



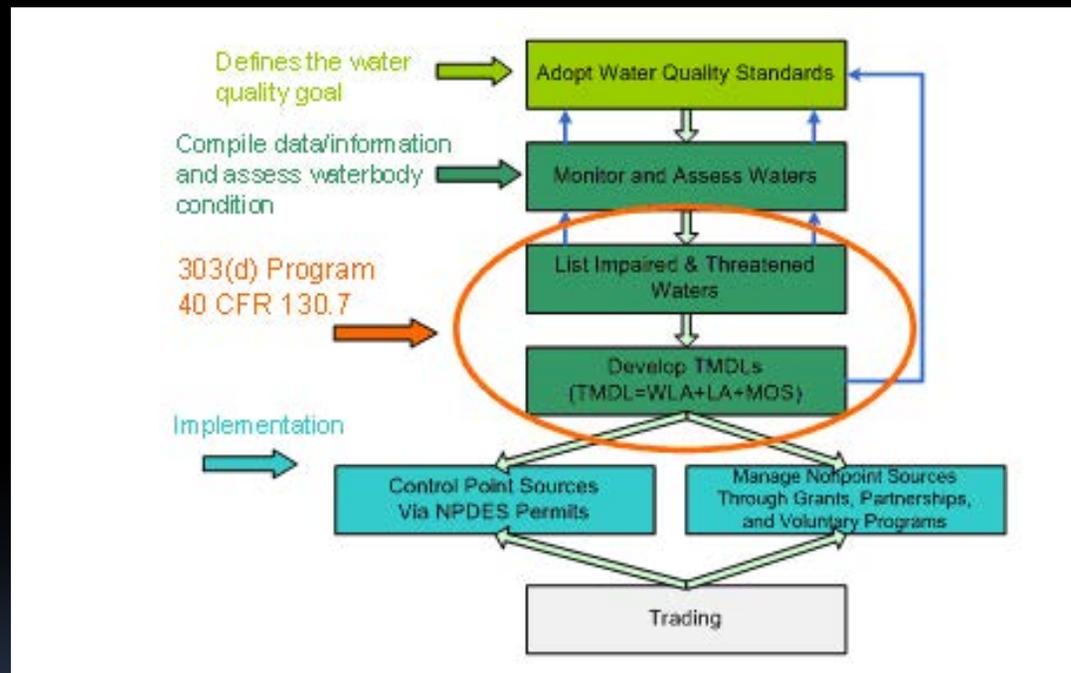
Impairment Decisions
Total Maximum Daily Loads (TMDL's)

APPLYING WATER QUALITY STANDARDS

What I will cover

- Basic Information (review a primer for permit writers module)
- Case Studies (using the standards)
 - Impairment Decision – Stampede Creek
 - TMDL allocation – Big Lake

Water Quality Standards are the Basis



Serve as the foundation for Protection & Restoration

Water Quality Standards

- Designated use (e.g., aquatic life, recreation, drinking water)
- Water quality criteria to protect uses
 - Narrative or numeric
 - Magnitude, duration, frequency (e.g., DO: 5 mg/L daily minimum; fecal coliform: 200 counts/100 mL 30-day geometric mean)
- Antidegradation provisions
- General implementation policies



[7]

First used to figure out what we have

Monitoring and Assessment

- Establish monitoring programs to assess the quality of waters
- Include physical, chemical and biological data
- Include appropriate quality assurance and control
- Support a variety of CWA programs:
 - Abatement and control
 - Water quality standards
 - TMDLs
 - NPDES
 - Section 305(b) and 303(d) reporting



[8]

Used as the basis for polluted waters decision

303(d) List of Impaired Waters

- Identify waters that do not meet WQS after:
 - Technology-based effluent limitations
 - More stringent effluent limitations
 - Other pollution control requirements
- Include a priority ranking for all listed segments
- Identify TMDLs scheduled for next 2 years
- Identify the pollutants causing or expected to cause violations of the applicable WQS
- Provide documentation to support determination to list or not to list its waters



