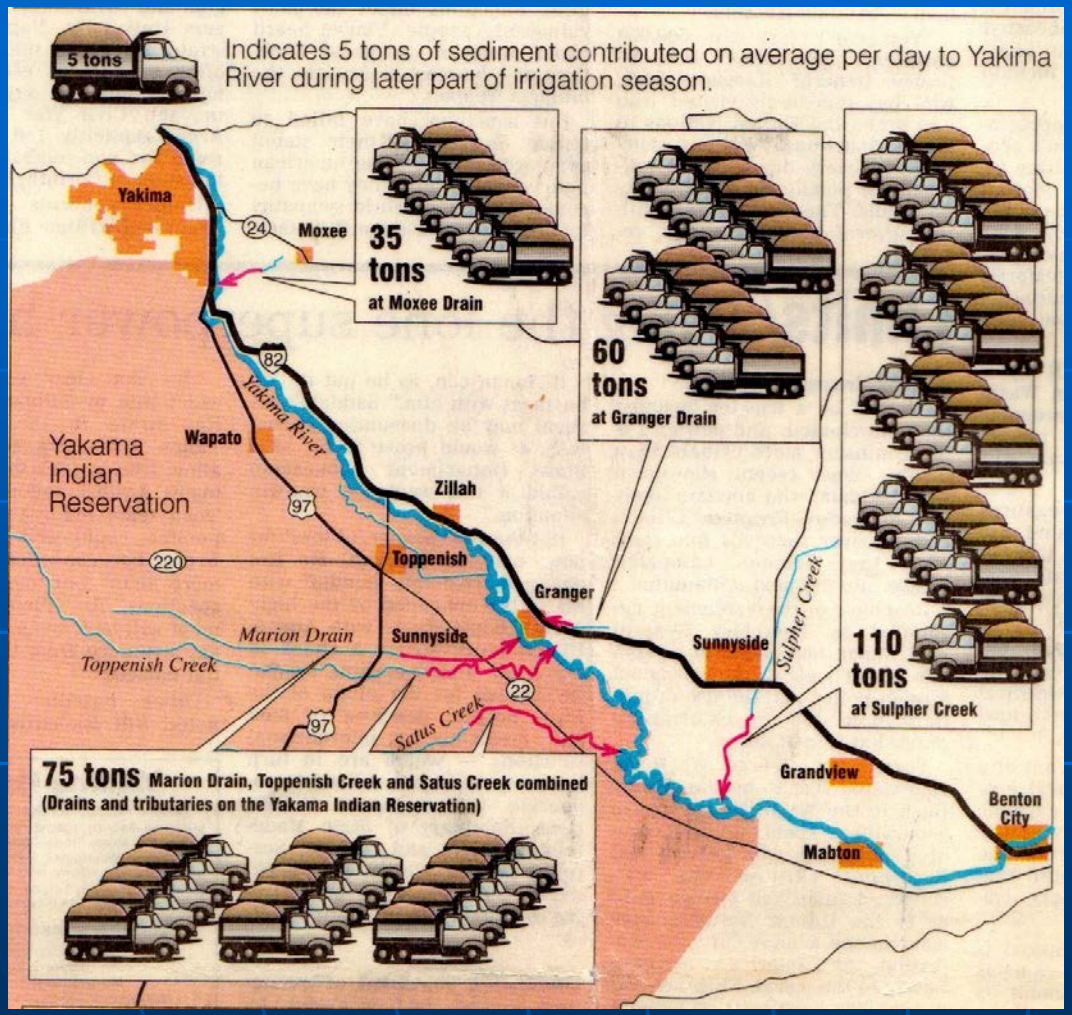
Hydrologic/Ecologic Importance

July-September

2007	***2008***		
480 cfs	549 cfs	-	Yakima River at Parker
441 cfs	442 cfs	–	Reservation tributaries (below Parker)







