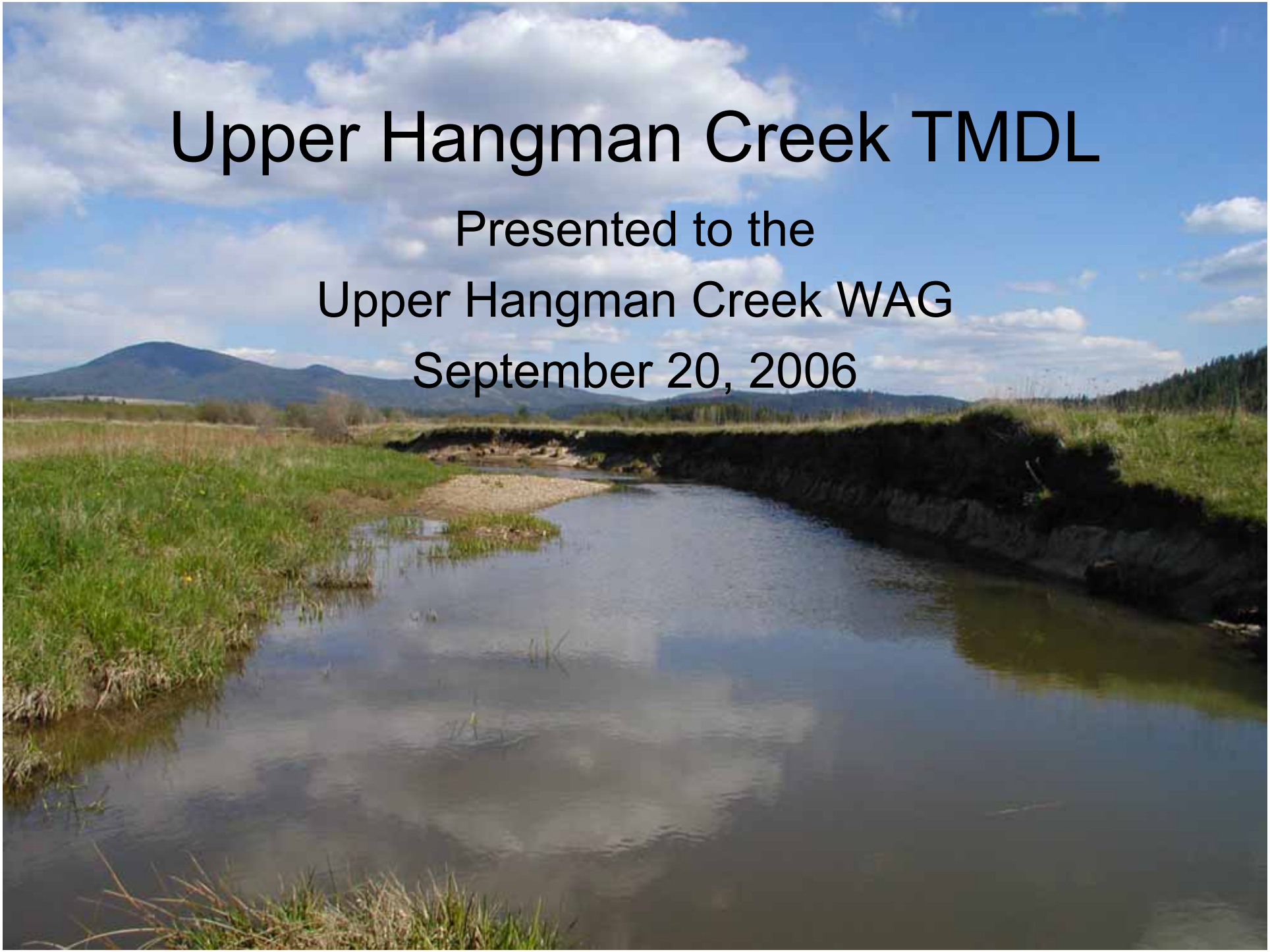


Upper Hangman Creek TMDL

Presented to the

Upper Hangman Creek WAG

September 20, 2006

DRAFT AGENDA

Upper Hangman Creek Watershed Advisory Group
Wednesday September 20, 2006
9:00 am – 12:00 pm
Tensed City Hall
311 C Street, Tensed ID

9:00 - 9:15

1. **Introductions and Meeting Agenda**

9:15 – 9:45

2. **Review of Beneficial Uses and Water Quality Criteria**

   A. Addition of pollutants to Integrated Report
      - ID17010306PN001_02: Sediment and Bacteria
      - ID17010306PN001_03: Temperature

