Upper Hangman Creek Subbasin Assessment and Total Maximum Daily Load

Presented by Tyson Clyne

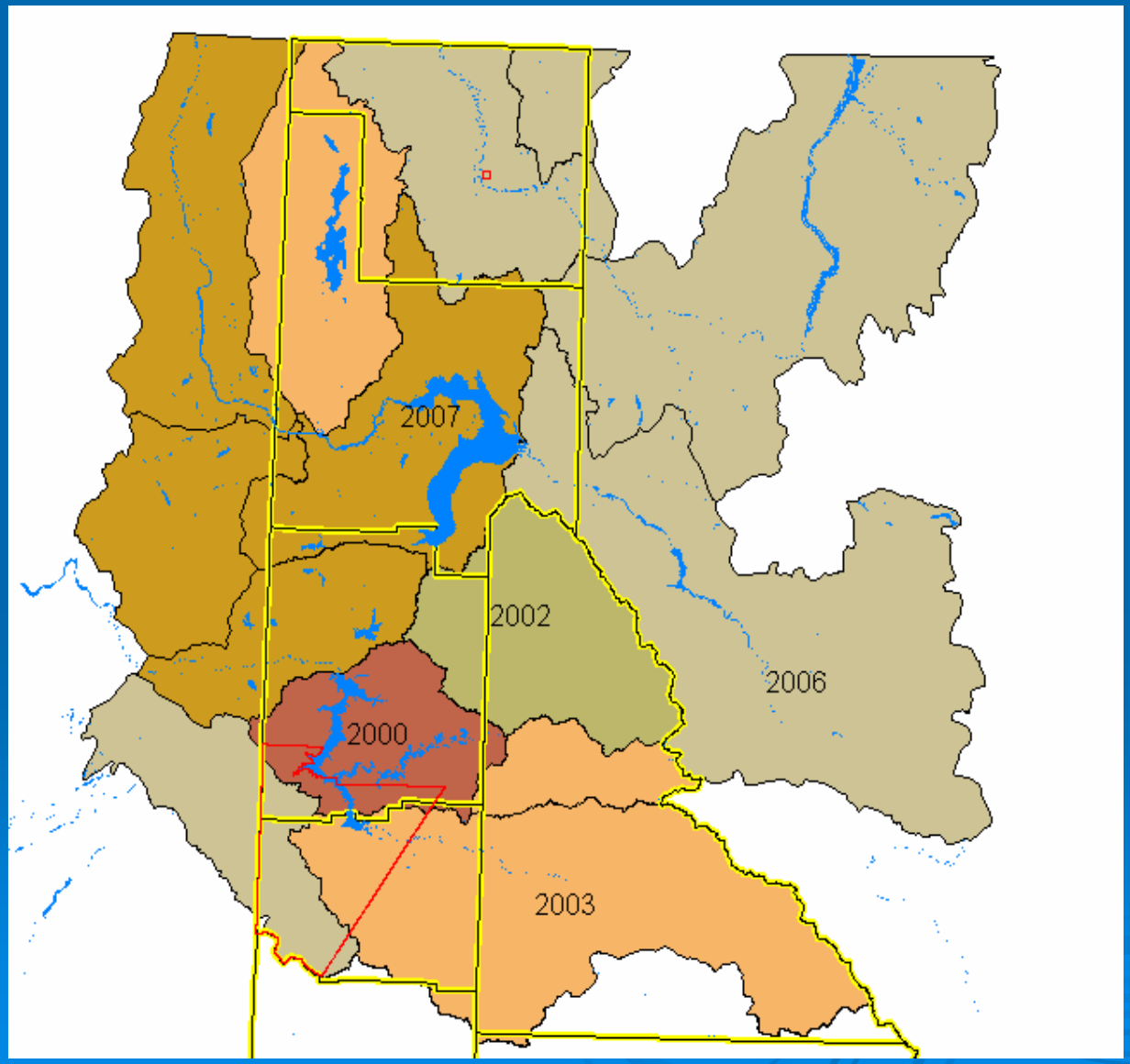
Idaho Department of Environmental Quality

Meeting Agenda

- Where is the study area?
- Who has been involved in the process?
- Why are we developing a TMDL?
- What were the study findings?
- How were the findings determined and why do we care?
- What's next?

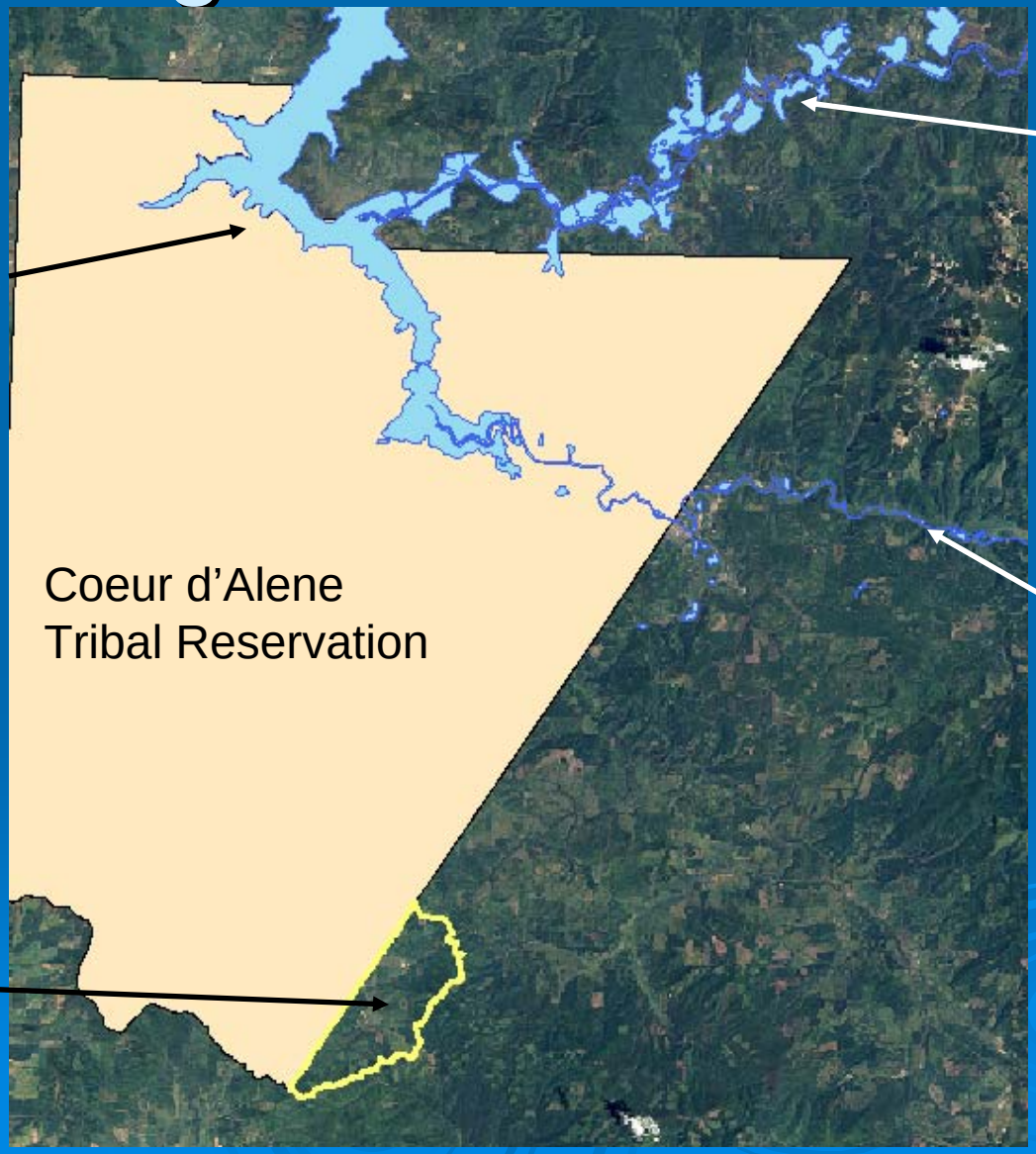
Where is the study area?

Idaho Panhandle Subbasins

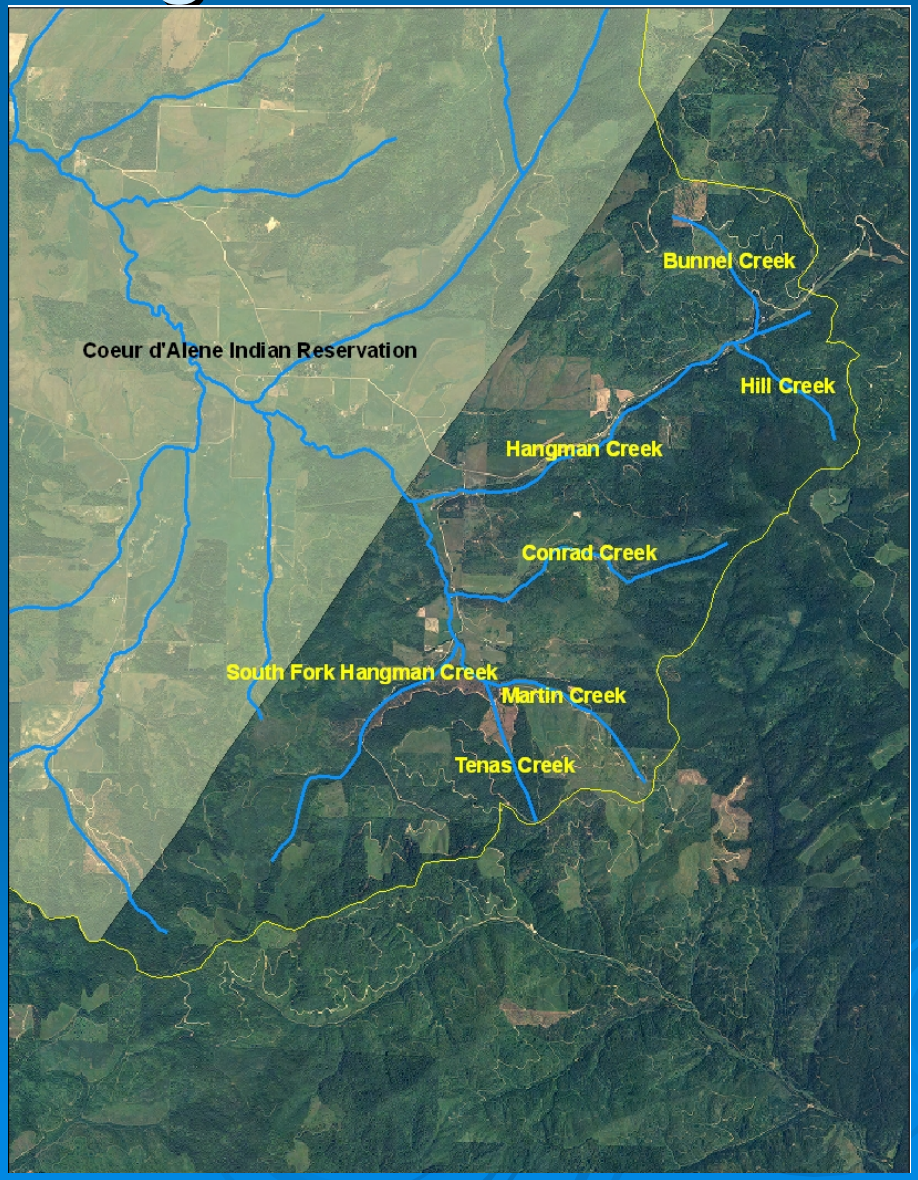


- Priest
- Kootenai
- Moyie
- Lake Pend Oreille
- Lower Clark Fork
- Upper Spokane
- CDA Lake
- NF CDA River
- SF CDA River
- St. Joe/St. Maries
- Hangman

