

Temperature Total Maximum Daily Loads of the Upper (North Fork) Coeur d'Alene River Subbasin

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September 23, 2010



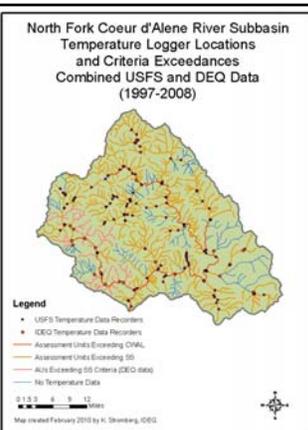
Overview

- Temperature assessments and status
- Methods used to develop these TMDLs
- Load allocations and shade targets
- Implementation
- Review and comment process

Temperature assessments and status

- Reviewed all available temperature data from DEQ and USFS 1997-2008
- Overall, 54 stream assessment units exceeded WQS for temperature
 - 31 Confirmed from 2008 list
 - 3 No Data (proposed “delisting”)
 - 23 Additions

Type	Location	Criteria*	Dates	
Cold Water Aquatic Life	Applies to entire subbasin	22 °C (71.6 °F) Maximum Instantaneous	Applies entire year	
		(MDMT) 19 °C (66.2 °F)		
		Maximum Daily Average (MDAT)		
Salmonid Spawning	Applies to North Fork Coeur d'Alene River (headwaters to mouth) and Pritchard Creek (headwaters to mouth) and all other tributaries	13 °C (55.4 °F) Maximum Instantaneous	Spring Spawning Jun 1 – Jul 31	Fall Spawning Aug 15 – Nov 15
		(MDMT) 9 °C (48.2 °F)	>4,000 ft	
		Maximum Daily Average (MDAT)	3,000 – 4,000 ft May 15 – July 15	
			<3,000 ft May 1 – July 1	
Current Idaho Bull Trout Criteria ^b	Applies to entire subbasin except 5 th order streams (Tepee Creek below Independence Creek, and North Fork Coeur d'Alene River below Tepee Creek) ^c	13 °C (55.4 °F) Maximum Weekly Maximum	Rearing Jun 1 – Aug 31	N/A
		(MWMT) 9 °C (48.2 °F)	N/A	Spawning Sep 1 – Oct 31
		Maximum Daily Average (MDAT)		
			Jun 1 – Sep 30	
EPA Bull Trout Criteria	Brown Creek, Falls Creek, and Graham Creek	10 °C (50 °F) Maximum Weekly Maximum (MWMT)	Jun 1 – Sep 30	



6 stream assessment units exceeded WQS for Cold Water Aquatic Life (CWAL)
54 stream assessment units exceeded WQS for Salmonid Spawning (SS)

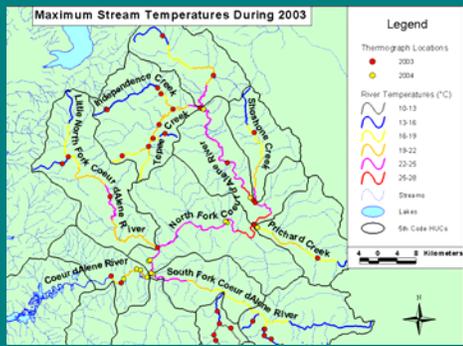
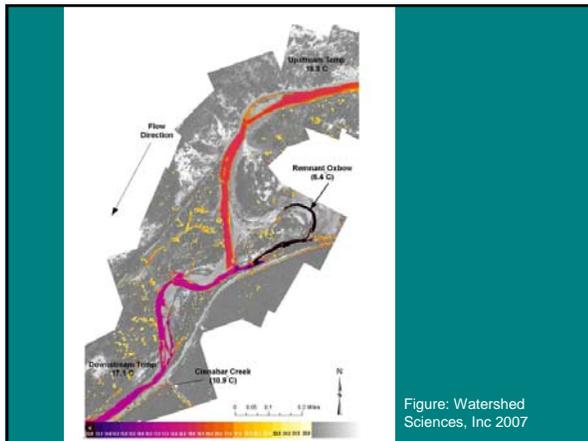
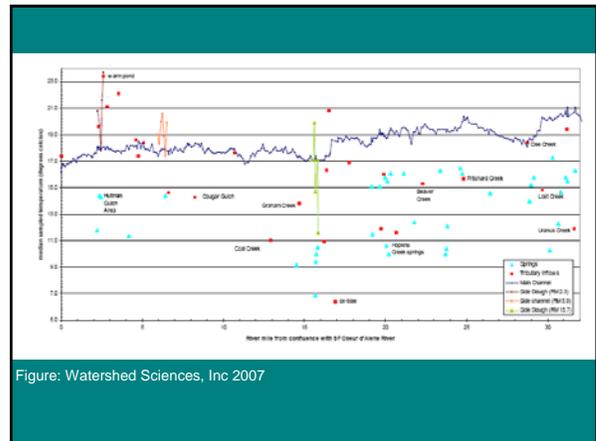
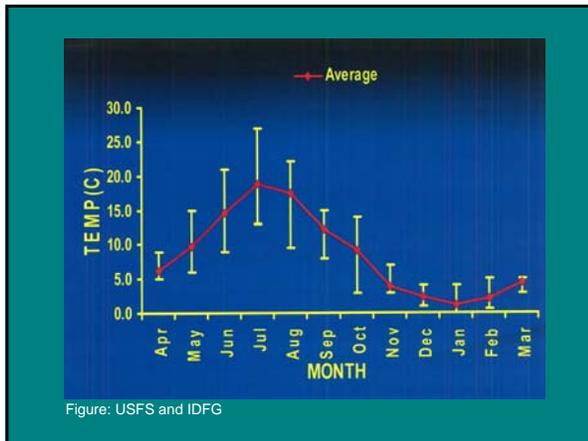