9:45 – 11:30

3. **Methods used to develop pollutant loads and Draft results**

   A. Temperature
      - Potential Natural Vegetation (PNV)

Break

   B. Sediment
      - Stream bank and Road evaluation

   C. Bacteria
      - Mathematical calculations

11:30 – 11:45

4. **Section 4, Summary of Past and Present Pollution Control Efforts**

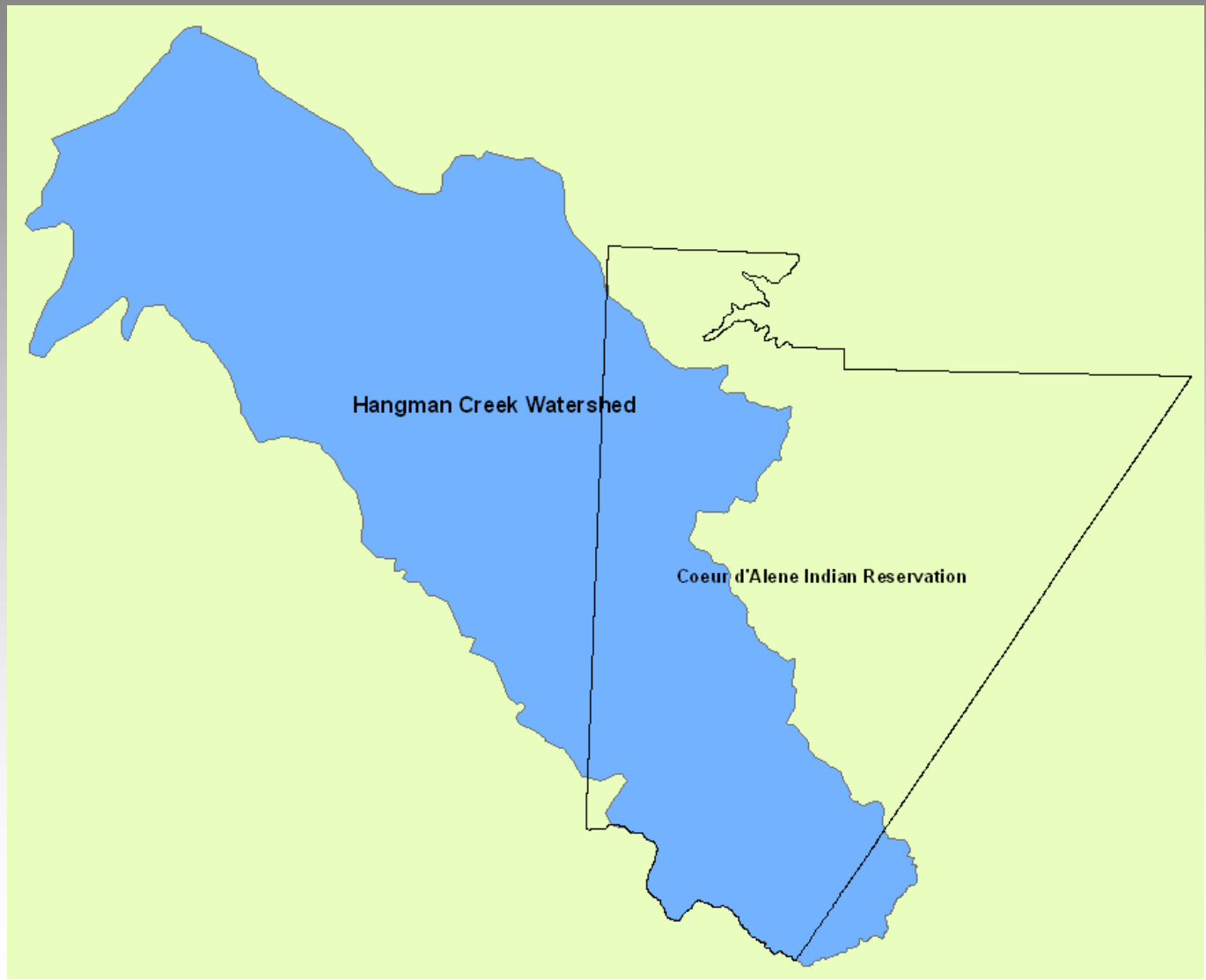
11:45 - 11:55

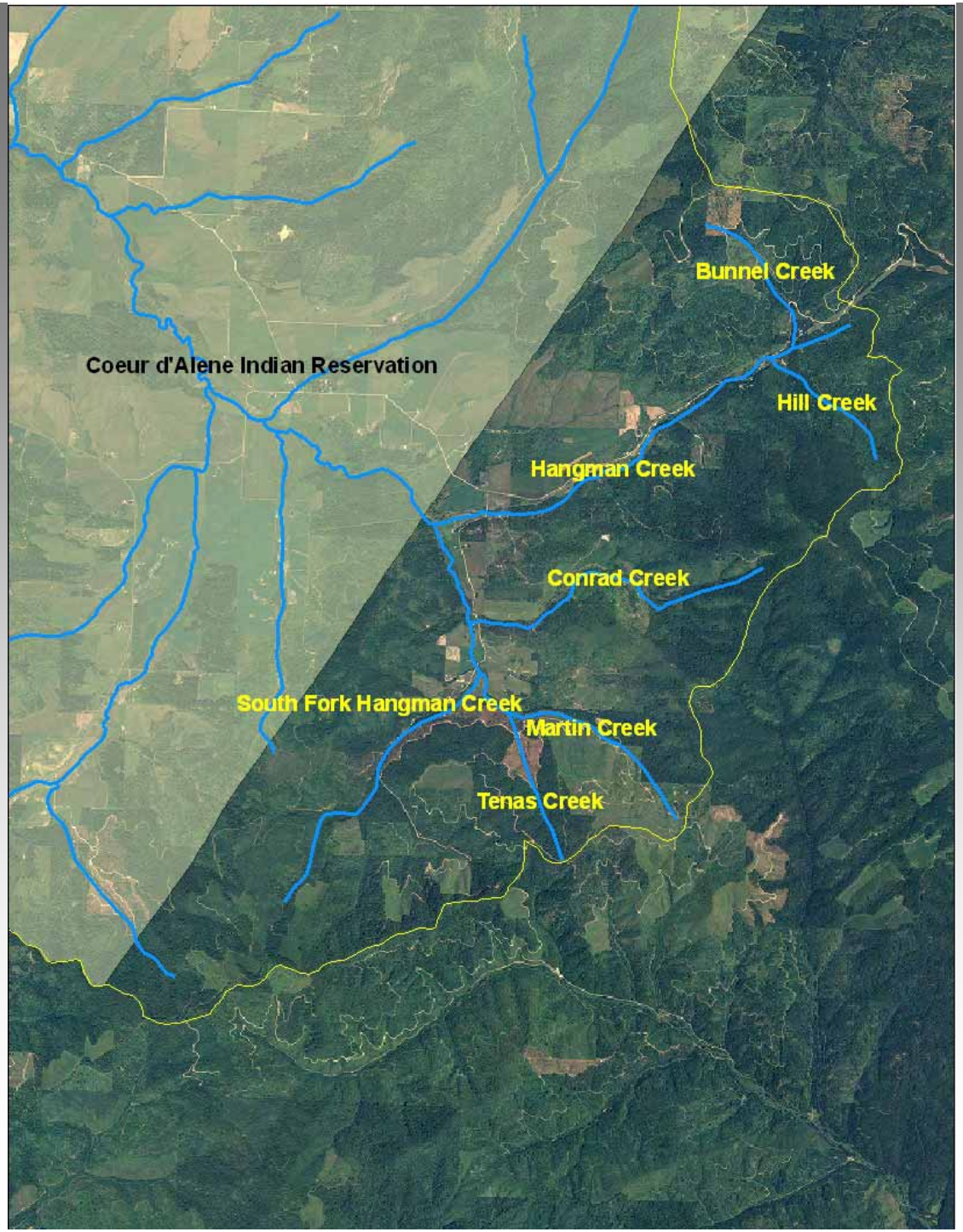
5. **Update Upper Hangman Creek TMDL Draft Timelines and Milestones**

11:55 - 12:00

6. **Future WAG meetings**

Upper Hangman Creek




Coeur d'Alene Indian Reservation
Bunnel Creek
Hill Creek
Hangman Creek
Conrad Creek
South Fork Hangman Creek
Martin Creek
Tenas Creek

Beneficial Uses

- Beneficial Uses are any of the various uses of water
  - Beneficial Uses of Upper Hangman Creek include cold water aquatic life, salmonid spawning and secondary contact recreation
- Beneficial uses are broken into three categories
  - Existing – uses actually attained in the water body on or after November 28, 1975
  - Designated – uses specified in water quality standards
  - Presumed – all waters without existing or designated beneficial uses assigned, DEQ will apply the numeric cold water criteria and primary or secondary contact recreation criteria

Upper Hangman Creek Use Designation

Water Body	Uses	Type of Use
Hangman Creek	Cold water aquatic life Secondary contact recreation	Designated
Hangman Creek	Salmonid spawning	Existing
Tributaries to Hangman Creek	Cold water aquatic life Secondary contact recreation	Presumed
Tributaries to Hangman Creek	Salmonid spawning	Existing