Upper Hangman Creek Watershed



Upper Hangman Creek Watershed

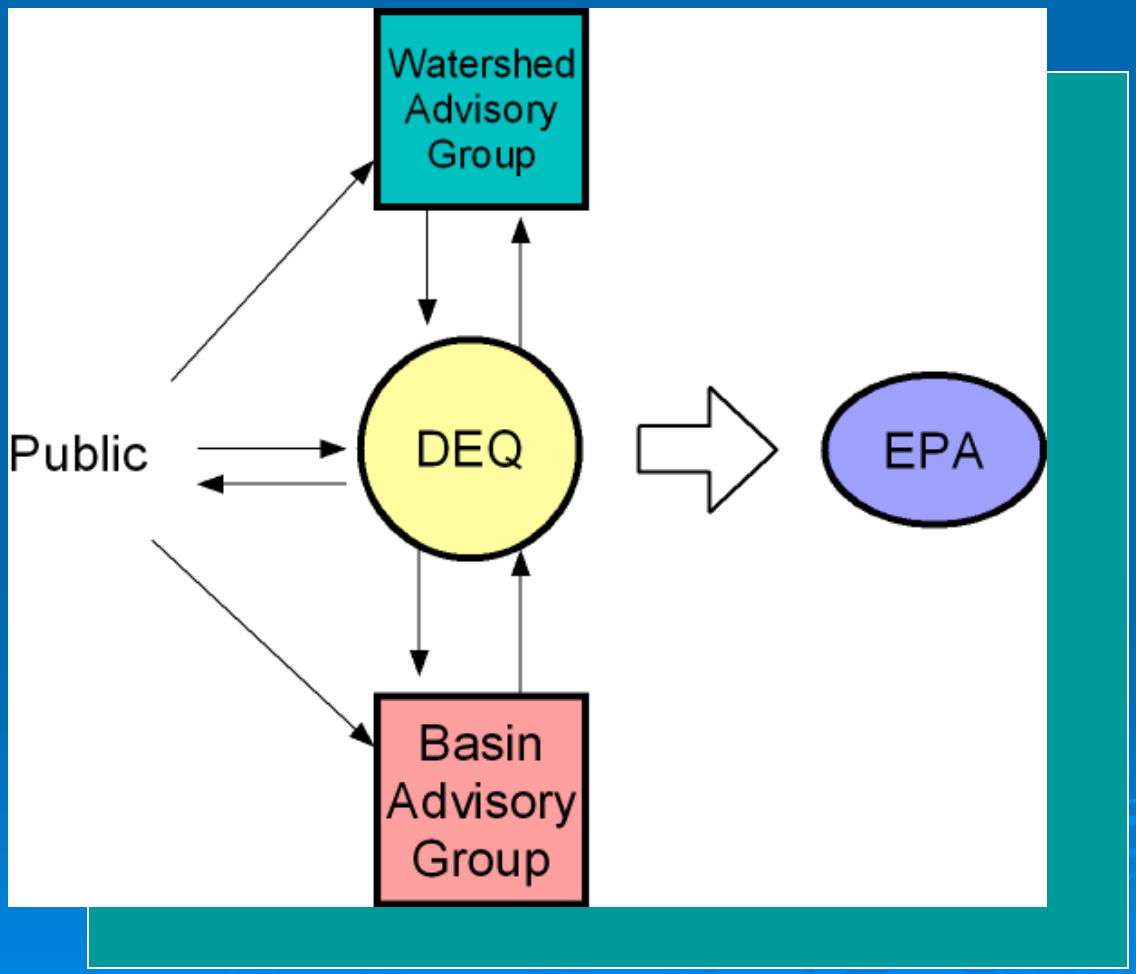


Who has been involved in the process?

Watershed Advisory Group Participants

Meg Foltz	United States Forest Service
Elaine Snouwaert	Washington Dept. of Ecology
Bob Cordell	Concerned Citizen
Neil Smith	Potlatch Forest Holdings
Steve Cuvala	Idaho Dept. of Lands
Mike Kerttu	Bennett Lumber Products
Dee Bailey	Coeur d'Alene Tribe
Bruce Kinkead	Coeur d'Alene Tribe
Deborah Olson	Concerned Citizen
Sherry Klaus	Benewah Soil and Water Conservation District
Mark Cottrell	Benewah Soil and Water Conservation District
Terry Doupè	Benewah County Commissioner District II
Terry Cundy	Potlatch Forest Holdings
Mike Mihelich	Kootenai Environmental Alliance
Robert Steed	Idaho Department of Environmental Quality
Jenna Borovansky	Idaho Department of Environmental Quality

TMDL Public Process



The Upper Hangman Creek WAG

- DEQ solicited interest in June 2006 from local residents, agencies, and industry
- First meeting was held on August 2, 2006
- Four more meetings held
  - September, October, November, January

Why are we developing a TMDL?

Protection of Beneficial Uses

- Clean Water Act requires states and tribes to maintain the chemical, physical, and biological integrity of the nation's waters

- To achieve this goal states and tribes must adopt water quality standards to protect fish, shellfish, wildlife, and recreational activities, known as beneficial uses

Beneficial Uses in Upper Hangman Creek

- Cold water aquatic life
- Secondary contact recreation
- Salmonid spawning

→ TMDLs written

- Industrial water supply
- Agricultural water supply

→ Protected by stricter standards

- Aesthetics
- Wildlife habitat

→ TMDLs not written

Idaho Water Quality Standards

- To protect the swimable/fishable goals of the Clean Water Act
- Temperature (CWA and SS)
  - Numeric water temperature standards
  - Natural background provision
- Bacteria (Secondary Contact Recreation)
  - 126 *E. coli* cfu/100 ml
- Sediment
  - Narrative standard… Surface waters shall be free from….

What is a TMDL?

- Simply put, a TMDL is a pollutant budget. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive from human-caused sources and still protect Idaho Beneficial Uses.

The TMDL Equation

TMDL = MOS + LA + WLA + NB = LC

TMDL = Total Maximum Daily Load

MOS = Margin of Safety

LA = Load Allocation

(non-point sources-forest practices, agriculture, roads)

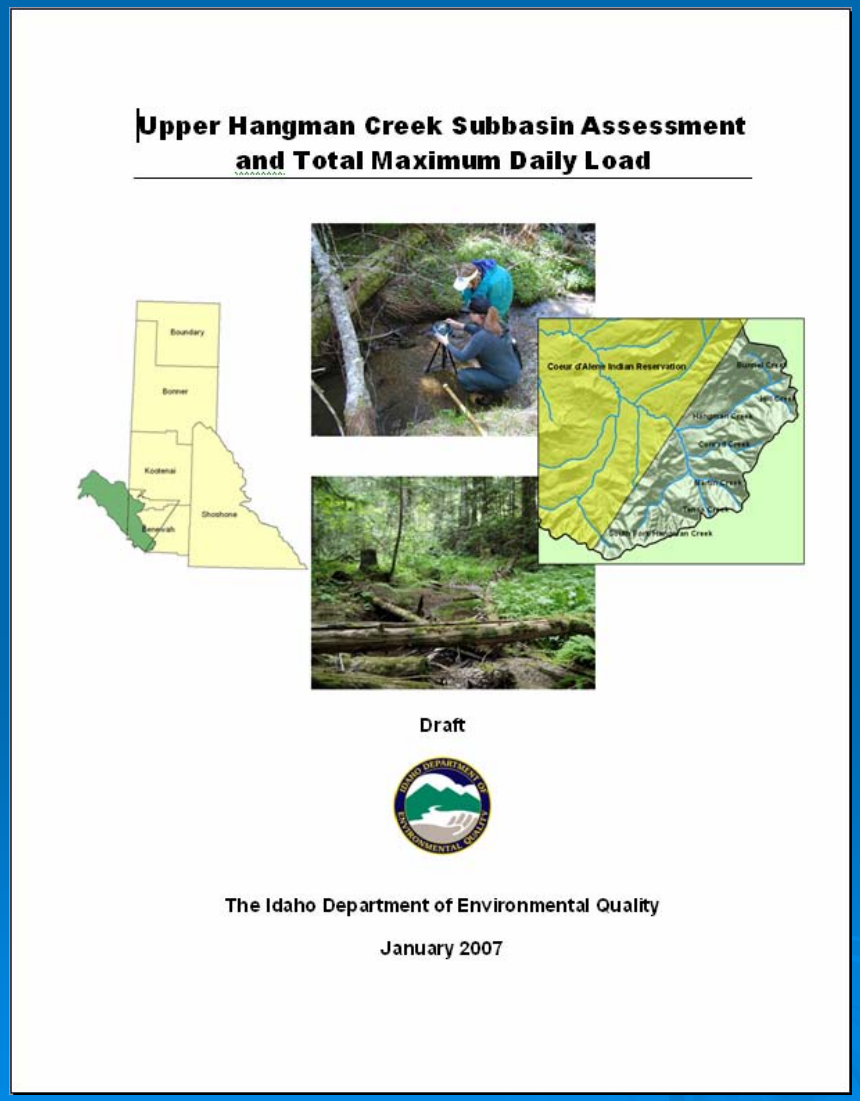
WLA = Waste load allocation

(point source – wastewater treatment plants)

NB = Natural background

(natural sources of pollutants – mass failures, stream bank erosion)

The TMDL Document


Upper Hangman Creek Subbasin Assessment
and Total Maximum Daily Load

Draft

The Idaho Department of Environmental Quality

January 2007

Made up of 6 sections

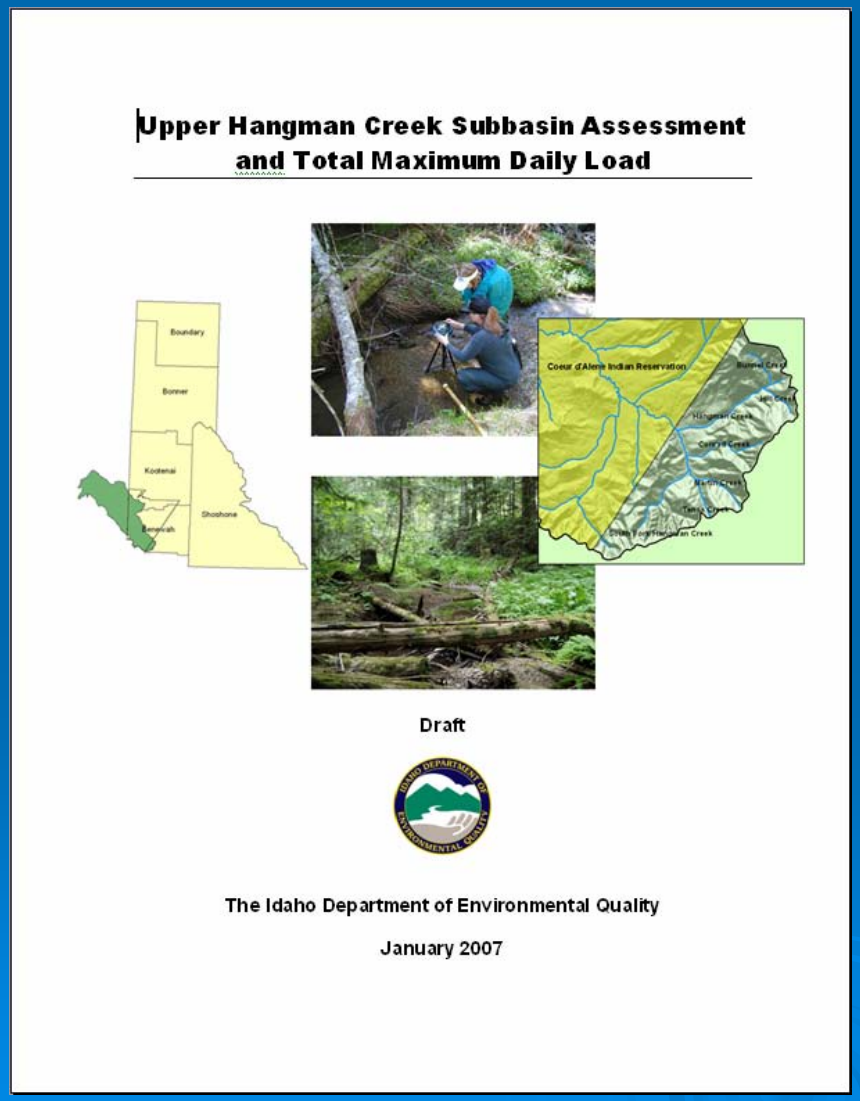
1. Executive Summary

Subbasin Assessment

2. Watershed Characterization
3. Water Quality Concerns and Status
4. Pollutant Source Inventory

5. Summary of Past and Present Pollution Control Efforts
6. Total Maximum Daily Load(s)

The TMDL Document



Upper Hangman Creek Subbasin Assessment and Total Maximum Daily Load

Draft

The Idaho Department of Environmental Quality

January 2007

- Approximately 140 pages
- Addresses only portion of watershed above tribal reservation
- Addresses temperature, sediment, and bacteria

Why are we looking at Upper Hangman Creek?