Marion Drain, Toppenish Creek, & Satus Creek

1995: 75 tons/day

2007-08: 5 tons/day

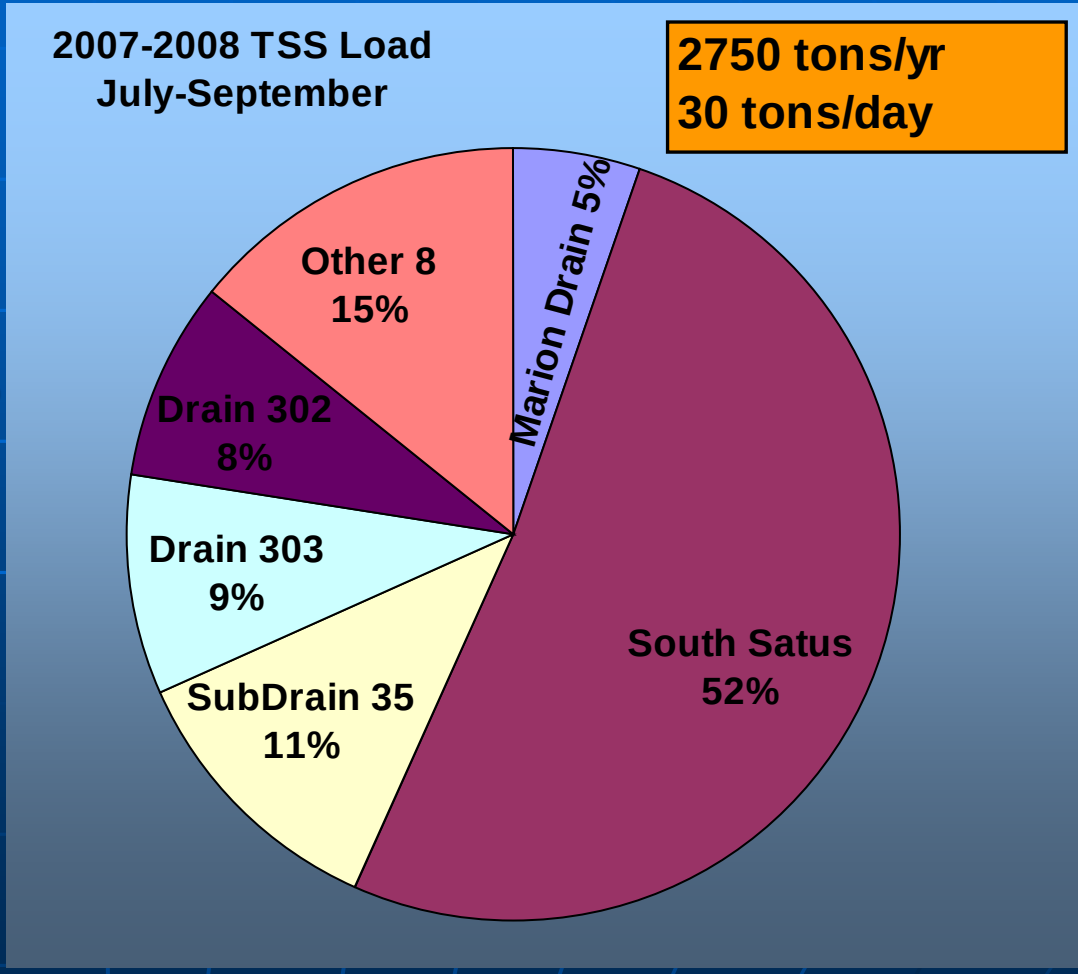
93% reduction!

For July-September …

- The “Muddy 5”
  contributed 85% of the TSS loading and only 52% of the flow.

- **South Satus Drain - 52% of TSS load & 14% of flow**

- Satus-Marion-Toppenish:
  15% of Reservation TSS load



Main Canal (New Reservation)
Wapato Irrigation Project
July-September

2007	2008
◆ TSS in:	
-50 tons/day	*-52 tons/day*
◆ TSS out (13 drains & streams):	
-29 tons/day	-31 tons/day

Fecal Indicator Bacteria

Sites that meet standard during irrigation season:

Fecal Coliform

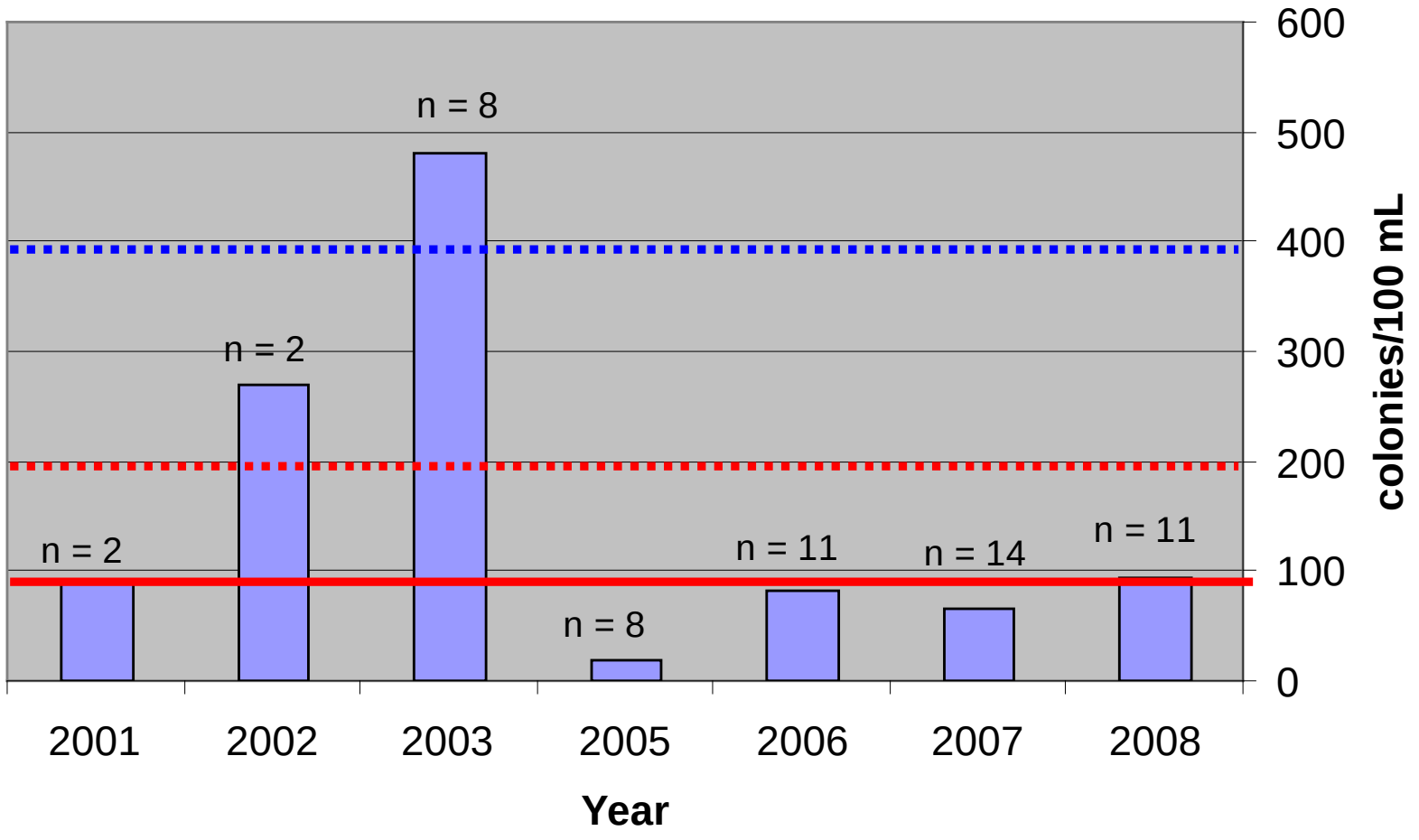
- 1 of 13 drains/streams
- 0 of 3 internal drains
- 5 of 5 reference sites