Applicable Water Quality Criteria

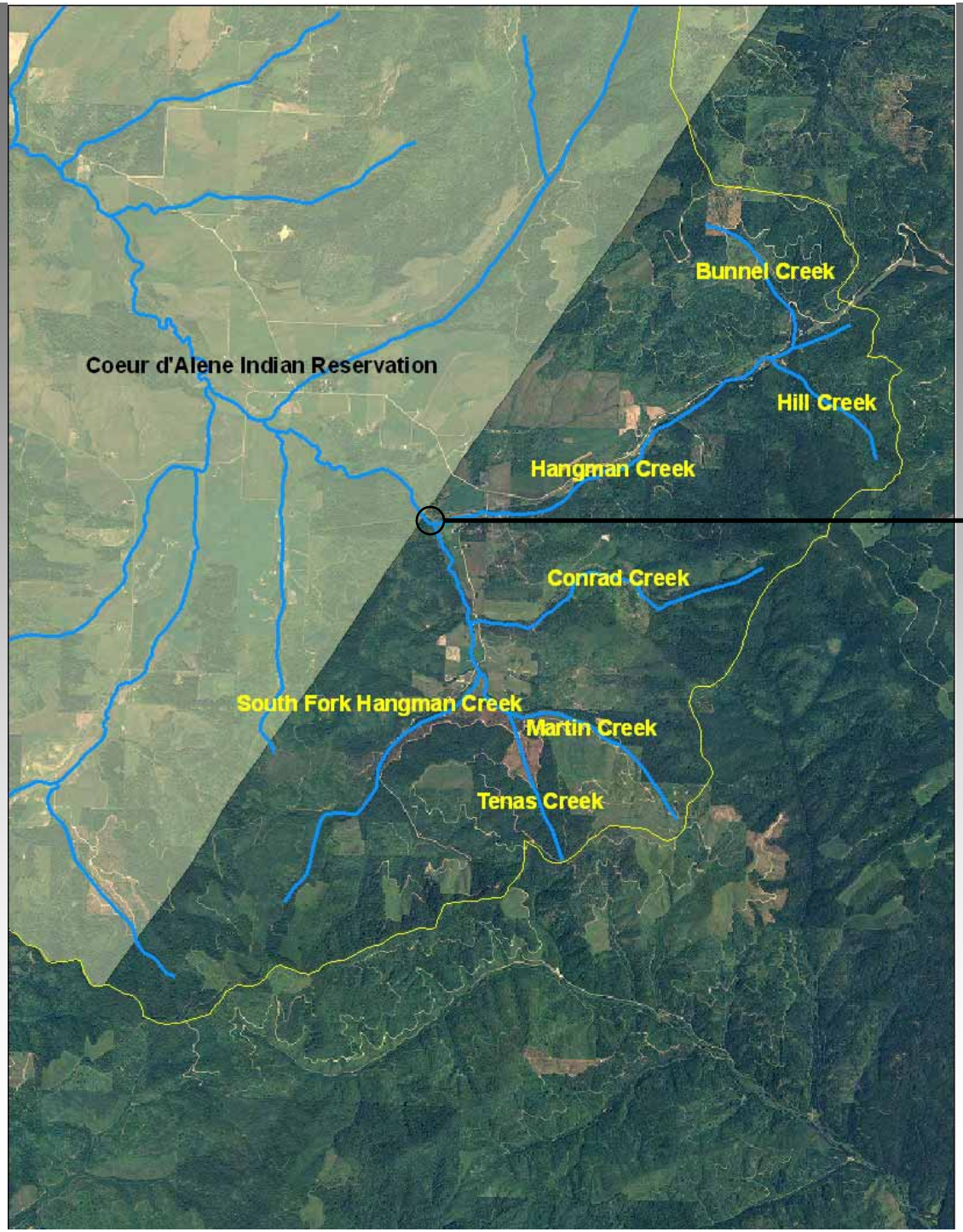
- Bacteria
  - *E. coli* concentrations are not to exceed 126 *E. coli* organisms/100ml.
- Nutrients
  - Narrative standard - surface water shall be free from excess nutrients that cause visible slime growth.
- Sediment
  - Narrative standard - sediment shall not be in quantities which impair designated beneficial uses.
- Temperature
  - Numeric standard - cold water aquatic life daily max 22°C
    salmonid spawning daily max 13°C

From Idaho water quality standards (IDAPA 58.01.02.200.09), if natural conditions exceed numeric water quality criteria, exceedance of the criteria is not considered a violation of water quality standards.

Pollutant Additions to Idaho's Impaired Waters List

- Sediment and Bacteria
  - ID17010306PN001_02, all waters above the South Fork Hangman confluence with Hangman Creek including Hangman Creek.
- Temperature
  - ID17010306PN001_03, Hangman Creek below the South Fork Hangman Creek confluence.

Assessment units determined to be exceeding Idaho Water Quality Standards during Subbasin Assessment (SBA) development.