How does DEQ's report to EPA?

Surface water assessment

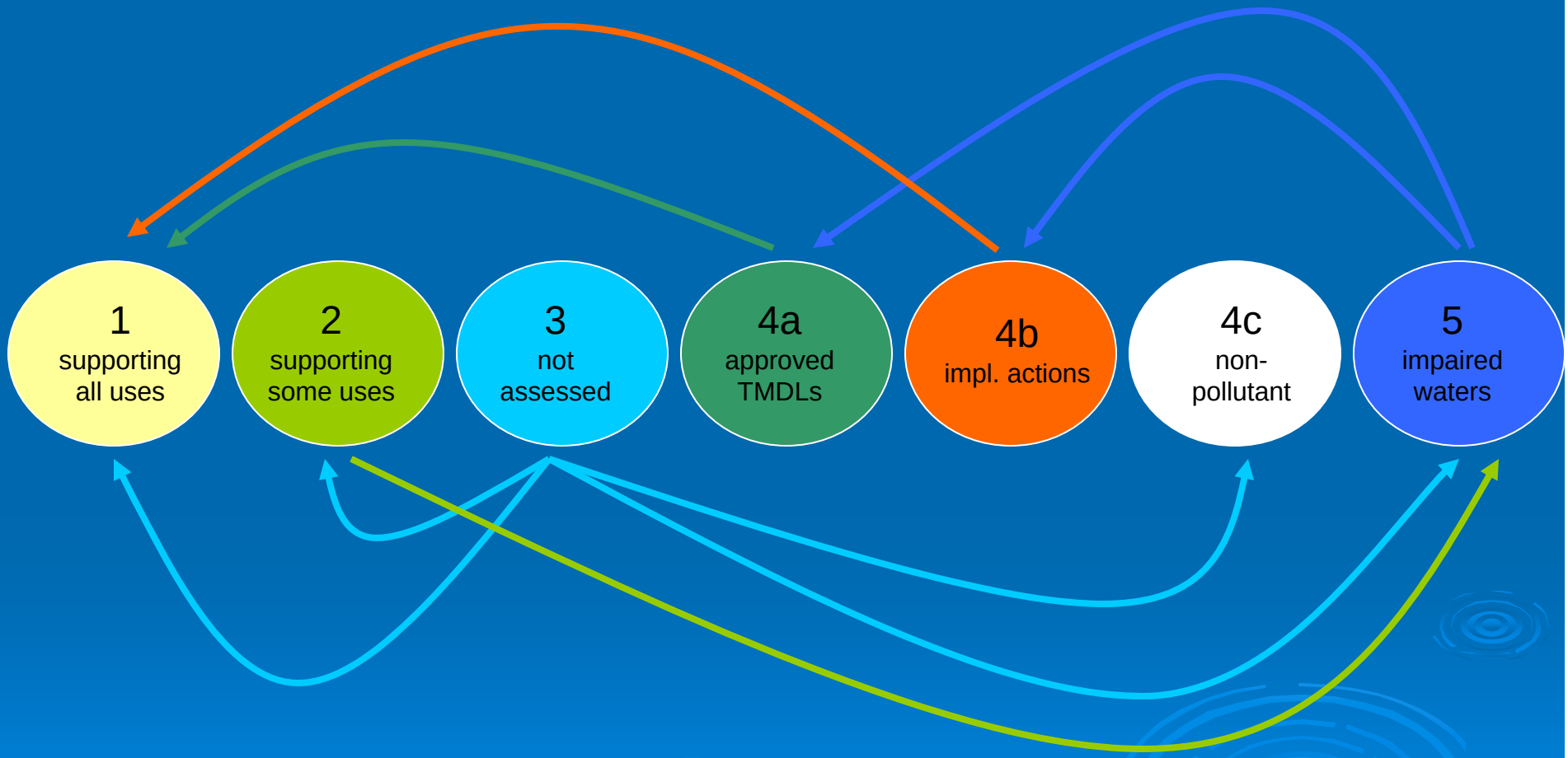
- Every two years DEQ reviews applicable data to determine the water quality status of surface waters of the state

- Data evaluated
  - Chemical – nutrients, bacteria
  - Physical – habitat assessments, shade
  - Biological – bugs, fish

Outcome of Assessments to Integrated Report

- Section 1
  - Rivers Supporting All Uses
- Section 2
  - Rivers Supporting Some Uses
- Section 3
  - Rivers Not Assessed
- Section 4a
  - Rivers with EPA approved TMDLs
- Section 4b
  - Rivers impaired with current implementation actions
- Section 4c
  - Rivers Impaired by Flow or Habitat alteration
- Section 5
  - Impaired Waters

Integrated Report Sections



Integrated Report, Section 5

Basin	Segment Name	Bac	Cd	Ukn	Pb	Hg	Met	Nut	O/G	Org	DO	IOrg	Path	Pest	pH	P	Sa	Se	Sed	TSS	Tem	TDG	Tox	NH3	Z	SIZE
ID17010304PN013_03	Tyson Creek - source to mouth																		1		1					2.14
ID17010304PN017_04	West Fork St. Maries River - source to mouth																		1		1					3.66
ID17010304PN017_03	West Fork St. Maries River - source to mouth																		1		1					5.53
	Summary for 17010304 (54 detail records)																									*1147.9 70000*
HUC	*17010305*																									
ID17010305PN014_03	Fish Creek - Idaho/Washington border to Twin Lakes			1															1		1					4.53
ID17010305PN014_02	Fish Creek - Idaho/Washington border to Twin Lakes																									
ID17010305PN004_02	Spokane River - Coeur d'Alene Lake to Post Falls Dam																									
ID17010305PN003_04	Spokane River - Post Falls Dam to Idaho/Washington border						1	1																		
	Summary for 17010305 (4 detail records)																									
HUC	*17010306*																									
ID17010306PN001_03	Hangman Creek	1						1																		
ID17010306PN001_02	Hangman Creek - source to Idaho/Washington border																									
ID17010306PN002_02	Little Hangman Creek - source to Idaho/Washington border																									
ID17010306PN002_03	Moctileme Creek							1																		
ID17010306PN002_04	Little Hangman Creek							1																		
	Summary for 17010306 (5 detail records)																									
	Summary for Panhandle (278 detail records)																									
Salmon																										
HUC	*17060101*																									

Friday, September 30, 2005

HUC	*17010306*	
ID17010306PN001_03	Hangman Creek	1
ID17010306PN001_02	Hangman Creek - source to Idaho/Washington border	
ID17010306PN002_02	Little Hangman Creek - source to Idaho/Washington border	
ID17010306PN002_03	Moctileme Creek	
ID17010306PN002_04	Little Hangman Creek	
	Summary for 17010306 (5 detail records)	

Integrated Report, Section 5

HUC	17010306
ID17010306PN001_03	Hangman Creek
ID17010306PN001_02	Hangman Creek - source to Idaho/Washington border
ID17010306PN002_02	Little Hangman Creek - source to Idaho/Washington border
ID17010306PN002_03	Moctileme Creek
ID17010306PN002_04	Little Hangman Creek

Summary for 17010306 (5 detail records)

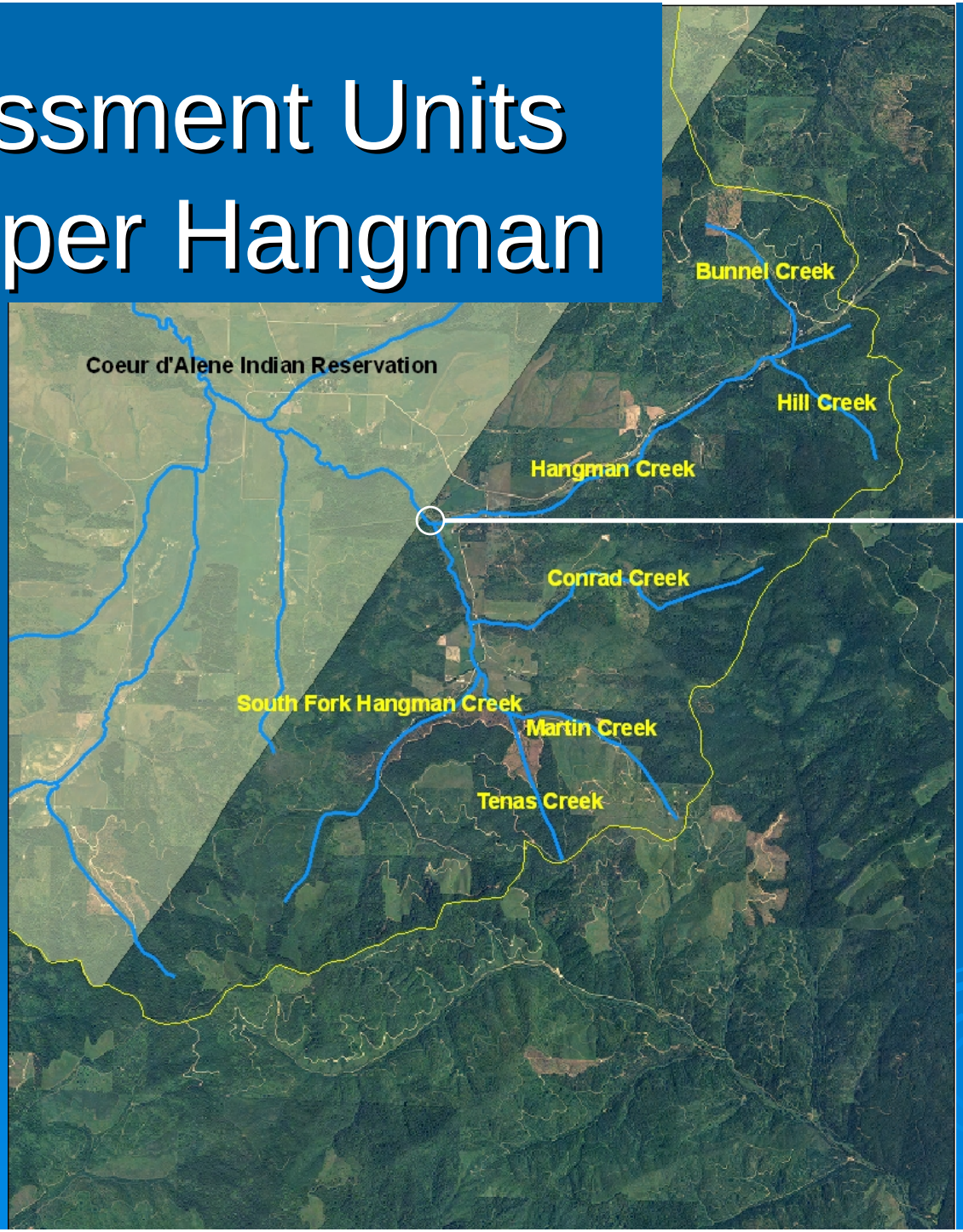
Bacteria, Nutrients, Sediment

Temperature

No TMDL completed by Idaho DEQ.

Streams located outside the state of Idaho's jurisdiction on Coeur d'Alene Tribal Reservation.

Assessment Units in Upper Hangman



ID17010306PN001_03

ID17010306PN001_02

All other waters

What were the study findings?

TMDL Findings

- Sediment
  - A reduction of 54%
- Temperature
  - An increase in shade of 74-15%
- Bacteria
  - A reduction of 85-0%
- Nutrients
  - No TMDL completed

TMDLs Completed

Sediment and Temperature

Sediment and Temperature

Bacteria, Sediment and Temperature

Sediment and Temperature

Bacteria, Sediment and Temperature

Bacteria, Sediment and Temperature

Sediment and Temperature

How were the findings determined and why do we care?