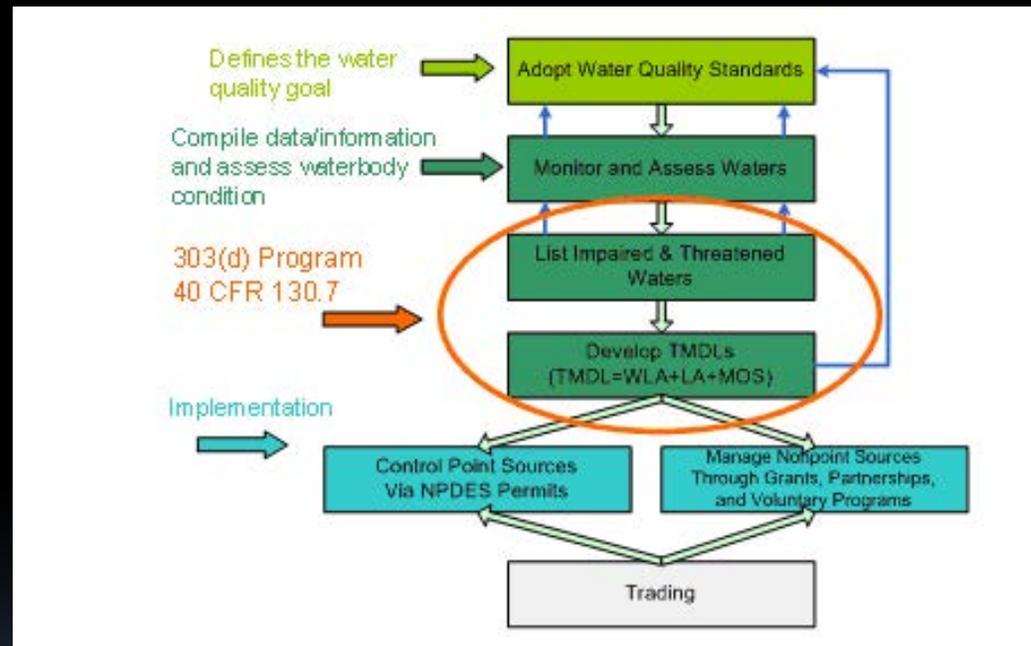
[9]

303(d) List of Impaired Waters (cont.)

- Developed every 2 years
- Submitted to EPA for review/approval
- Available on state websites and summarized on EPA's TMDL website
- www.epa.gov/owow/tmdl