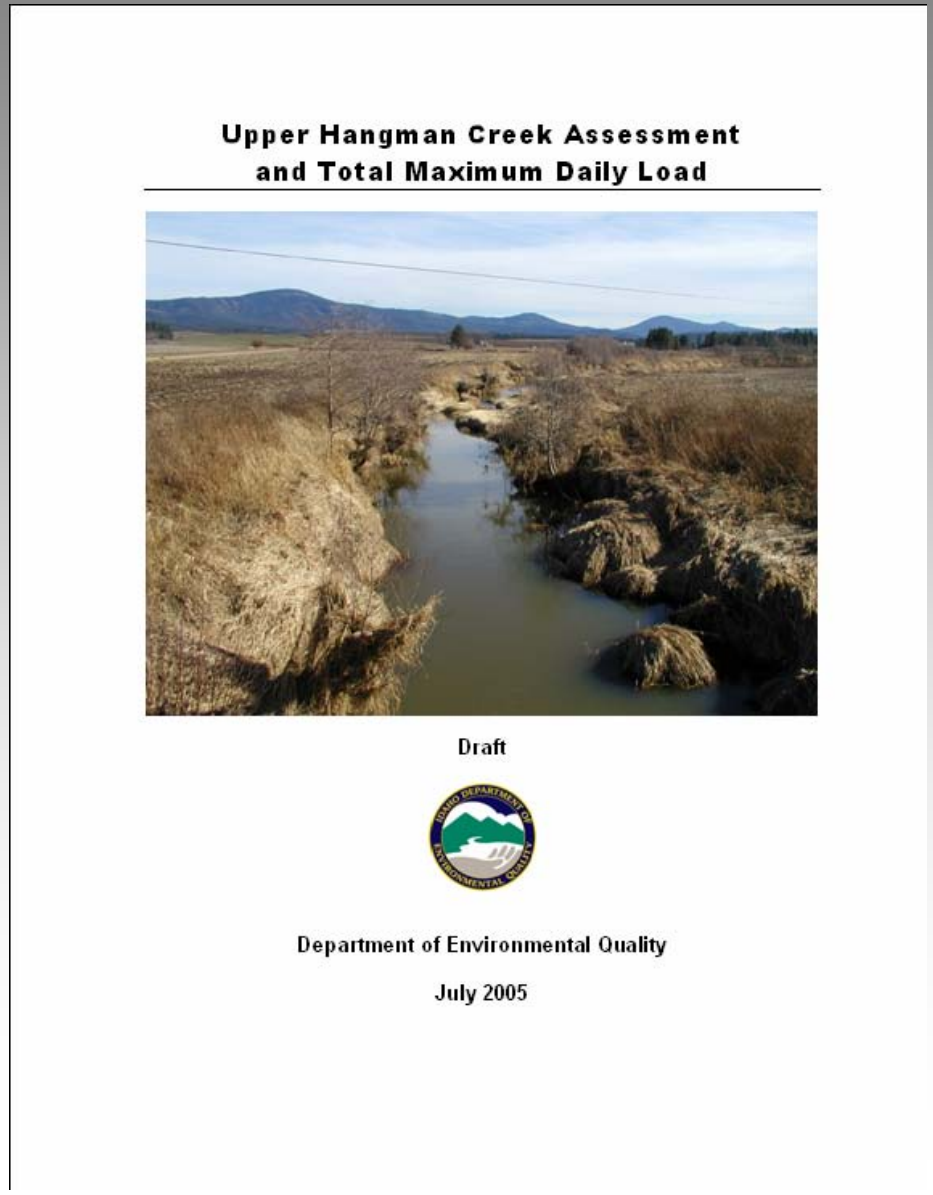


ID17010306PN001_03

ID17010306PN001_02

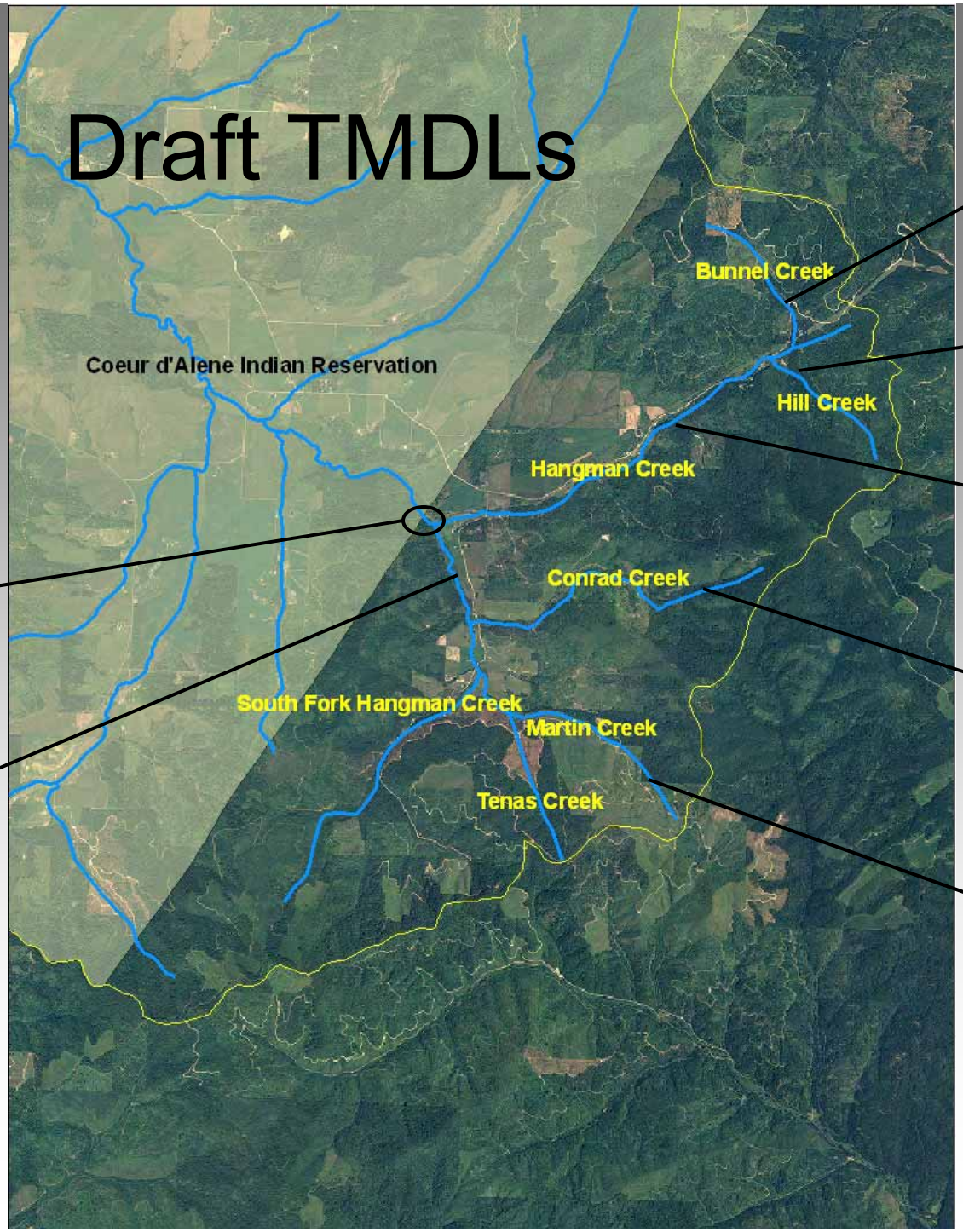
All other waters

Draft Upper Hangman Creek Assessment and TMDL



- Written by DEQ Technical Services
  - Mark Shumar
  - Don Zaroban
- 151 pages
- Addresses
  - Sediment
  - Temperature
  - Bacteria
  - Nutrients
- Completed July 2005

Draft TMDLs



Sediment and Temperature

Sediment and Temperature

Bacteria, Sediment and Temperature

Bacteria, Sediment and Temperature

Sediment and Temperature

Bacteria, Sediment and Temperature

Sediment and Temperature

Draft Upper Hangman Creek TMDL Overview

- **Temperature**
  - All streams assessed were determined to be exceeding temperature standards
  - All streams assessed given 90% shade target
  - Solar loading reductions ranged from 50% - 0%
- **Sediment**
  - Bank stability, mass failures and road erosion used to determine appropriate sediment load
  - 80% bank stability set as target, 50% over natural background set as target for roads
  - Sediment loading reductions ranged from 73% - 0%
- **Bacteria**
  - Water quality standard is target, 126 cfu/100 ml of *E. coli.*
  - Reductions ranged from 85% - 0%
- **Nutrients**
  - No TMDL developed, recommended nutrient de-listing
  - Nutrients found to be in concentrations near reference conditions

TMDL Development Methods

- Temperature
  - Potential Natural Vegetation (PNV)
- Sediment
  - Stream bank, mass failures and road evaluation
  - 50% above natural background
- Bacteria
  - Sample concentrations and flow

Potential Natural Vegetation

- Provides the expected effective shade (along with topography).
- Produces natural stream temperatures (assuming no point sources, dams, etc.).
- Equates to natural background conditions in Idaho WQS.