Sediment

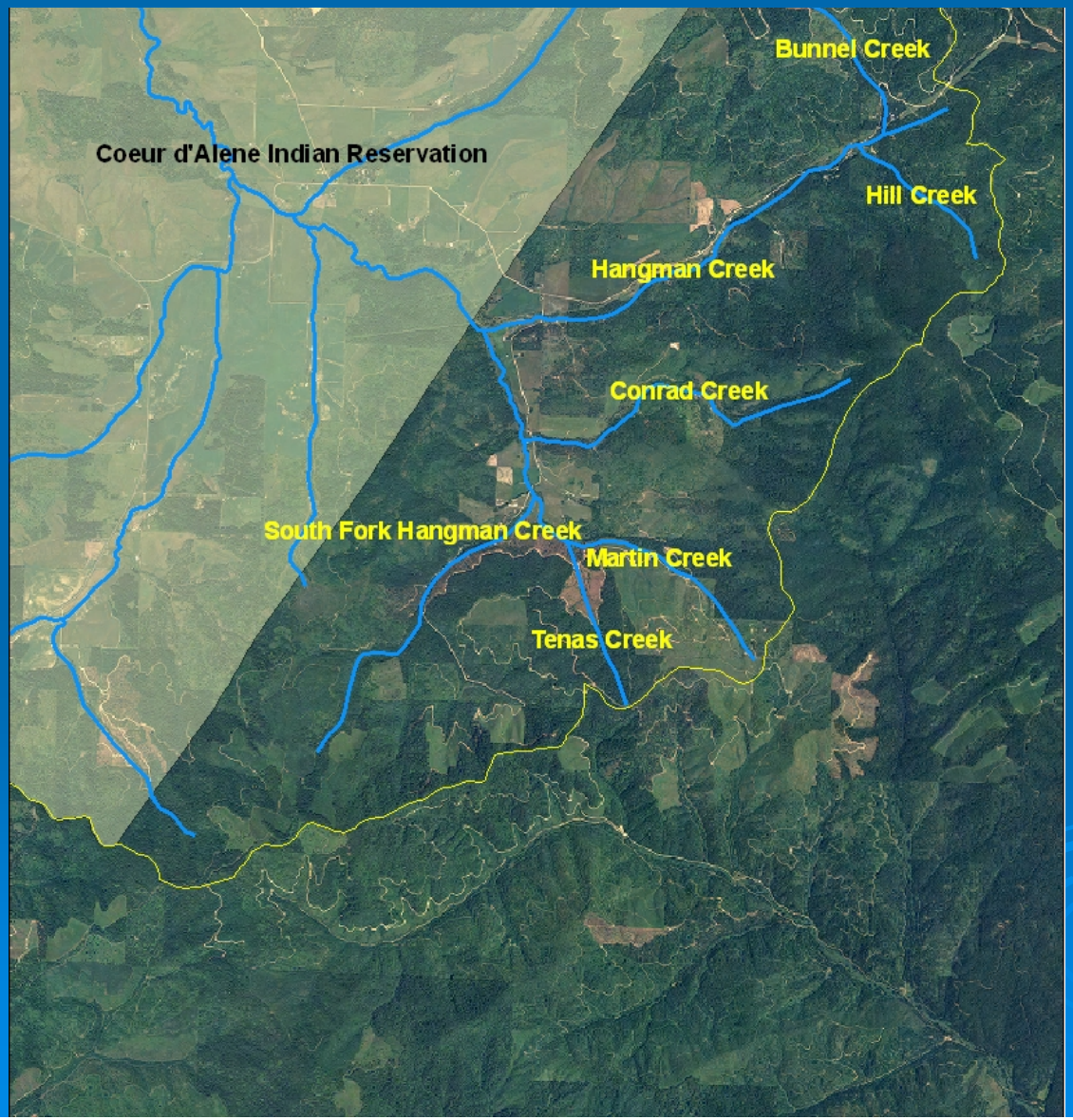
Why do we care?

- Excess sediment can impact fish and macroinvertebrate communities.
  - Suspended (floating in the water column) or bedload (substrate moving along the stream bottom)

Idaho Sediment Criteria

- Sediment shall not exceed quantities specified in Sections 250 and 252 or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses.
  - IDAPA 58.01.02.200.08

Sediment TMDLs Completed



Sediment

- Sediment contributions from roads, mass failures and stream bank erosion were totaled.
- Sediment target set at 80% bank stability and 50% above natural conditions for roads and mass failures.

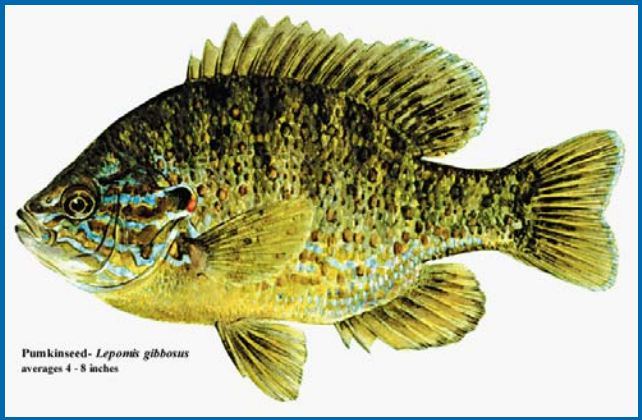
Sediment Sources

Source	Existing Load (tons/year)	Loading Capacity (tons/year)	Reduction (%)
Stream banks	753	339	55
Roads	270	135	50
Mass Failures	7	3.5	50
Total	**1030**	**477.5**	**54**

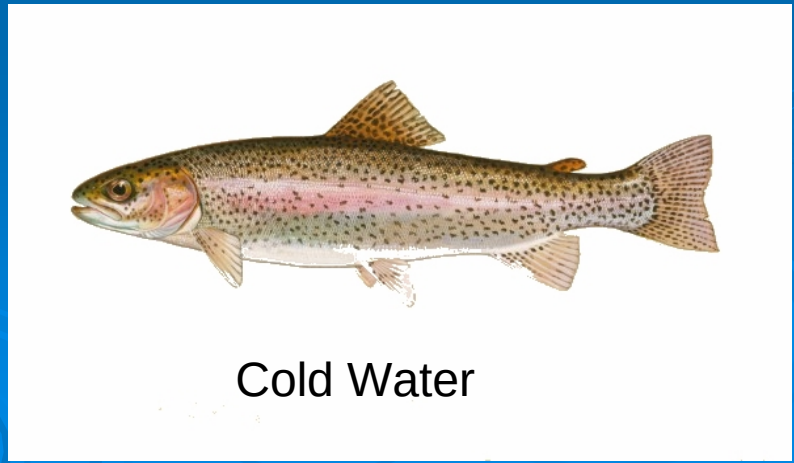
Temperature

Why do we care?

- Temperature dictates what type of aquatic communities will be present:
  - Warm or cold water fish assemblages.
  - Temperature tolerant or intolerant aquatic macroinvertebrates.



Warm Water



Idaho Temperature Criteria

Numeric standard

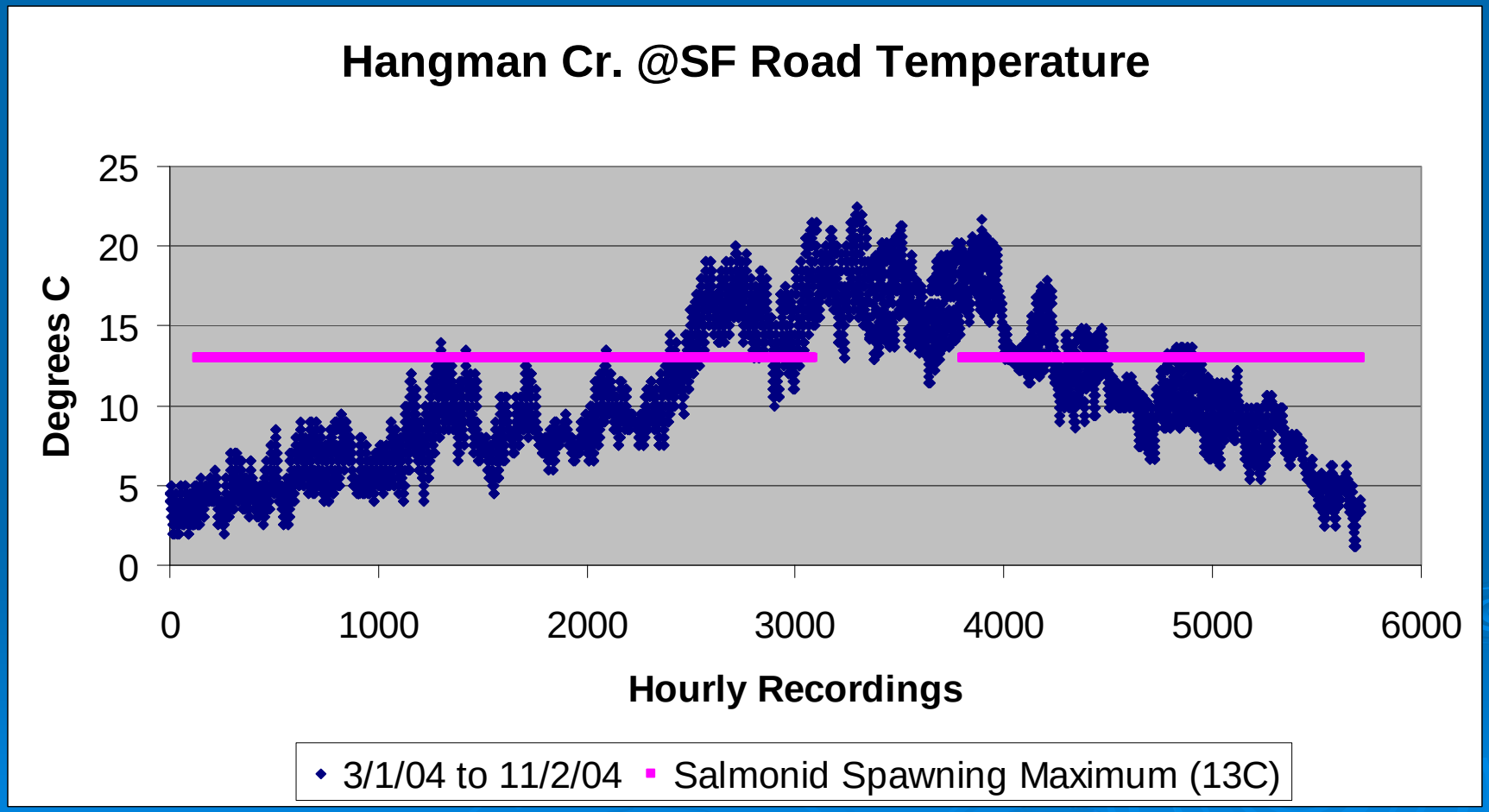
- Cold water aquatic life beneficial use criteria:
  - 22 °C or less daily maximum; 19 °C or less daily average.
- Salmonid spawning beneficial use criteria:
  - 13 °C or less daily maximum; 9 °C or less daily average.
  - Bull trout: not to exceed 13°C maximum weekly maximum temperature over warmest 7-day period, June – August; not to exceed 9 °C daily average in September and October

