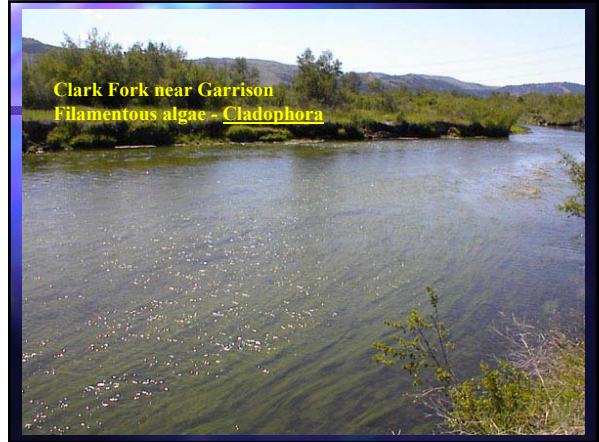


The Problem

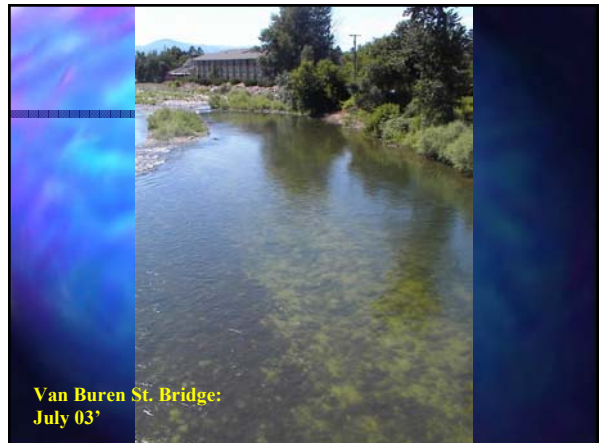
Clark Fork near Garrison
Filamentous algae - Cladophora



Clark Fork at
Gold Creek
Filamentous
Algae



Van Buren St. Bridge:
July 03'



Higgins St. -
July 03'




Below Higgins Bridge in Missoula 7-03

Orange St. - July 03'





Impacts of excessive algae:



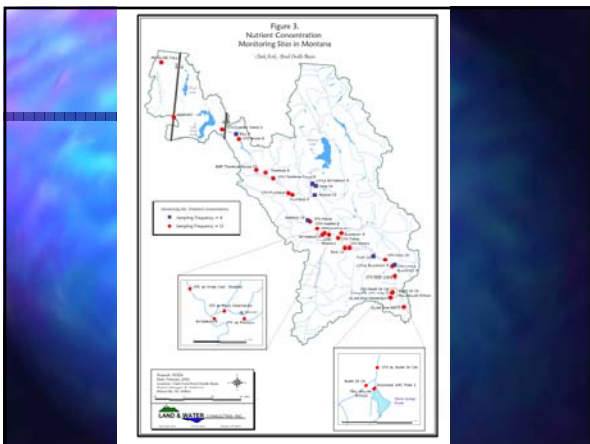
- Degrades aquatic habitats & alters invertebrate communities.
- Depletes dissolved oxygen supplies and contributes to documented low fish populations
- Modifies flows & increases sedimentation in algal beds

The Clark Fork & Water Quality Law

- Section 303(d) of the Federal Clean Water Act requires states to assess the condition of their waters to determine where water quality is **impaired (does not fully meet standards)** or threatened (is likely to violate standards in the near future).
- The **Clark Fork was listed as impaired** due to algae growth in 1988
- State and Federal law **requires** that **TMDLs** (total maximum daily load) be developed to return water quality to acceptable levels

1993

- EPA and the state agencies form the Tri-State Implementation Council, a 28-member broad-based stakeholder group
 - Regulatory agencies
 - Dischargers
 - Watch-dog groups
 - Resource management groups/tribes



February 1994 a Nutrient Target subcommittee was established by the Tri-State Water Quality Council

- Two questions:
 - What should the standards be?
 - What are you going to do to meet them?

Targets/Standards for Clark Fork River mainstem:

Algae:

100 milligrams/meter² chlorophyll a (summertime mean),
& 150 milligrams/m² (peak), chlorophyll a

Nutrients:

20 micrograms/Liter of Total Phosphorus (upstream of Missoula/*Bonner)

39 micrograms/Liter of Total Phosphorus (downstream of Missoula /*Bonner)

300 micrograms/Liter of Total Nitrogen (anywhere in river)

*Targets became standards in summer of 2002 with P standard changing at confluence of Blackfoot

1998: VNRP (Voluntary Nutrient Reduction Program) signed giving 10 years to achieve reductions resulting from promised actions.

Signatories: DEQ, EPA, Butte/Silverbow, City of Deerlodge, City of Missoula, Missoula County, Missoula Health Board, Smurfit-Stone

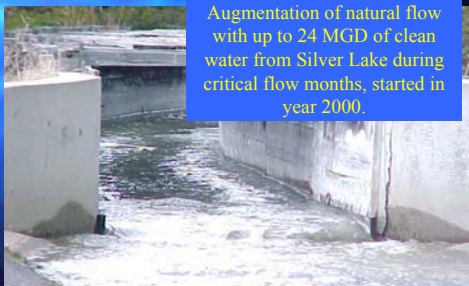
Butte Silver Bow Commitments in VNRP Agreement

- Reduce summer phosphorus and nitrogen discharge to 9% and 22%, respectively, of 1991 levels.
- In order to accomplish this Butte SB will:
 - pump effluent to land application;sod farm & golf course
 - augment flow in WS Creek with clean Silver Lake water;
 - take other measures as necessary to meet target levels of nutrients in the Clark Fork just below Warm Spring
 - Constructed storm water catch-basins

Sod Farm Irrigation Utilizing Butte Silver Bow WWTP Effluent



Warm Springs Creek Flow Augmentation: for dilution of metals and nutrients in upper Clark Fork



Augmentation of natural flow with up to 24 MGD of clean water from Silver Lake during critical flow months, started in year 2000.