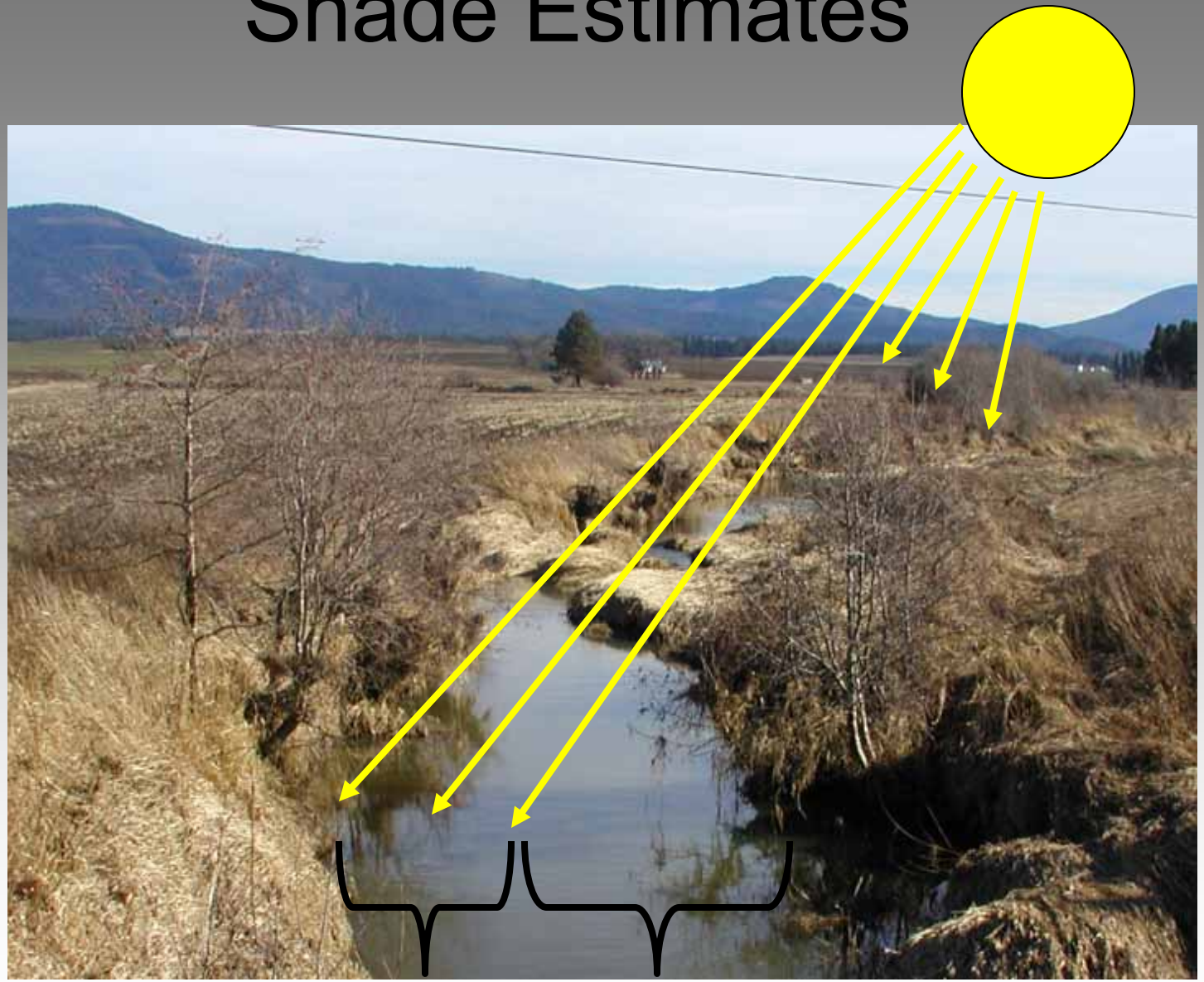
PNV Steps

1. Shade estimates using satellite image analysis.

2. Field validation of initial shade estimates.

3. Numeric calculation of existing load and potential natural load. Difference equals load allocation.

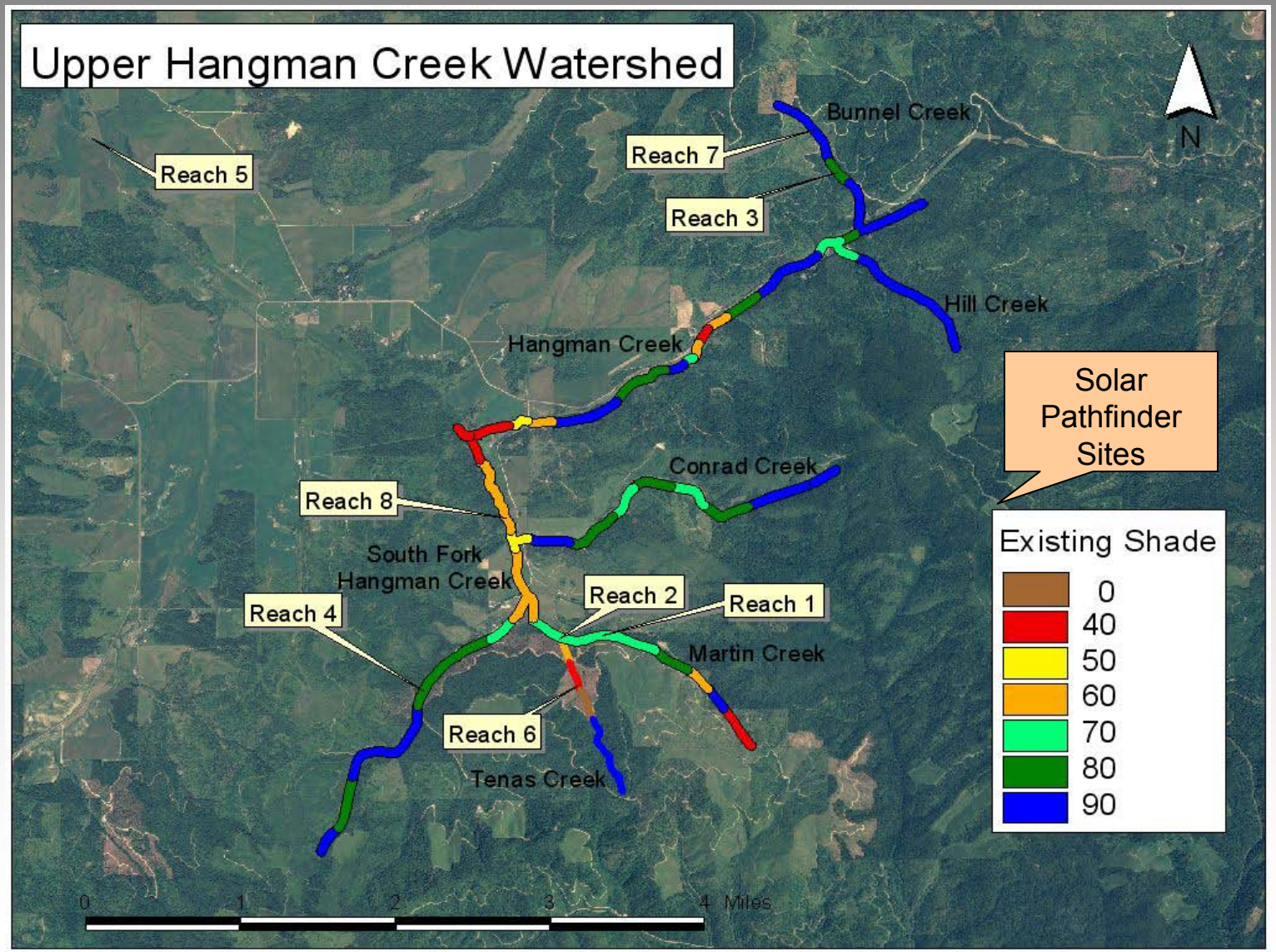
Shade Estimates



Un-shaded 40% Shaded 60%

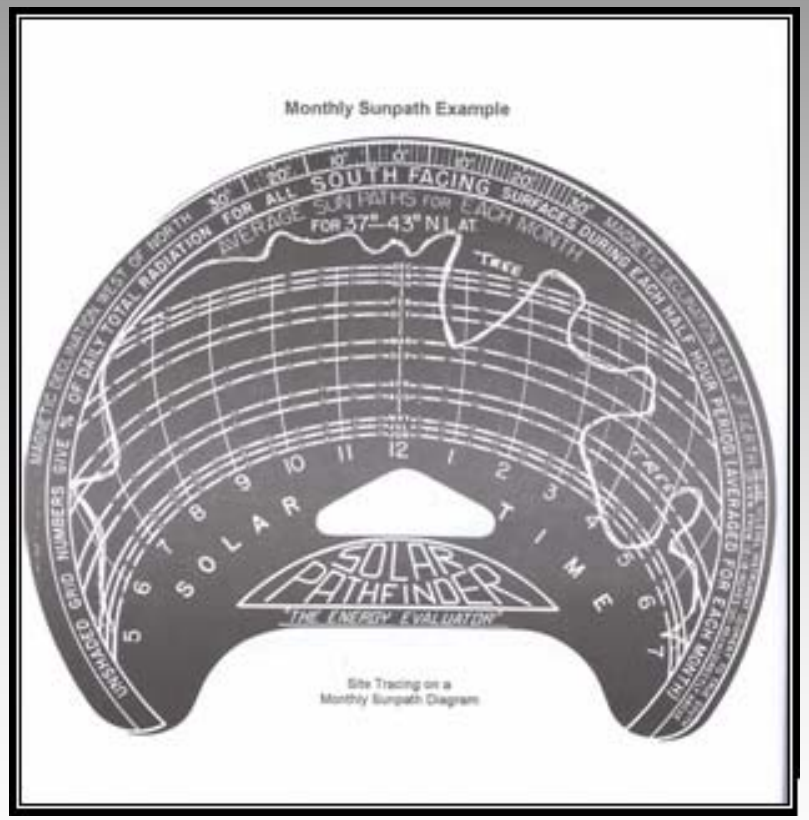
Step 1

- Satellite image shade estimates



Step 2

- Field validation of initial shade estimates



Solar Pathfinder trace

Collecting existing shade values