Idaho Temperature Criteria

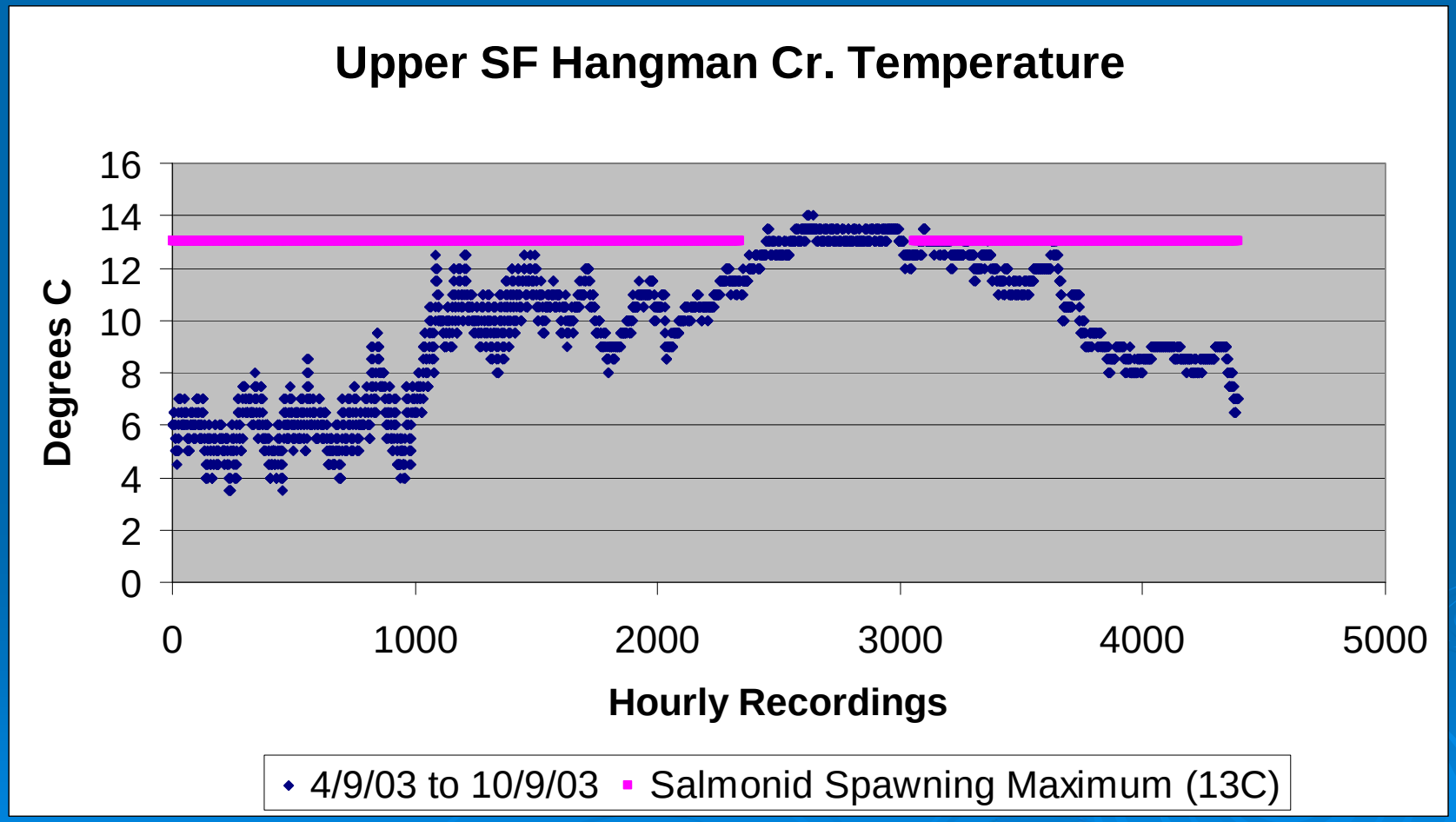
Applied narrative standard

- When using natural background as the target, numeric water quality criteria do not apply
- Natural background shade levels set as the desired target
- Stream with natural shade will result in the lowest possible water temperature

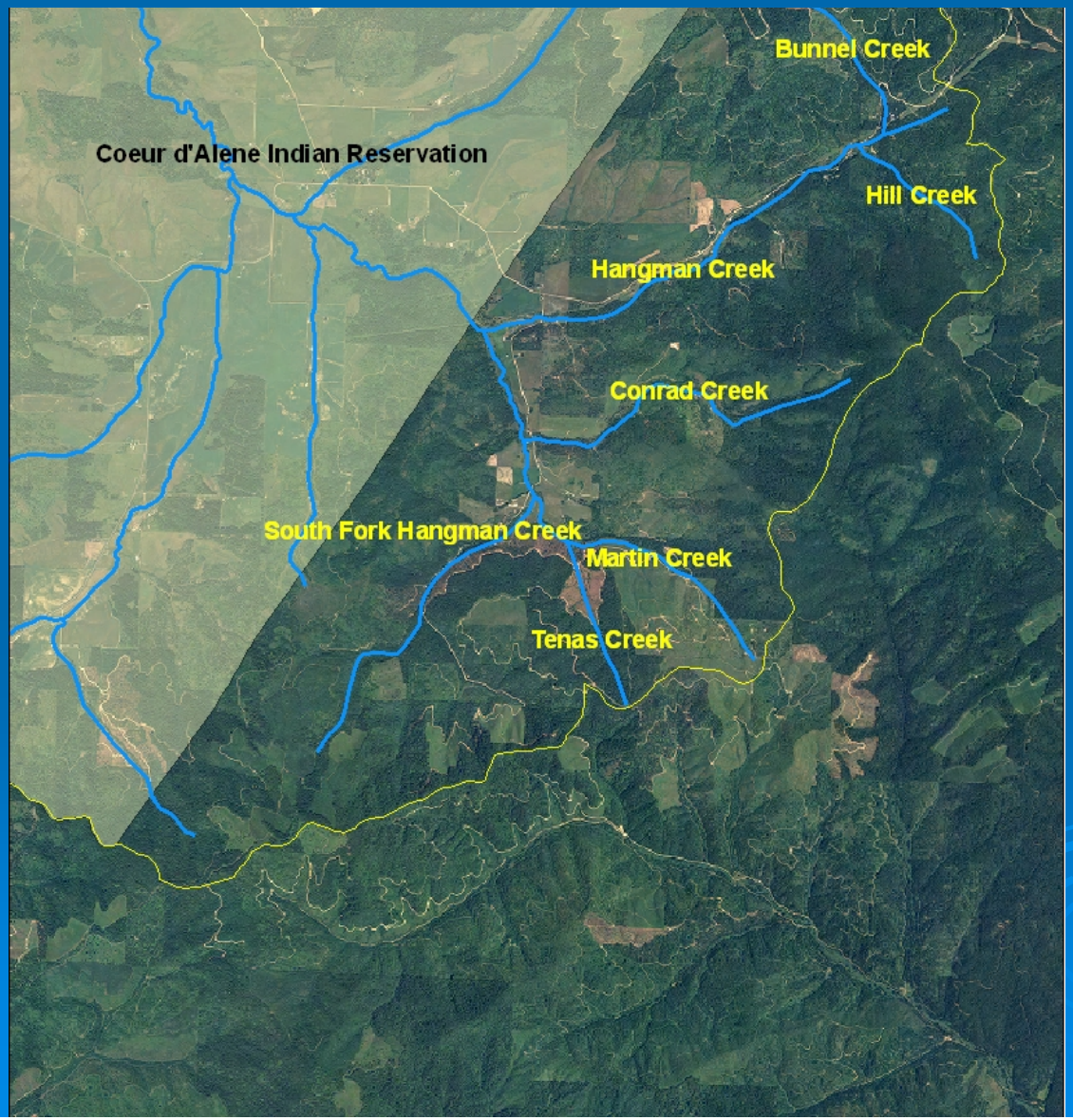
Hangman Creek Thermal Graph



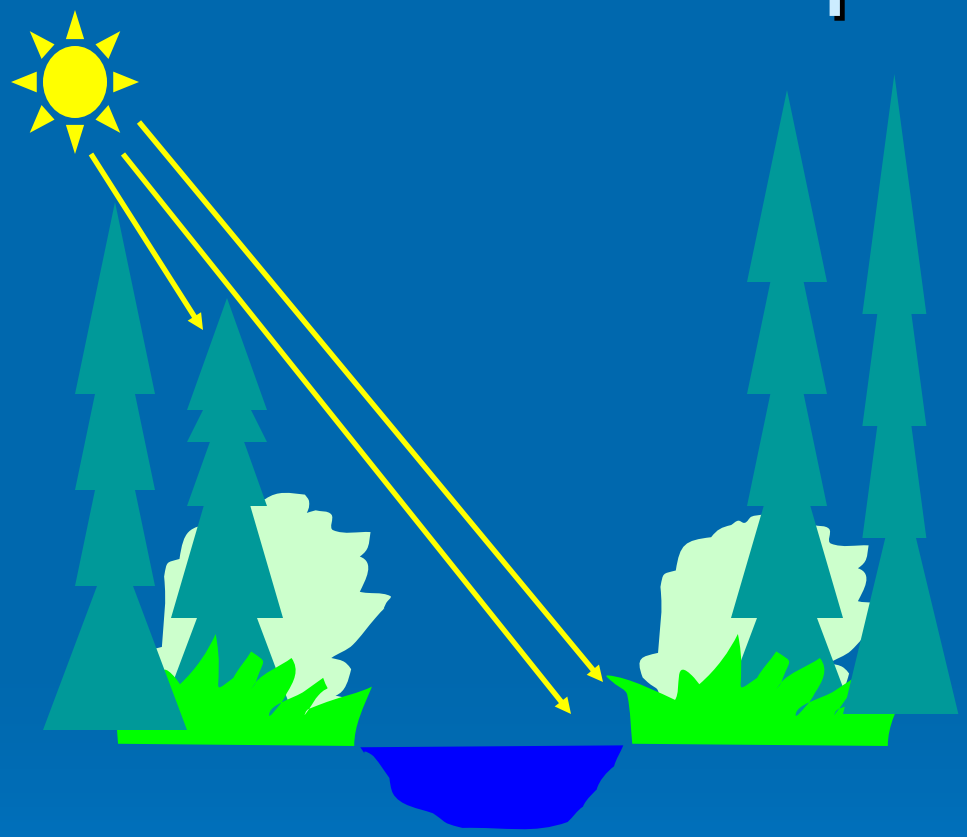
Upper SF Hangman Creek



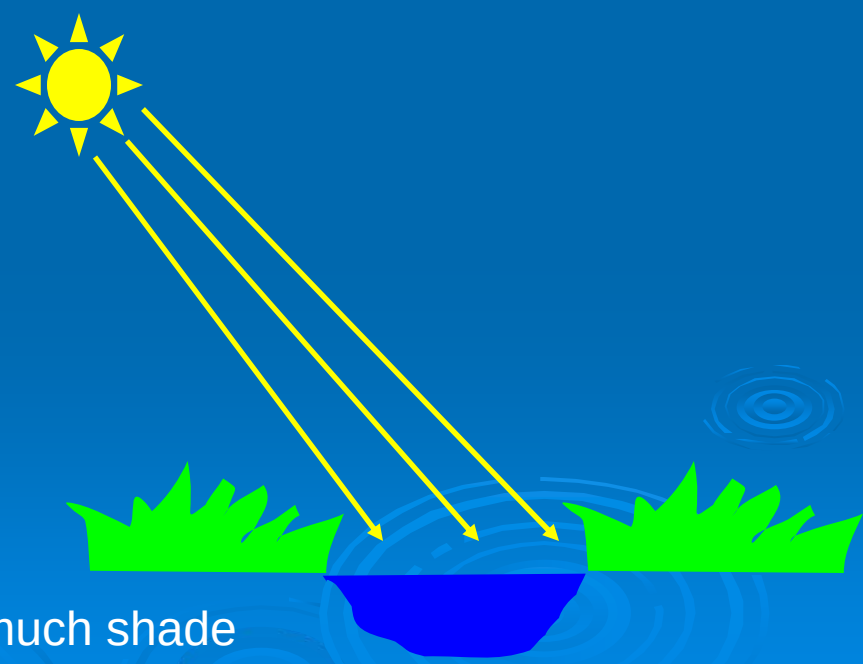
Temperature TMDLs Completed



Temperature



Lots of Shade



Not that much shade

Temperature

- Why use shade?
  - Most controllable
  - Easily measured
  - Thermal inputs most likely cause of increased water temperature
  - Other possible sources not seen in watershed