Remember, also used in TMDL's & Permits



Two Case Studies

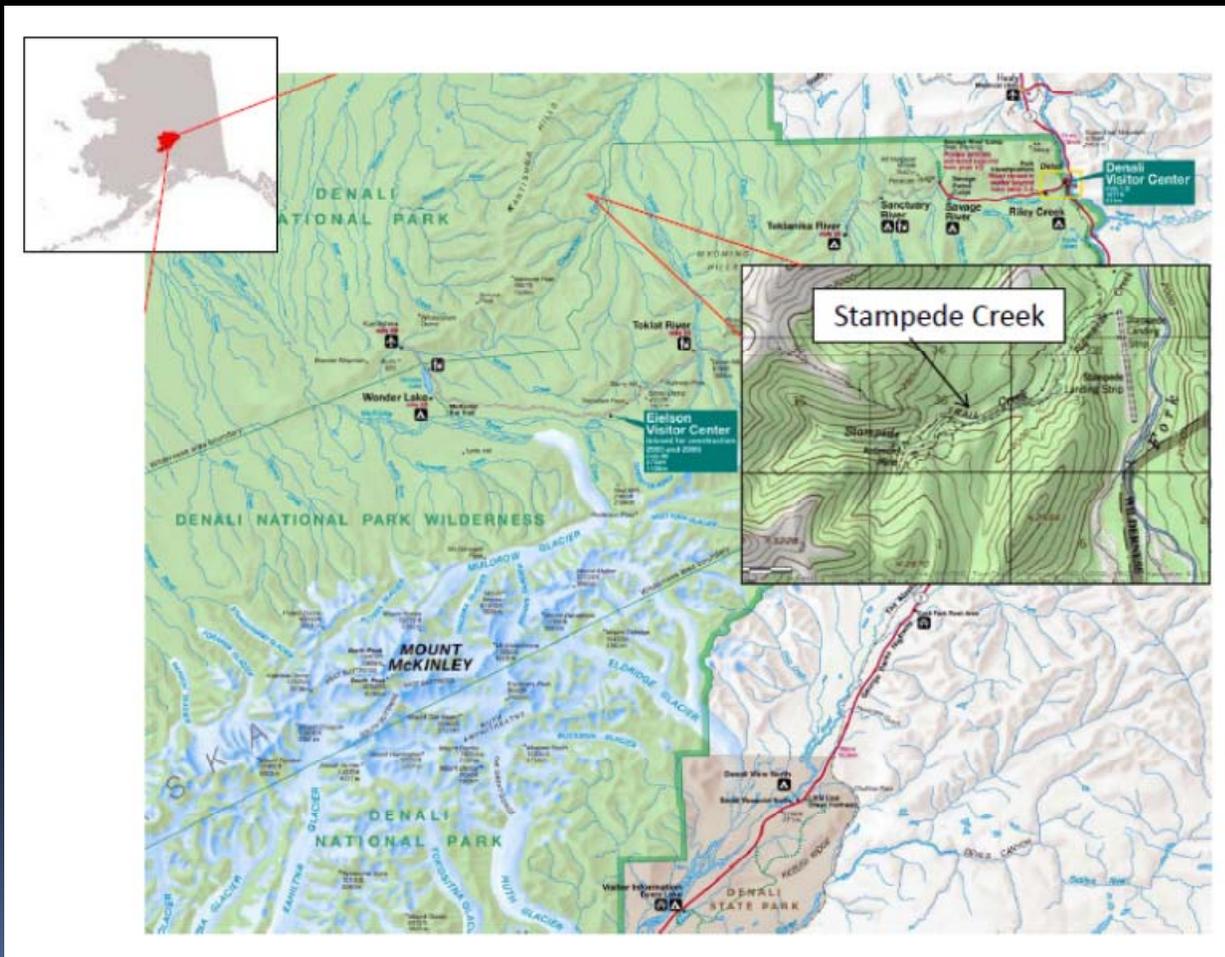
- Impairment Decision
 - 2012 Integrated Report
 - Data
 - Compare to standard
 - Are we over?

Stampede Creek, Denali National Park



There is gold in
them thra hills

Stampede Creek



Stampede Creek (history)

- Gold discovery in 1905 began mining in the area
- 1936 active antimony mine began; 40-ton mill construction in 1939
- Mine closed 1970
- Denali National Park expanded in 1980, most mining ceased by 1985
- 1,100 cubic yards – fine tailings
- 650 cubic yards – waste rock
- Creek runs through material