Step 3

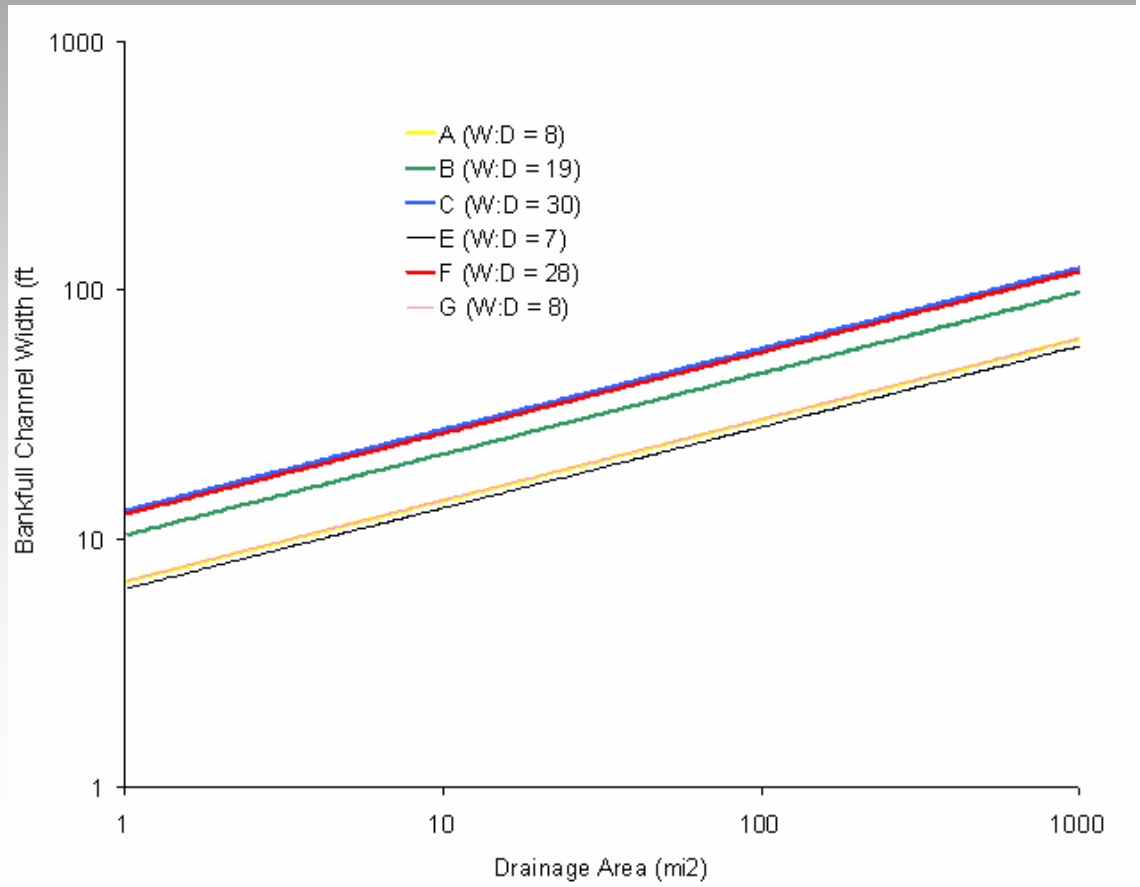
- Solar load calculations

  PNV load – Existing load = Load reduction

  Solar load under PNV = Load capacity

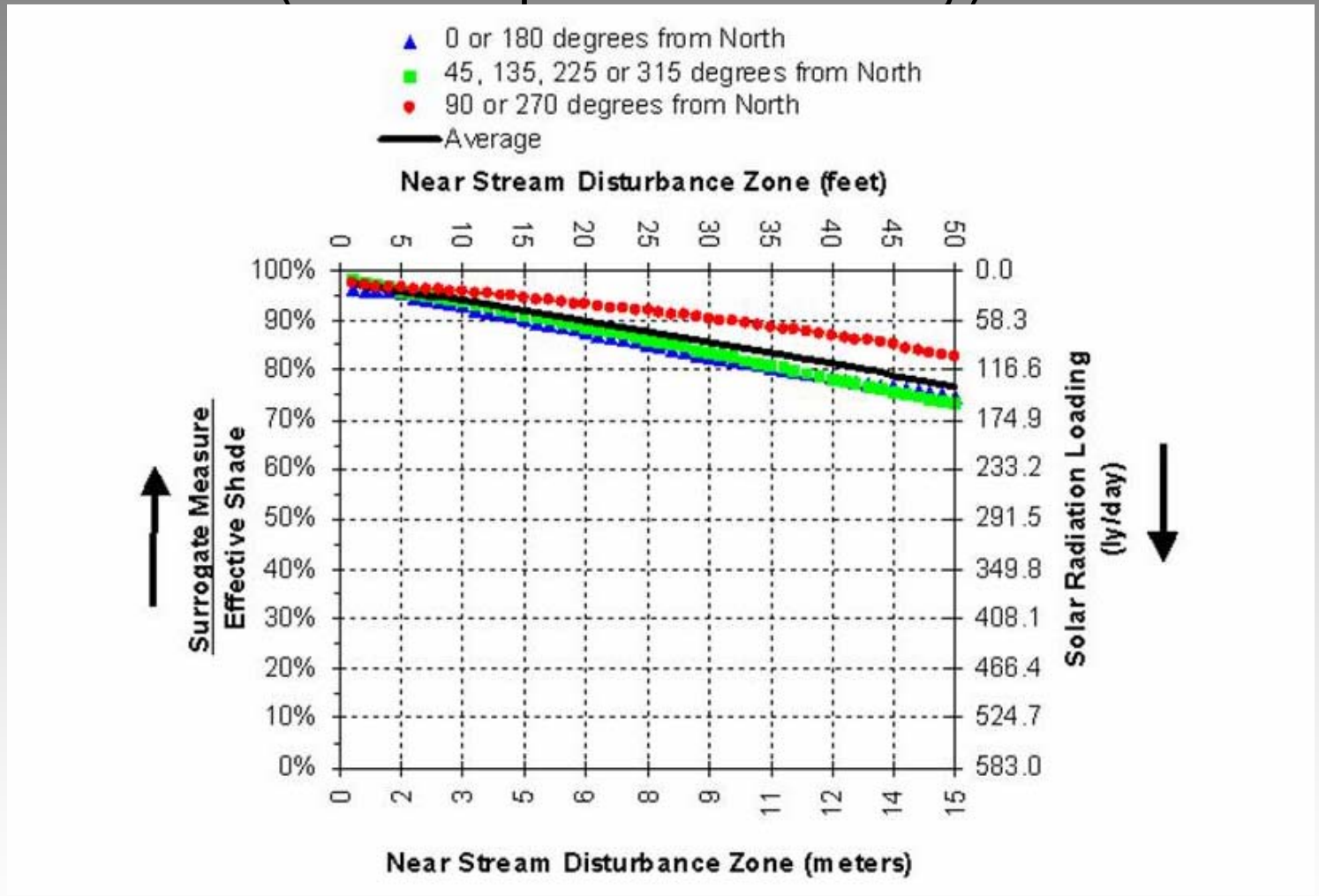
Step 3 continued

- Determining solar load
  - Stream width determined from drainage area curve
  - All streams 3m or less
  - Headwater streams =0.5m
  - Lower Hangman and Lower SF Hangman 3m at lowest portion



Step 3 continued

- PNV shade (mature riparian community)

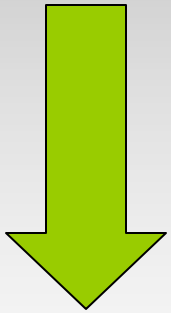