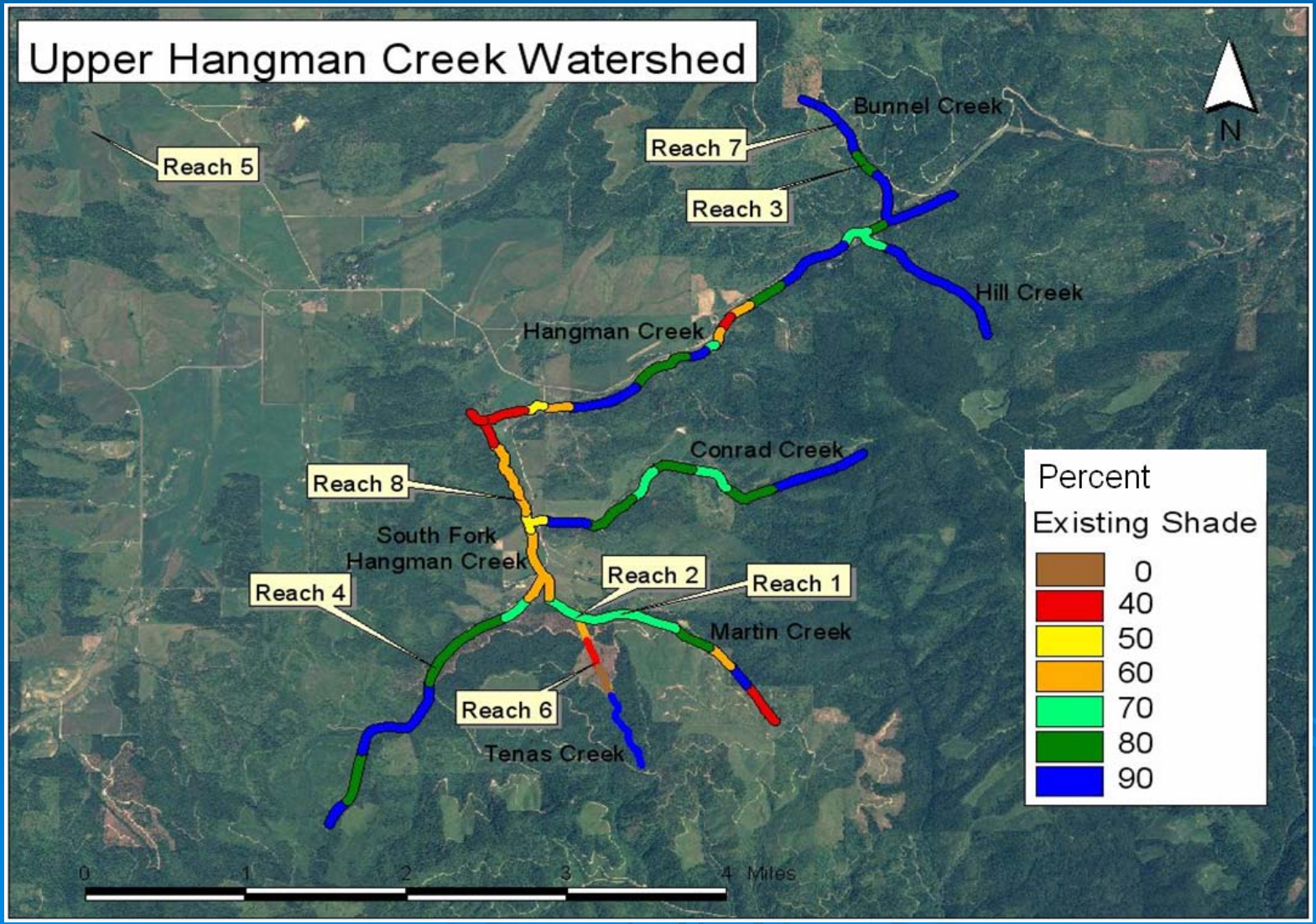
Temperature

- How is shade used?
  - Existing shade estimates made from aerial image
  - Existing shade subtracted from 100 and multiplied by energy recorded from flat plate collector
  - End result is a thermal load

Temperature

- Potential shade determined from shade curves
  - Shade curves characterize shade provided to a stream under unaltered conditions
- The potential shade is then multiplied by the flat plate collector resulting in the load capacity
- The difference between the two loads is the load allocation

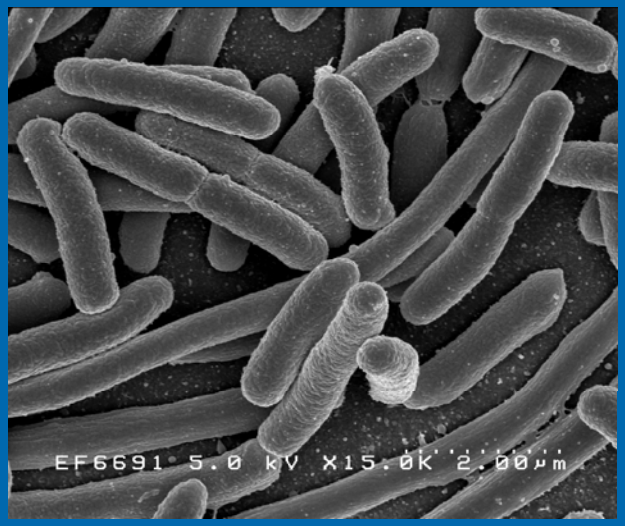
Existing Shade

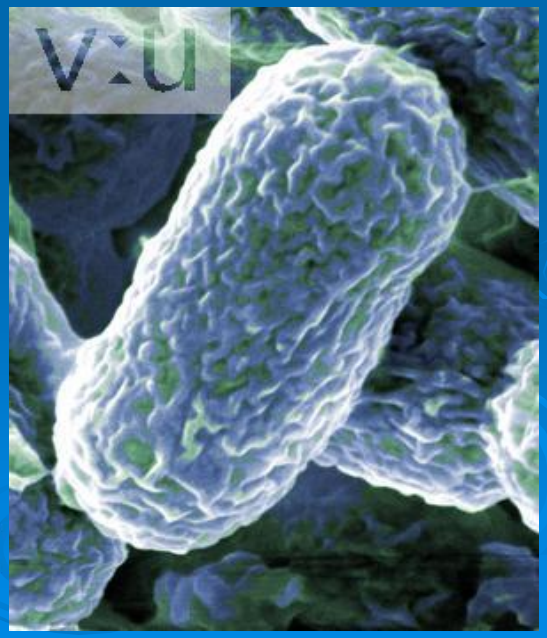


Bacteria

Why do we care?

- Can be harmful if ingested, sickness or even death may result in the most severe cases.
- *Escherichia coli* or *E. coli* is measured by the IDEQ to indicate the presence of disease causing microorganisms in aquatic systems.





Bacteria

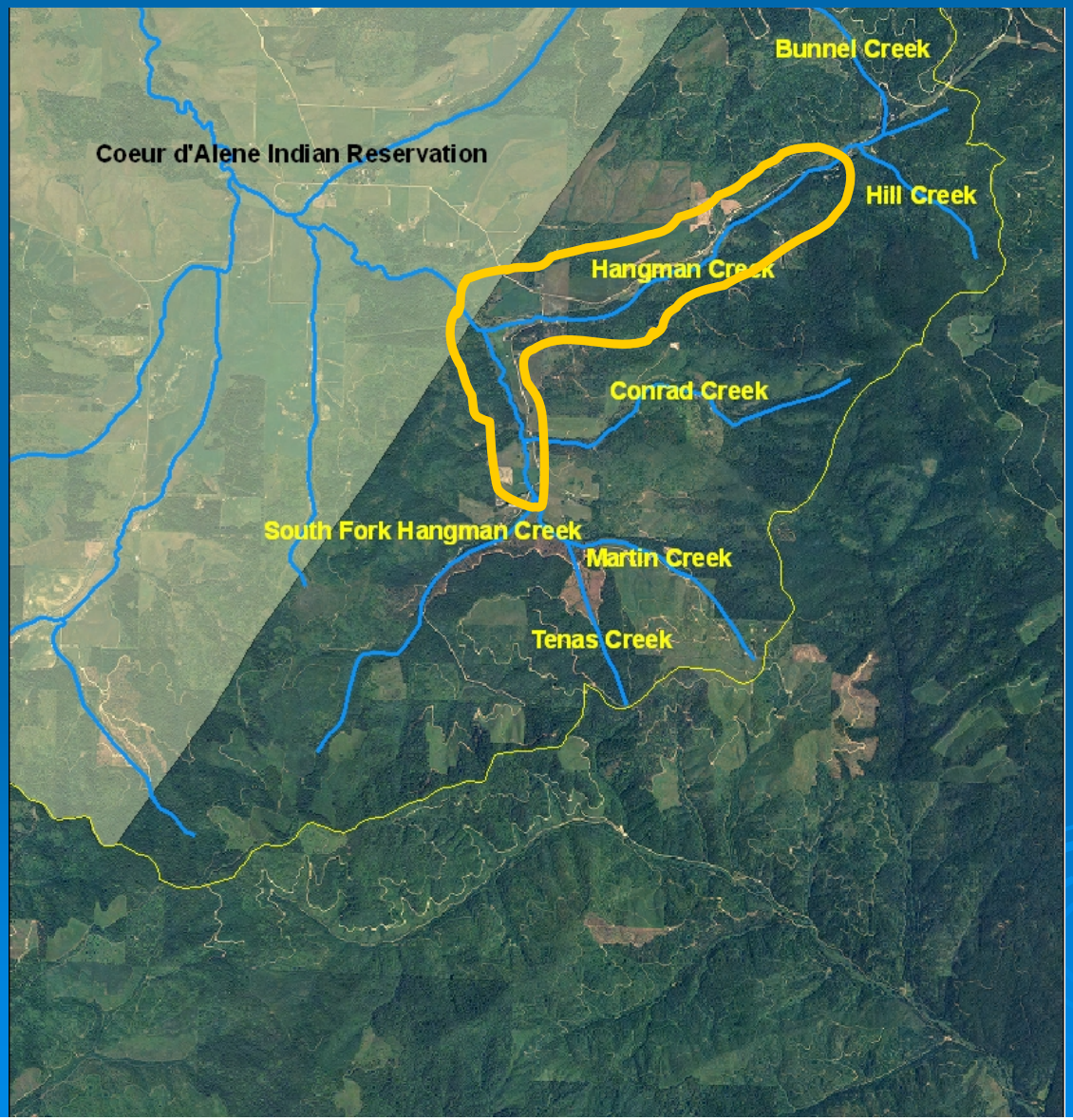
- What is *E. coli*?
  - Naturally occurring found in warm blooded animals
  - Hundreds of strains only a few are harmful
  - Indicator organism
- Sources
  - Human – Septic systems, recreation, etc…
  - Animals – domesticated and wild

Idaho Bacteria Criteria

- Waters designated for primary or secondary contact recreation are not to contain E. coli bacteria in concentrations exceeding a geometric mean of

  126 E. coli/100ml based on a minimum of five (5) to seven (7) days over a thirty (30) day period.
  - IDAPA 58.01.02.251.01a

Bacteria TMDLs Completed



Bacteria TMDL Findings

Stream	Flow (cfs)	Load Capacity	Geo-means	% Reduction
Hangman Creek	0.35	11,203	74,992	85
	0.266	8,542	25,571	67
	0.246	7,899	12,741	38
	0.232	7,450	6,388	0
South Fork Hangman Creek	0.312	10,019	13,477	26
	0.238	7,643	11,355	33
	0.222	7,129	8,374	15
	0.21	6,744	11,251	40