Figure: USFS and IDFG

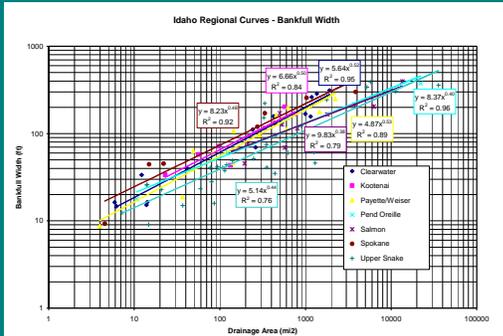


- Trout survive due to:
- Daily cycles of heating and cooling
 - Moving into cold water refugia associated with tributaries of various sizes
 - Moving into back water and side channel habitats
 - Effects of hyporheic flows
- However, suspect temperatures are having lethal and sub-lethal effects to fish.

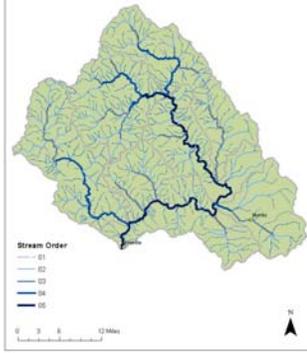
- Also know it's possible that natural background temperatures may exceed numeric criteria and still provide full beneficial use support.
- Don't know the # for background temperatures
- Use PNV method instead to approximate those conditions and temperatures
- Further temperature research on reference watersheds could be helpful.

- ### Methods
- Potential Natural Vegetation
- Estimate Solar Loading under Potential Natural Vegetation (TMDL target and load allocations)
 - Estimate Solar Loading under existing conditions
 - Difference are the load reductions necessary and increases in shade to strive for.

Estimate Bankfull Width

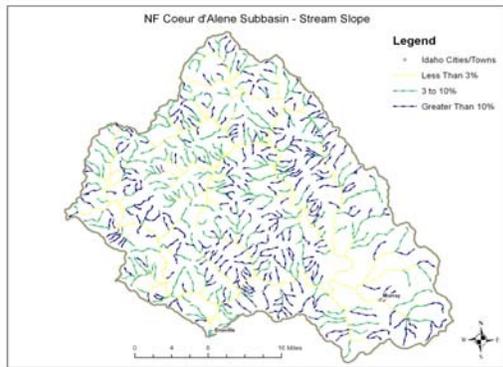


Stream Order in the Upper (North Fork) Coeur d'Alene River Subbasin 1:100,000 NHD