E. Coli

- 0 of 13 drains/streams
- 0 of 3 internal drains
- 3 of 5 reference sites

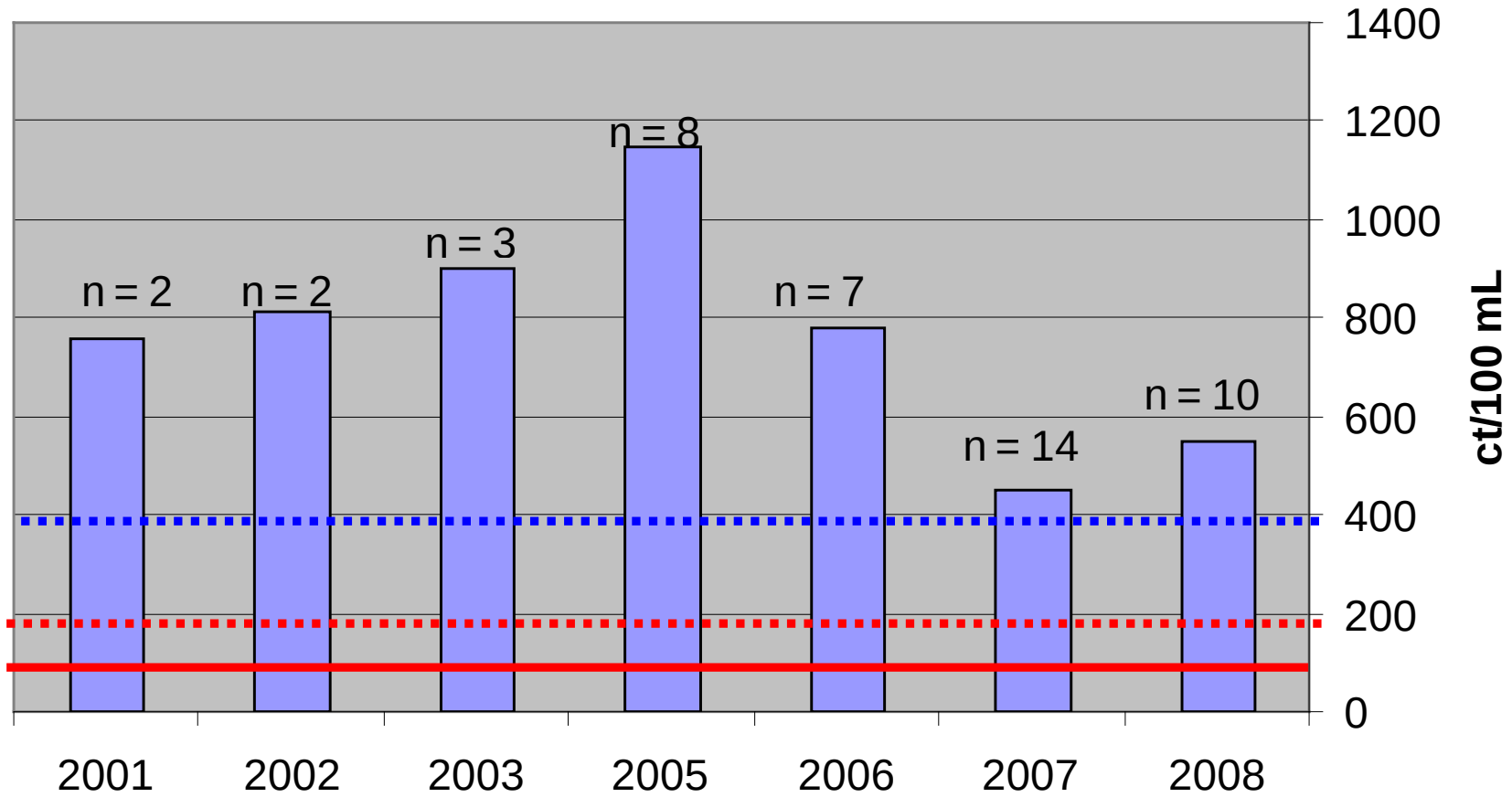
Marion Drain

Fecal coliform - Irrigation Season



Mud Lake Drain

Fecal Coliform - Irrigation Season



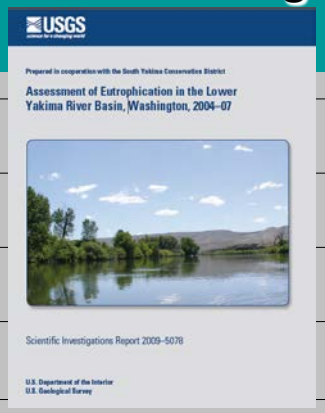
Nutrients

Excessive Nutrient Indicators: nuisance aquatic growth, DO and/or pH violations.

Dissolved Inorganic Nitrogen

2006-08

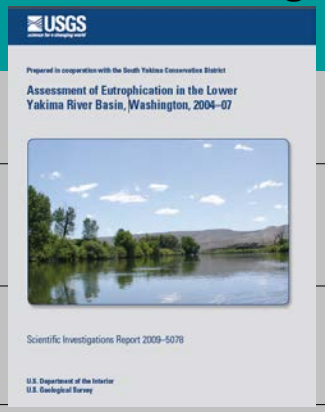
Lower Yakima R.
0.50 – 1.10 mg/l



Soluble Reactive Phosphorus

2006-08

Lower Yakima R.
0.03 – 0.12 mg/l



Take Home Messages

- Improvements have been realized, but there is still work to be done
- Variability in time and space at multiple scales is key to understanding the system
- Hydrology strongly influences water quality and is a driving force in determining certain parameters

More Information

http://www.ecy.wa.gov/eim

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How to improve

- on-farm turbidity targets;
- reduced water deliveries;
- conversion to sprinkler or drip;
- convert open ditches to pipe;
- BMPs – settling ponds, filter strips, PAM

WIP Priority Improvement Measures

- Reduce backlog of deferred maintenance ($200+ million)
- Better water accounting throughout system
- Re-regulation reservoirs
- Pipe Satus Unit
- On-farm conservation
- Canal lining
- Conversion to wildlife refuge