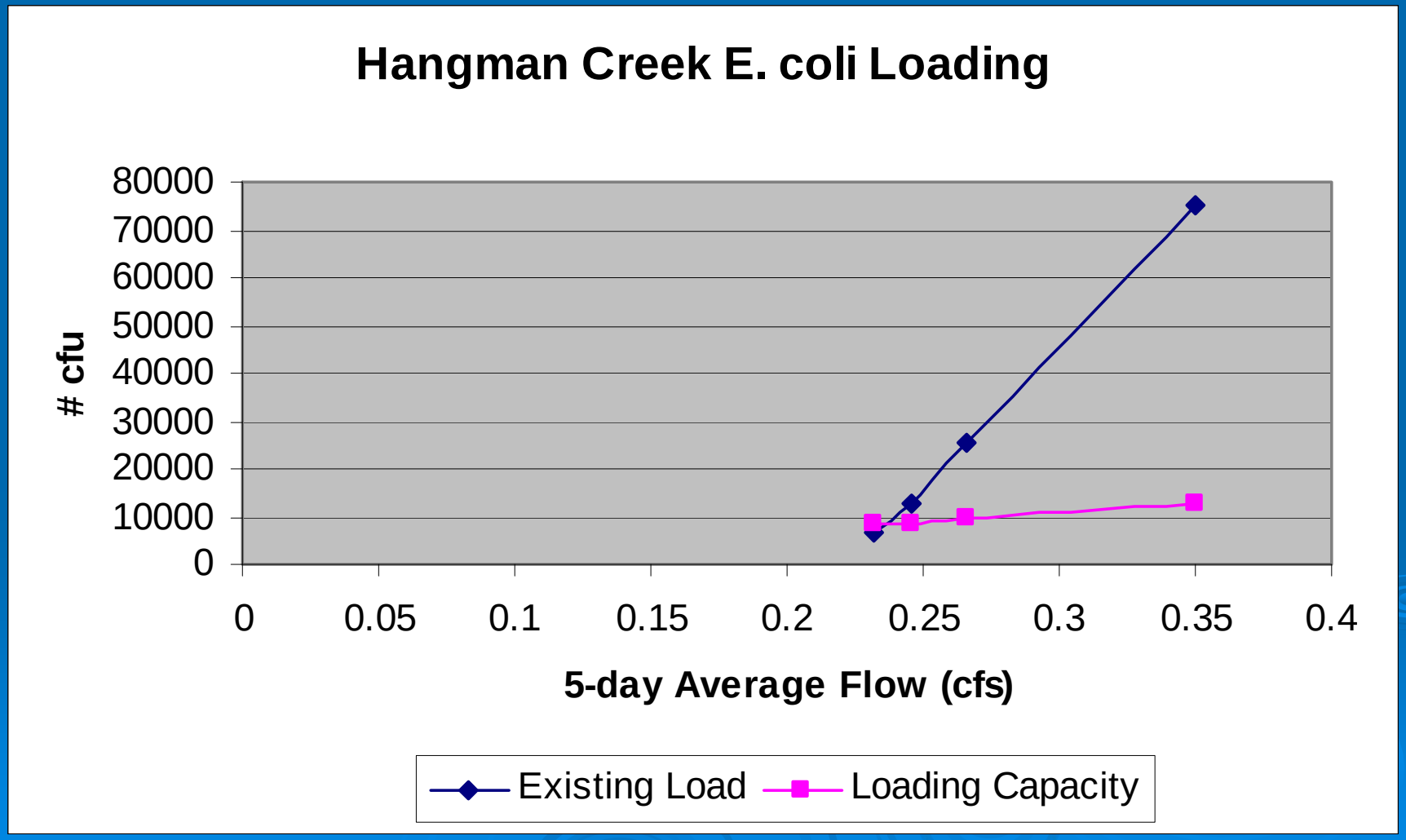
Bacteria Load Calculations

- Flow based calculation
  - A flow of 1 cfs can contain 35,679 cfu of *E. coli* at loading capacity

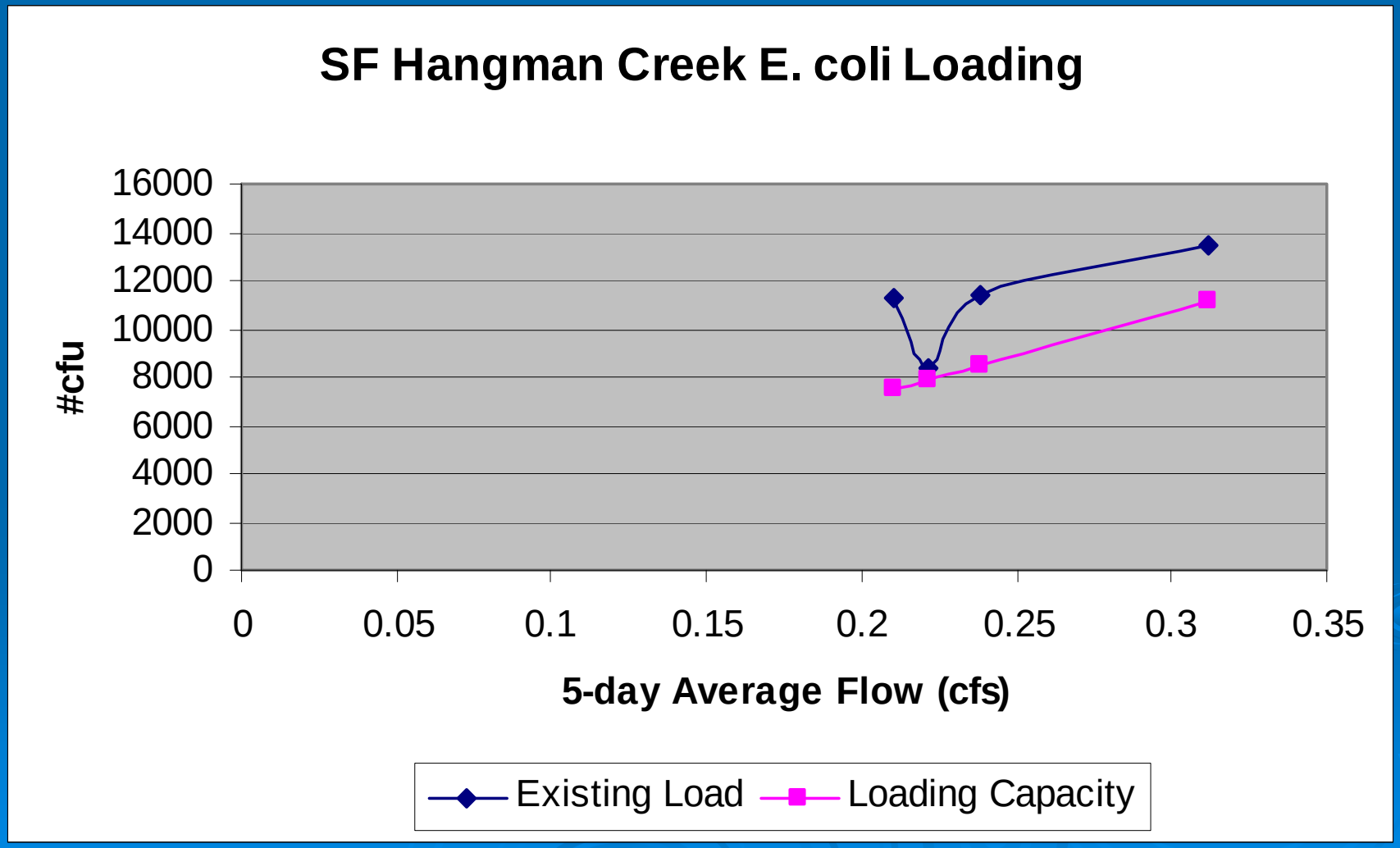
1 cubic foot	28,316.85 milliliters	126 cfu
	1 cubic foot	100 milliliters

= 35,679 cfu of E. coli per 1 cfs at loading capacity

Hangman Creek Bacteria Load



SF Hangman Bacteria Load



What's next?

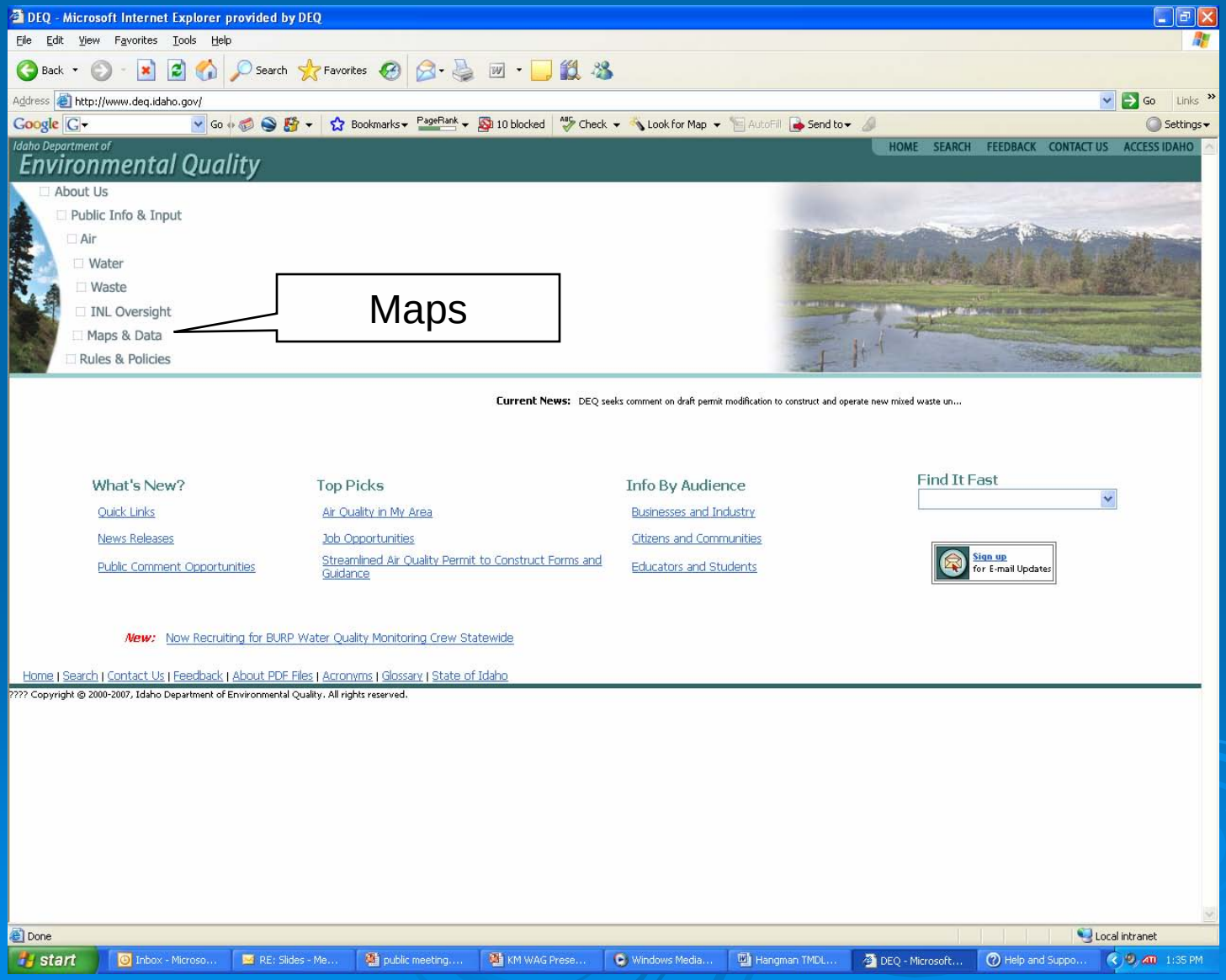
- Implementation
- Continued assessment of watershed
- 5 year review
  - 2011