Ponderosa pine and Grand fir shade curve developed for the Clearwater River

Step 3 continued

- 90% shade target
  - Any tree or larger shrub community, deciduous or coniferous, is capable of providing ≥ 90% shade for streams 3 meters or smaller.

(Solar load from Flat Plate collector) X (100-Target Shade or Existing Shade)



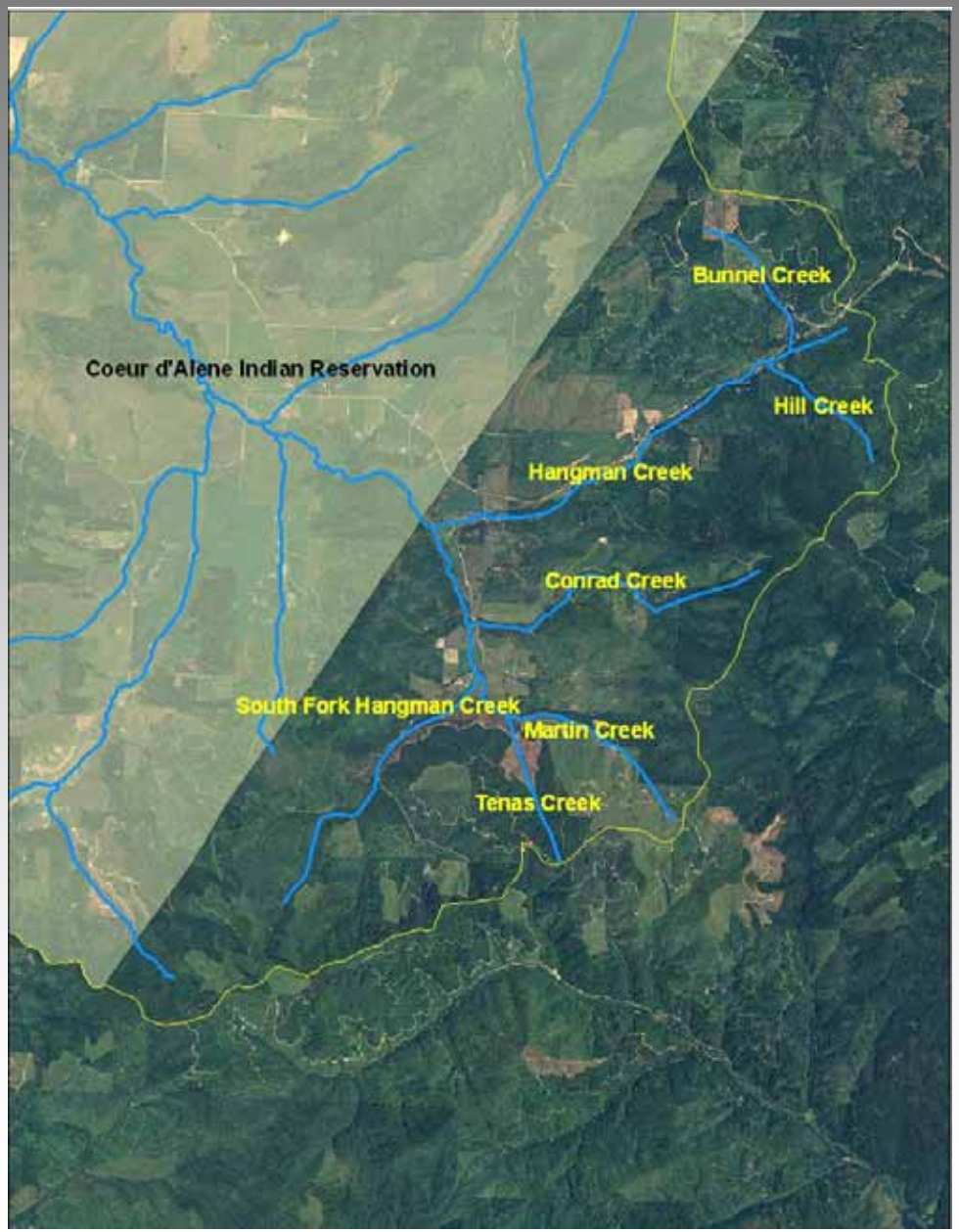
Solar load reaching stream

Step 3 continued

- Solar load reaching stream under natural conditions minus solar load reaching stream under existing conditions = load reduction.