City of Deer Lodge Commitments in the VNRP Agreement

- Meet in-stream nutrient and algae targets by constructing a land application system for wastewater effluent;
- Implementation of a phosphate laundry detergent ban.

City of Missoula Commitments to the VNRP Agreement:

- Reduce nutrient loading to river through a biological nutrient removal (BNR) upgrade and an expansion of the wastewater treatment plant;
- Address septic nutrient impacts by working with Missoula County on hooking septic systems to sewer.

Missoula County/City Commitments to the VNRP Agreement

- Address septic effluent impact on surface water pollution by:
 - Offering incentives to connect to public sewer for existing facilities and new subdivisions;
 - Connecting 50% of the existing 6,780 septic systems in the Missoula urban area to sewers;
 - Continuing to connect existing septic systems to sewers in the Missoula area at a rate equivalent to the number of new septic systems.

Present & Future Nutrient Removal at Treatment Plant

	Influent Jun-Sep 2003 mg/l	Effluent Current Jun-Sep mg/l	Effluent BNR Jun-Sep mg/l	Percent Removal Current Condition	Percent Removal BNR Condition
Total Phosphorus	5.55	3.42	0.7	38.4%	87.4%
Total Nitrogen	33.1	24.2	7.0	26.9%	78.8%

Nitrogen back to atmosphere

Phosphorus in sludge is dewatered and ends up in EKO-Compost



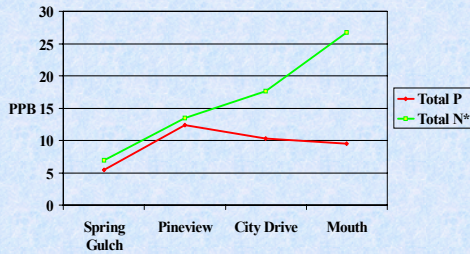
SEWER EXTENSION PROJECTS	units served	units connected thru 2002	Timeline
East Reserve I	930	496	2001
Pineview	120	48	2001
East Reserve II	647	252	2002
East Missoula	538	122	2002
Rattlesnake	477		2003-4
Mullan Road*	270		2003-4
Total	2712	918	

*El Mar @ 491 not counted toward VNRP, land app., not septic

Where Rattlesnake septic effluent goes

- 477 Rattlesnake units generate 119,250 gpd of sewage
- It all ends up in the Rattlesnake aquifer
- Some then enters Rattlesnake Creek
- Most of it flows into the Missoula Aquifer
- It all eventually enters the Clarkfork

Rattlesnake Nutrients Fall - 2002



Smurfit-Stone Commitments

- Adopted Voluntarily Control Strategies in 1995 (3 years ahead of the formal VNRP program) including:
 - Operate Color Removal Plant (*unless process changes eliminate need*) from June 15 through September 21.
 - Use Storage Ponds farthest from River to reduce seepage contribution during the summer months.
 - No Direct Discharge in July/August unless river flow >4000 cfs.
 - Research Nutrient Removal Technologies/Techniques

Summer Nutrients - Percent of Samples below Target

Station	TP	TN
Silver Bow Creek ab WWTP	0%	0%
Clark Fork bl Warm Springs	6%	61%
Clark Fork ab Ltl Blackfoot	4%	50%
Clark Fork bl Missoula	65%	37%
Clark Fork at Huson	90%	70%

Stations with Statistically Significant (P<0.05) Trends based on Summer Data

Station	TN	TP	SRP	TSIN
Silverlow/Opportunity				
Clark Fork below Warm Sp.	Decreasing	Decreasing	Decreasing	Decreasing
Clark Fork abv L. Blackfoot	Decreasing	Decreasing	Decreasing	
Clark Fork below Missoula		Decreasing	Decreasing	Decreasing
Clark Fork at Huson		Decreasing	Decreasing	Increasing

What else is likely necessary to meet standards in the river and to comply with the VNRP?

Connection Ordinance

- To be proposed for implementation after BNR & hydraulic expansion is in place
- To require connection at time of sale/transfer
- To affect properties where sewer is available in the adjacent right-of-way

Probable requirement for denitrifying septic systems

- Develop requirements for denitrifying septic systems
- Need to develop predictable, enforceable method to provide for necessary maintenance over time for both private and small community systems

Summary

- The Clarkfork River is severely impacted by nutrients and the plant growth nutrients cause
- State and Federal law requires that the problem be corrected
- The plan for correction is the VNRP
- Other cities, towns and a company are fulfilling VNRP requirements.
- The City, County, and City-County Health Department are obligated to connect 3390 septic systems to City sewer by 2008
- To date, 5 projects (three in the city and two in the county) have been created to accomplish our VNRP obligations

- The City is building a 19 million dollar expansion and treatment upgrade to fulfill VNRP promises.
- The plant will remove 87.4% of Phosphorus and 78.8% of Nitrogen
- The Rattlesnake SID's are necessary to fulfill VNRP connection requirements
- There is nothing special about the affected areas or their effluent that suggests these SID's for sewer should not be created