DEQ Website

- Find information
- Make comments

http://www.deq.idaho.gov/

DEQ Website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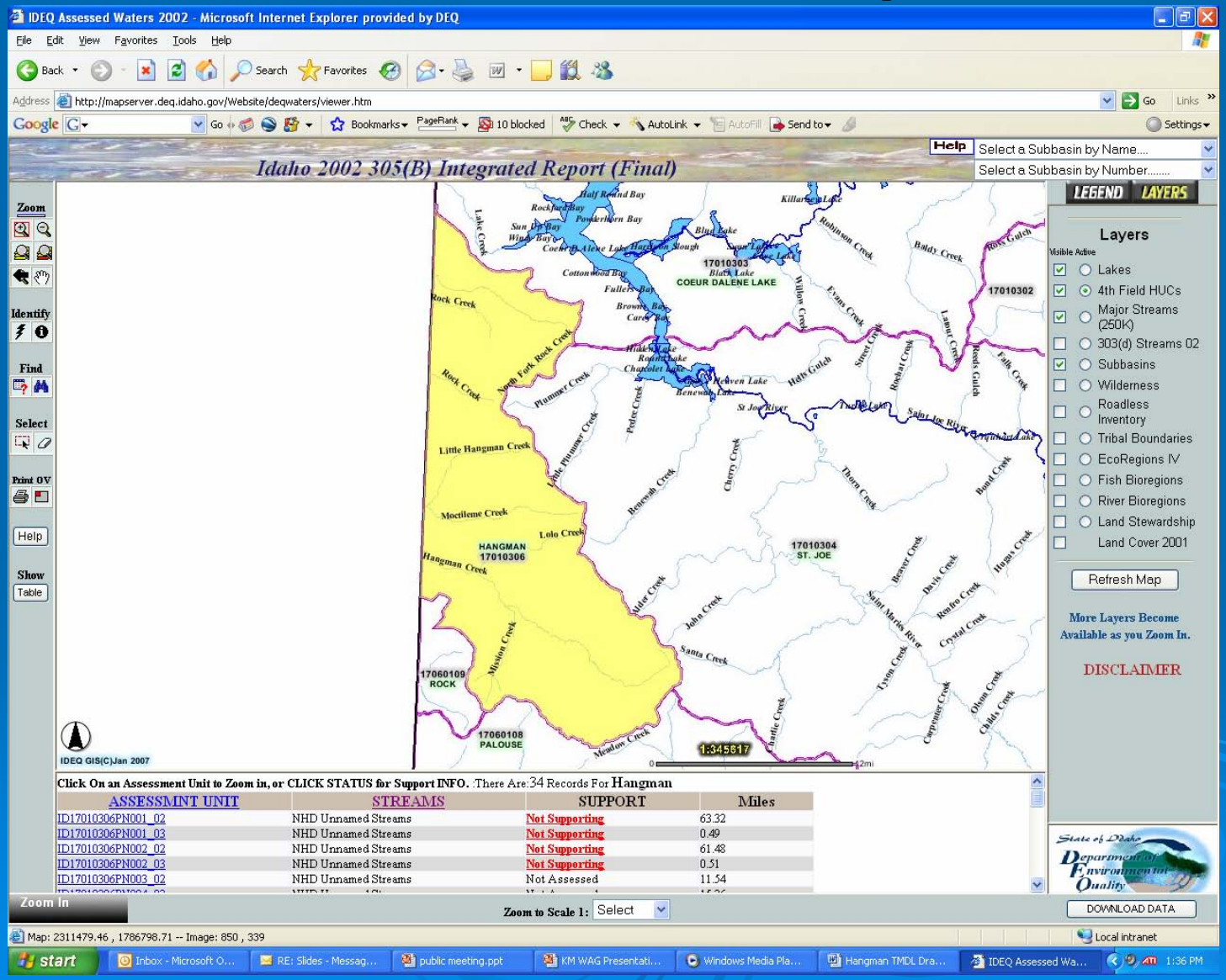
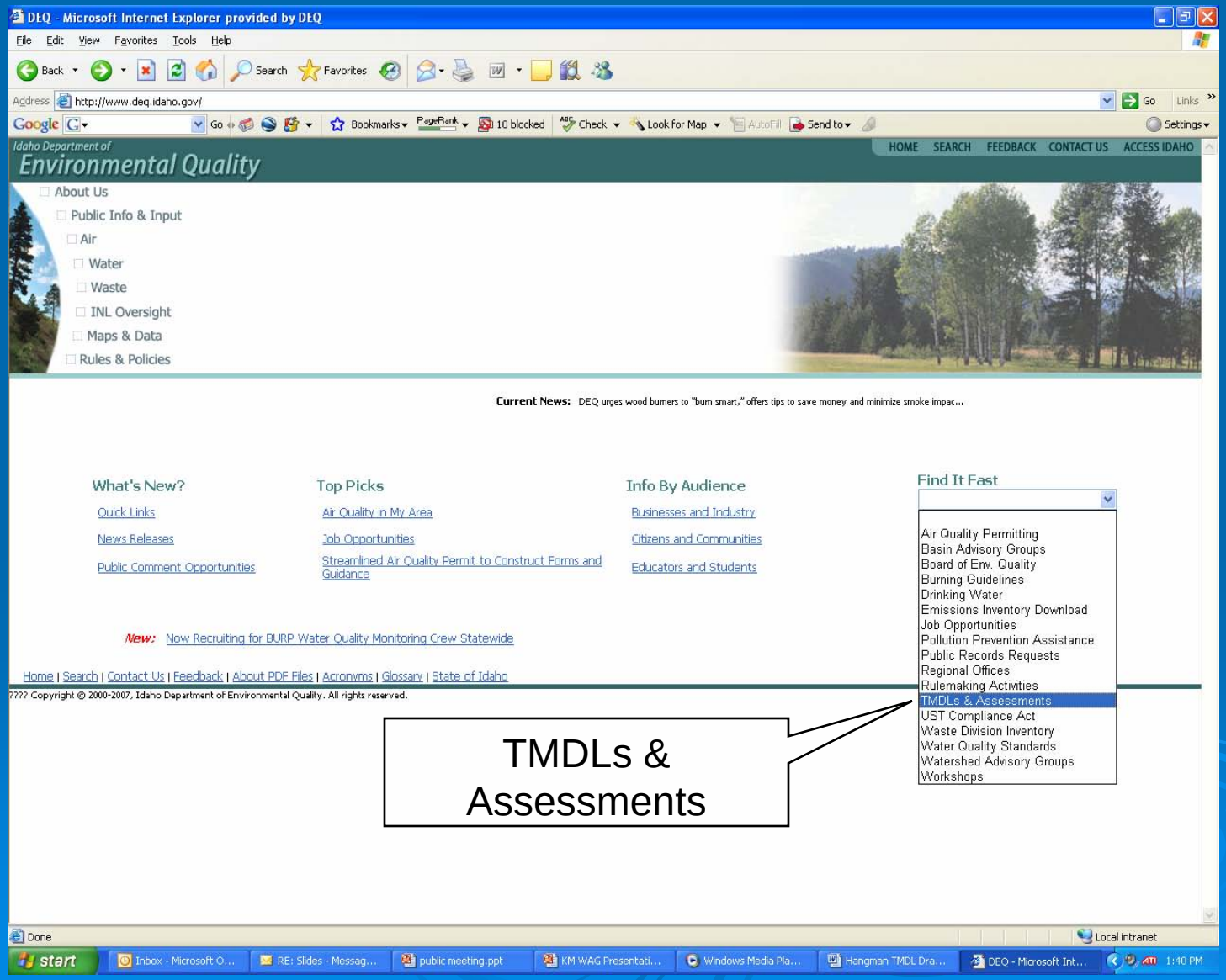
Interactive Maps



TMDLs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TMDLs

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Surface Water Quality: Subbasin Assessments, Total Maximum Daily Loads (TMDLs), and Implementation Plans

Key to Footnotes | Reports Listed Alphabetically | Reports Listed by DEQ Region

Below are links to subbasin assessments, total maximum daily loads (TMDLs), and implementation plans completed or underway in Idaho.

For information on a specific report, click on the report name (reports under development do not have live links) or contact the DEQ regional office contact listed for that report. For general information on the TMDL process, link to the pages above or contact DEQ's TMDL Program Manager, Marti Bridges, at (208) 373-0382 or marti.bridges@deq.idaho.gov.

Reports Listed Alphabetically

TMDL Name	Hydrologic Unit Code (HUC)	TMDL Status	Implementation Plan Status	DEQ Contact Name/Region	Phone[a]
American Falls	17040206	Submitted to EPA September 2006		Lynn Van Every Pocatello	236-6160
Bear River Basin/ Malad River Subbasin[b]	16010201 16010102 16010204 16010202	Approved by EPA June 2006		Lynn Van Every Pocatello	236-6160
Beaver-Camas	17040214	Approved by EPA August 2005	Under development	Troy Saffle Idaho Falls	528-2650
Big Lost River	17040218	Approved by EPA August 2004	Under development	Tom Herron Idaho Falls	528-2650
Big Wood River	17040212	Approved by EPA May 2002 Draft Addendum Open for Public Comment Feb. 22 - Mar. 30, 2007	Under development	Balthasar Buhidar Twin Falls	736-2190
Billingsley Creek	17040212	Aquaculture TMDL Approved by EPA September 2005		Balthasar Buhidar Twin Falls	736-2190

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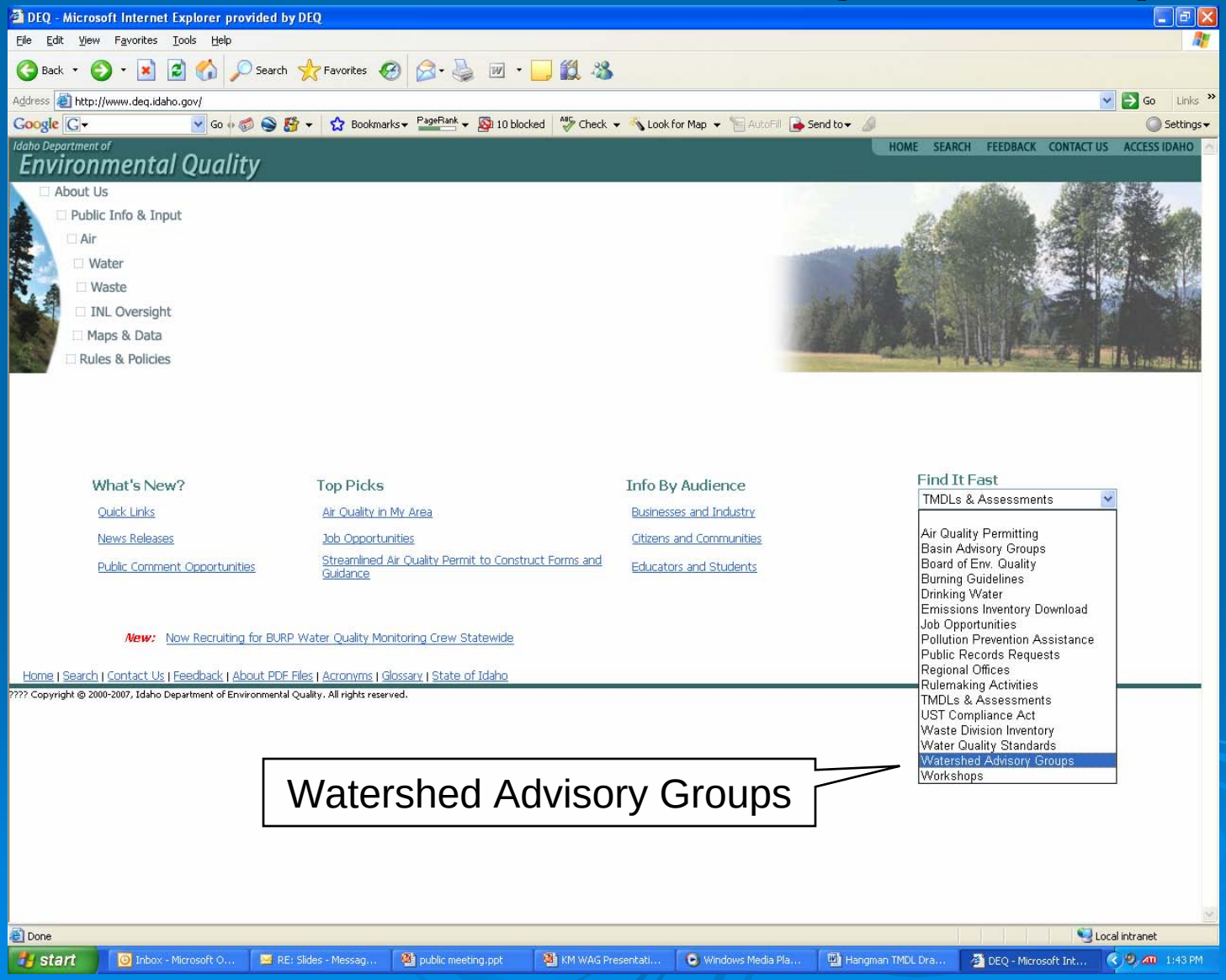
Watershed Advisory Groups



Watershed Advisory Groups

Watershed Advisory Groups (WAGs) in Idaho - Microsoft Internet Explorer provided by DEQ

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Address http://www.deq.idaho.gov/about/regions/wags_index.cfm

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Surface Water: Basin Advisory Groups (BAGs) and Watershed Advisory Groups (WAGs) in Idaho

Link to agendas, meeting minutes, presentations, and related background information for Basin Advisory Groups (BAGs) and Watershed Advisory Groups (WAGs) in Idaho.

Basin Advisory Groups

Coeur d'Alene Region

- Panhandle Basin Advisory Group

Watershed Advisory Groups

Boise Region

- Boise-Mores Creek (Mores and Grimes Creek and Tributaries)

Coeur d'Alene Region

- Fish Creek Watershed (Upper Spokane Subbasin)
- Kootenai and Moyie Rivers
- Lower Clark Fork River Subbasin Watershed
- North Fork Coeur d'Alene River Subbasin
- Pend Oreille River and Tributaries (to Pend Oreille Lake and River)
- Upper Hangman Creek Watershed

Twin Falls Region

- Wood River Watershed

See Also

Learn more about serving on a WAG here.

Contact DEQ

Regional Office
Water Quality Managers

State Office
Water Quality Division
Marti Bridges
(208) 373-0382

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Thank you for your time and keep in touch

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