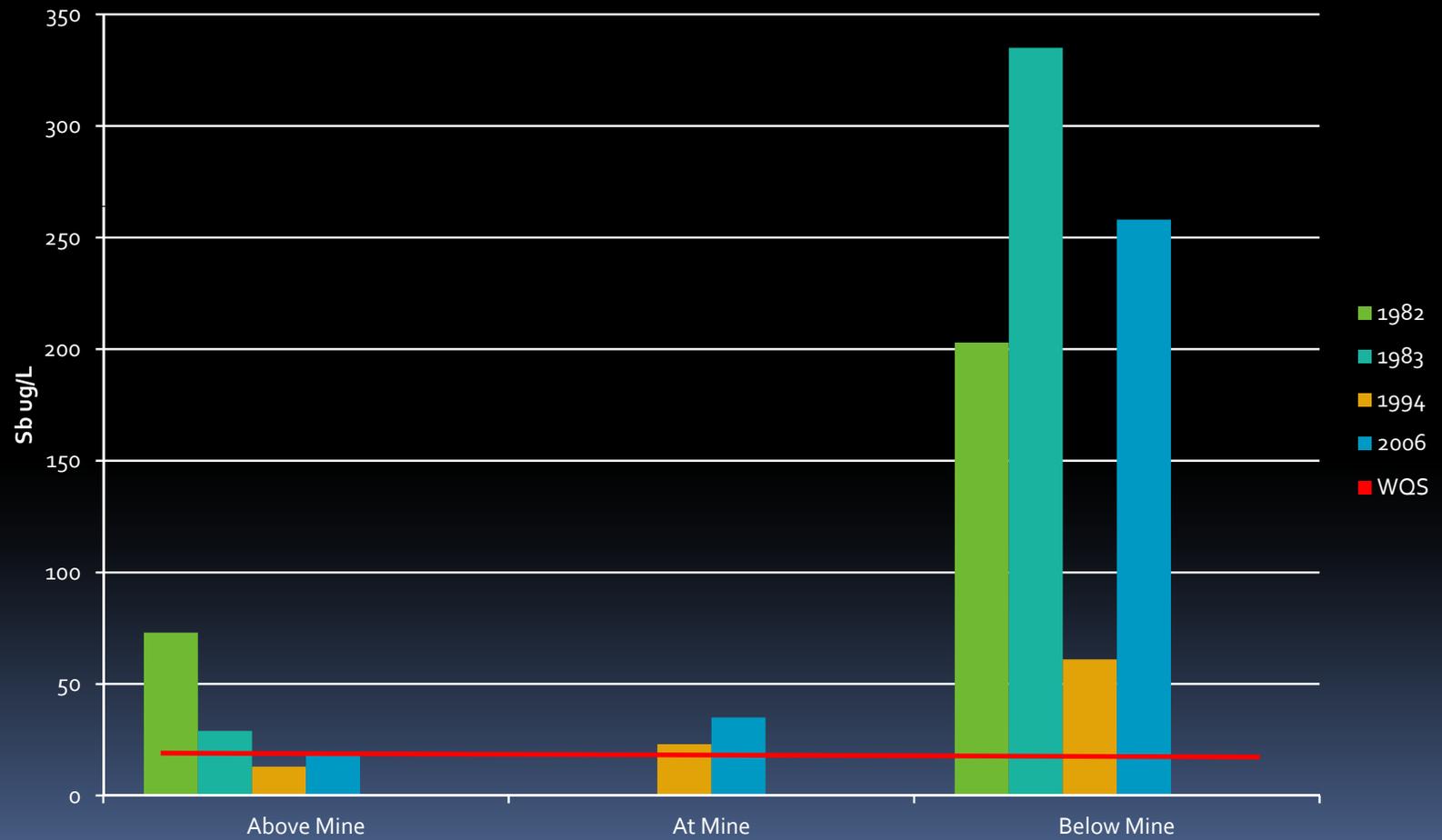
Water Quality Standard from Water Quality Criteria for Toxics and Other Deleterious Substances (Dec. 2006) (ug/L unless shown otherwise)

Pollutant	Type of Pollutant	Drinking water	Stock water	Irrigation Water	Aquatic Life for Fresh Water		Aquatic Life for Marine Water		Human Health for Consumption of:	
					Acute	Chronic	Acute	Chronic	Water + Aquatic Organisms	Aquatic Organisms Only
Antimony	Inorg	6	-	-	-	-	-	-	14	4,300

Magic Number

- 6 ug/L – Drinking water standard

Findings



Conclusion & Next Steps

- Over water quality standards
- Proposed list as “impaired” – Integrated Report 2012
- Continue work with National Park Service on remediation plan

Case Study # 2 – Big Lake

- Impairment Decision
- Data
- Limits
- Develop Total Maximum Daily Load



Photo thanks to Cook
Inlet Keeper

Background

- Naturally occurring lake, about 60 miles from Anchorage
- Lots of weekend use
- Began water quality monitoring in 2004 – showed elevated hydrocarbons in shallow water
- More monitoring 2005
- 2006 DEC decided “Impaired”
- 2009 more testing – same problem
- Community working group

Background – potential sources

- Motor boats
- General construction Activity
- Marina's – Does serving coffee count?
- Future growth