Stream Order

Stream Gradient

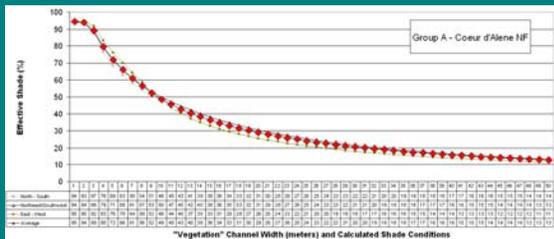


Classify Vegetation Groups

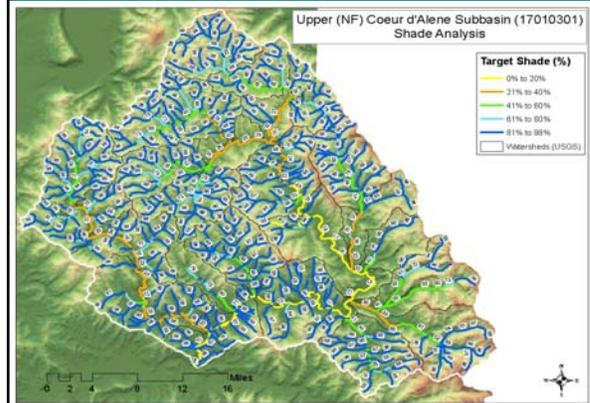
Table 5. Summary descriptions of PNV vegetation groups

PNV Group	Streams Included	Description
Forest Group A	< 5 th order Gradient ≥ 3% VRUs 1, 2, and 3	Warm/Dry: This setting includes the warmest and driest forest sites that support forest vegetation, usually at low elevations or mid-elevations on southerly aspects.
Forest Group B	< 5 th order Gradient ≥ 3% VRUs 4, 5, and 6	Moist: This setting includes moist forest sites, usually low to mid-elevation, and includes stream bottoms and adjacent benches and toe slopes. This setting is the most productive, with favorable soil moisture and temperature regimes that favor abundant plant growth.
Forest Group C	< 5 th order Gradient ≥ 3% VRUs 7 and 8	Subalpine: These settings includes the moist, lower subalpine forest to the cool or cold dry sites between forest and alpine tundra. The moist end of this setting is common on northwest to east-facing slopes, riparian and poorly drained subalpine sites. The cool to cold dry sites occur at higher elevations and typically have a short growing season.
Forest Group D	< 5 th order Gradient ≥ 3% VRUs 9, 10, and 11	Subalpine: These settings includes the moist, lower subalpine forest to the cool or cold dry sites between forest and alpine tundra. The moist end of this setting is common on northwest to east-facing slopes, riparian and poorly drained subalpine sites. The cool to cold dry sites occur at higher elevations and typically have a short growing season.
Non-Forest Group 1	< 5 th order Gradient < 3%	Diverse plant communities including late successional cedar-hemlock, black cottonwood, mixed conifer and shrubs.
Non-Forest Group 2	≥ 5 th order	Black cottonwoods common, shrubs and grasses common, and conifers rare.

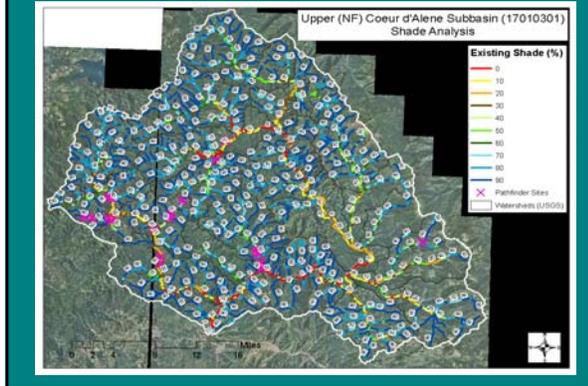
Shade Curves



Shade under Potential Natural Vegetation (TMDL Targets)



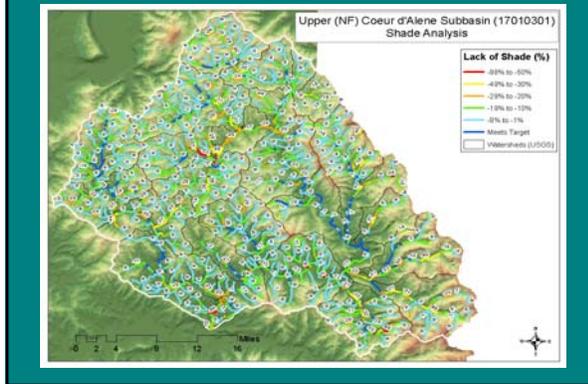
Estimates of Existing Shade – Aerial Photo Interpretation w/ Solar Pathfinder



Solar Pathfinder Field Measurements of Shade



Difference between PNV Shade Targets and Existing Shade



Load Allocations

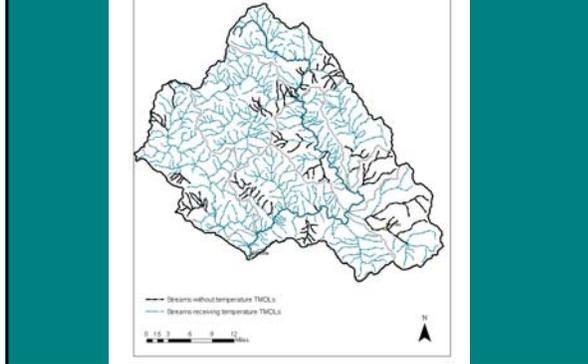
Assessment Unit Totals

Assessment Unit Number	Assessment Unit Name	Existing Load (kWh/day)	Load Allocation (kWh/day)	Load Reduction Needed (kWh/day)
ID17010301PN013_04	North Fork Coeur d'Alene River between Jordan and Teepe creeks	913,697	913,697	0
ID17010301PN014_05	North Fork Coeur d'Alene River between Teepe and Yellowdog creeks	2,072,334	2,130,373	541,961
ID17010301PN014_03	Jordan Creek and Lower Lost Fork	93,545	64,147	29,398
ID17010301PN015_02	North Fork Coeur d'Alene River, upper, headwaters and tributaries	213,488	100,419	113,069

Reach-Specific Targets

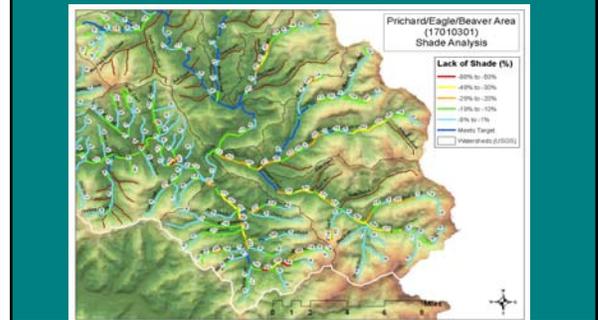
Segment Length (miles)	Existing Shade (fraction)	Existing Summer Load (kWh/m ² /day)	Potential Summer Load (fraction)	Potential Summer Load (kWh/m ² /day)	Potential Load (kWh/m ² /day)	Existing Stream Width (m)	Natural Stream Width (m)	Existing Segment Area (m ²)	Existing Summer Load (kWh/day)	Natural Segment Area (m ²)	Potential Summer Load (kWh/day)	Potential Load (kWh/day)	Lack of Shade (%)	Teepe Creek					
Assessment Unit # ID17010301PN017_05																			
200	0	5.5	0.25	3.905	-1.60	19	17	688	3740	3240	540	2243.3	-2298.8	-20					
200	0.1	4.95	0.25	3.905	-1.05	19	17	850	2224.5	493	1321.65	-802.85	-19						
200	0	5.5	0.25	3.905	-1.60	19	17	850	4625	850	3192.5	-1902.5	-20						
400	0.1	4.95	0.25	3.9	-0.99	20	19	3900	4120	860	3474.4	-1325.6	-19						
240	0	5.5	0.28	3.9	-1.54	20	18	480	2640	430	1767.2	-2222.8	-28						
1000	0.1	4.95	0.27	4.015	-0.94	21	19	2400	10168.5	1800	7673.55	-2644.95	-17						
180	0	5.5	0.25	4.125	-1.58	22	20	390	2115	390	1485	-630	-25						
1980	0.1	4.95	0.25	4.125	-0.83	22	20	23320	115434	21300	87450	-27984	-15						
3030	0	5.5	0.24			25	23	8220	45105	7020	0	-45105	-24						
Total														187,659	888,042	152,798	305,883	-583,169	-23

Temperature TMDLs for Streams in the Upper (North Fork) Coeur d'Alene River Subbasin



Implementation

- Increasing shade primary goal



Implementation

- Maintain existing shade and increase riparian shade by planting trees.
- Protect springs, headwaters, and other sources of cold water, and protect cold water refugia in side-channel habitats. Ensure access to cooler waters by removing barriers.
- Retain and restore large wood and boulders in stream channels.
- Minimize other sources of pollution and stressors to cold water aquatic life.

Review and comment

- WAG review (Oct)
- Internal DEQ review (Oct)
- Public comment period (Nov-Dec)
- Respond to comments (Jan)
- Send final version to state office for submittal to EPA (Jan-Feb)



THANK YOU!

QUESTIONS?