Water Quality Standard

<p>(5) PETROLEUM HYDROCARBONS, OILS AND GREASE, FOR FRESH WATER USES</p>	
<p>(A) Water Supply (i) drinking, culinary, and food processing</p>	<p>May not cause a visible sheen upon the surface of the water. May not exceed concentrations that individually or in combination impart odor or taste as determined by organoleptic tests.</p>
<p>(A) Water Supply (ii) agriculture, including irrigation and stock watering</p>	<p>May not cause a visible sheen upon the surface of the water.</p>
<p>(A) Water Supply (iii) aquaculture</p>	<p>Total aqueous hydrocarbons (TAqH) in the water column may not exceed 15 µg/l (see note 7). Total aromatic hydrocarbons (TAH) in the water column may not exceed 10 µg/l (see note 7). There may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that cause deleterious effects to aquatic life. Surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration.</p>
<p>(A) Water Supply (iv) industrial</p>	<p>May not make the water unfit or unsafe for the use.</p>
<p>(B) Water Recreation (i) contact recreation</p>	<p>May not cause a film, sheen, or discoloration on the surface or floor of the waterbody or adjoining shorelines. Surface waters must be virtually free from floating oils.</p>
<p>(B) Water Recreation (ii) secondary recreation</p>	<p>Same as (5)(B)(i).</p>

Magic Number

- 10 ug/L – Water supply aquaculture, and Growth and propagation of fish, shellfish, other aquatic life, and wildlife

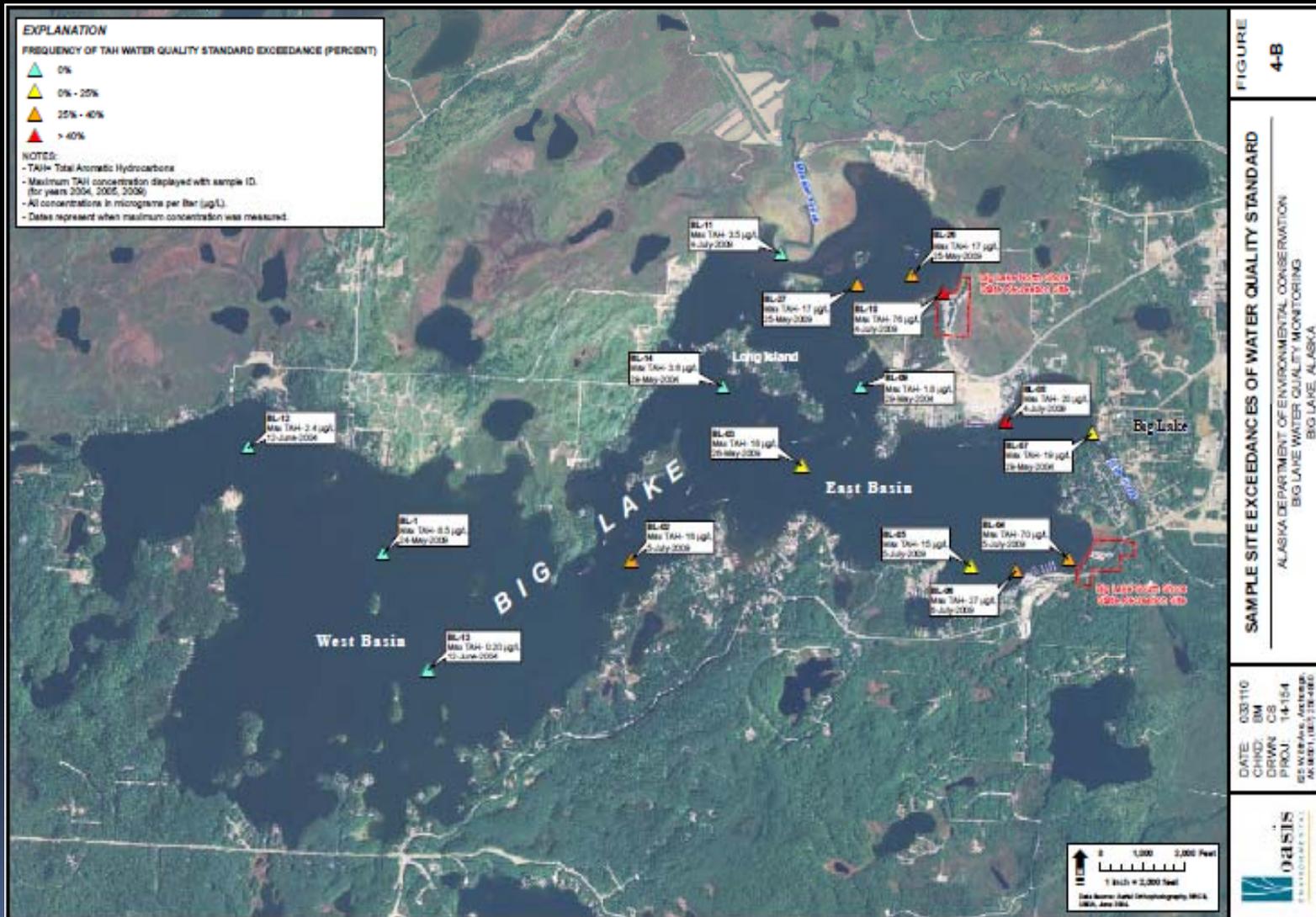
in a nutshell, not good for the fish food

Excerpt of results

Table 4-1: Summary Statistics for TAH in All Surface Samples

Station	2004	2005	2009	Description	Count of Samples	Minimum	Average	Maximum	Percent of Samples >10 µg/L
BL-1	X	X	X	Historical USGS sampling site at the deepest area of the west basin. Serves as a control site.	21	0.16	1.68	8.52	0%
BL-2	X		X	Major traffic lane between two basins.	16	0.16	6.36	16.14	38%
BL-3	X		X	Historical USGS sampling site at the deepest area of the east basin. There is boat traffic in this area.	16	0.16	5.62	17.73	25%
BL-4	X		X	Center of furthest east section of lake, near the South Shore State Recreation Site. This area is the most heavily used basin in the lake.	15	0.16	13.67	69.6	40%
BL-5	X		X	Traffic lane for the residences in the bay to the southwest.	16	0.16	5.47	15.14	25%
BL-6	X	X	X	Near Southport Marina and residences.	21	0.16	8.15	26.7	38%
BL-7	X	X	X	Near outlet of Fish Creek. This is a popular fishing area as well as a high use traffic lane.	21	0.16	4.90	19	14%
BL-8	X	X	X	Near Burkeshore Marina and extensive residential development.	22	0.16	8.22	20.3	45%
BL-9	X			Residential area and lodge.	3	0.16	1.15	1.8	0%
BL-10	X	X	X	Near the North Shore State Recreation Site. This area is heavily used for launching boats, swimming, camping, and operating personal watercraft.	23	0.16	23.82	75.675	65%
BL-11	X		X	In the east basin near the mouth of Meadow Creek, the lake's major inlet.	16	0.16	0.64	3.49	0%

Sample Results



TMDL Allocation

Sample Site	Total Aromatic Hydrocarbons measured as concentrations (µg/L)					Percent Reduction to Load Allocation
	Loading Capacity Concentration	Wasteload Allocation	Load Allocation	Future Growth	Maximum Observed	
BL-2	10	NA	10	10	16	38.0%
BL-3	10	NA	10	10	18	43.6%
BL-4	10	NA	10	10	70	85.6%
BL-5	10	NA	10	10	15	33.9%
BL-6	10	NA	10	10	27	62.5%
BL-7	10	NA	10	10	19	47.4%
BL-8	10	NA	10	10	20	50.7%
BL-10	10	NA	10	10	76	86.8%
BL-26	10	NA	10	10	17	41.1%
BL-27	10	NA	10	10	17	40.0%

Note: Applicable water quality criteria for petroleum hydrocarbons apply year round in Big Lake. However, impairment has only been observed during summer months. Therefore, noted reductions to meet the load allocation and loading capacity apply only during summer months when impairment occurs.



Next Steps

- Continued public involvement
- Future permits – set at standards (means no mixing zones)....

In Summary

- Water Quality Standards set the framework
- Defines what is healthy
- Integrated Report – documents what we know – persistently over the standard means we have a problem
- TMDL – use standards to set limits to bring water back to health