- Streams reaching natural conditions and exceeding numeric temperature standard still meet Idaho water quality standards.

Solar Load Reductions



- Bunnel Creek 15%
- Hill Creek 25%
- Conrad Creek 52%
- Hangman Creek 63%
- Martin Creek 69%
- SF Hangman Creek 70%
- Tenas Creek 74%

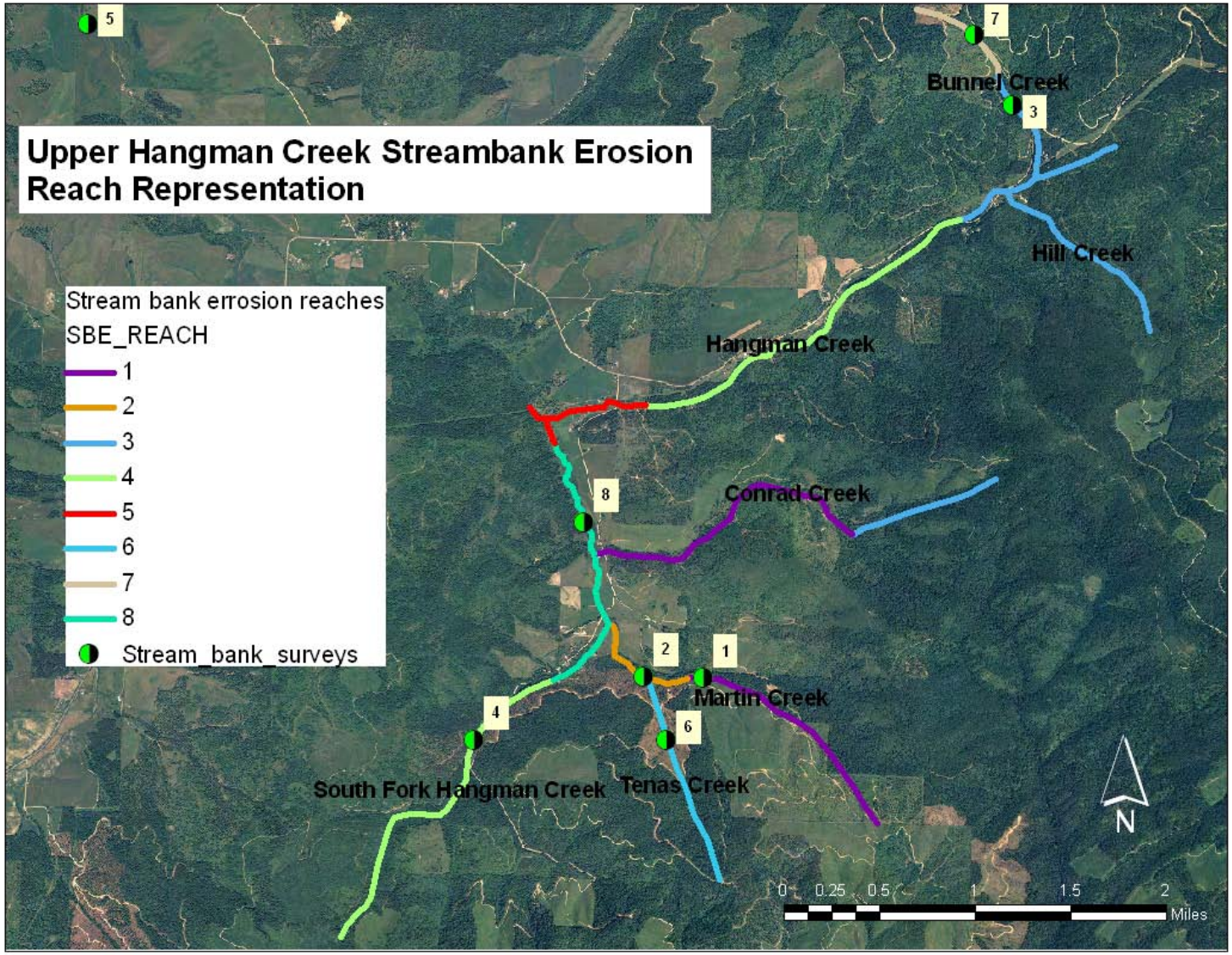
Break

Sediment

- Narrative standard
  - sediment shall not be in quantities which impair designated beneficial uses.

- Surrogate Targets
  - 80% Stream bank stability
    - IDEQ data collection 2005
  - ≤50% above background road sediment delivery
    - IDL CWE report
  - ≤50% above background mass failures
    - IDL CWE report

Stream bank erosion inventories



1. Forest-shrub mix
2. Grazed shrub
3. Intact forest
4. Road-slash-forest
5. Impacted brush
6. Harvest forest
7. Harvested forest
8. Brushy

Stream bank erosion Inventory Worksheet

STREAMBANK EROSION INVENTORY WORKSHEET

Stream:	Martin Creek	**Stream Segment Location (DD)**		**Elevation (ft)**
Section:	Reach 1	*Upstream:*	47.07372,-116.766	
Date Collected:	4/27/2005	*Downstream:*	47.07339,-116.764	
Field Crew:	Zaroban et al.	**Landuse and Notes:**	forest-shrub mix	
Data Reduced By:	Mark Shumar	represents 2000m of Martin and 2700m of Conrad		

Streambank Erosion Calculations

Average Bank Height	1.7	ft
Total Inventoried Bank Length	785	ft
Inventoried Bank to Bank Length	1570	ft
Erosive Bank Length	181	ft
Bank to Bank Eroding Segment Length	362	ft
Percent Eroding Bank	0.23057325	%
Eroding Area	615.4	ft^2
Recession Rate	0.12	
Bulk Density	90	lb/ft^2
Bank Erosion over Sampled Reach (E)	3.32316	tons/year/sample reach
Erosion Rate (Er)	22.3519552	tons/mile/year
Feet of similar stream type	8073	ft
Eroding Bank Extrapolation	4084.83567	ft
Total Streambank Erosion	37.4987914	tons/year

Summary for Load Reductions

Existing		Proposed		
Erosion Rate (t/mi/yr)	Total Erosion (t/y)	Erosion Rate (ton/mi/yr)	Total Erosion (t/yr)	% reduction
22.35195516	37.498791	19.38816	32.526576	13.25966851

Streambank Erosion Reduction Calculations

Eroding Area With Load Reductions	533.8	ft^2
Erosion over sampled reach (with load reduction (20%)	2.88252	tons/yr/sample
Erosion Rate	19.38816	tons/mile/year
Feet of Similar Stream Type	8073	ft
Eroding Bank Extrapoltation (with reduction)	3543.2	ft
Total Streambank Erosion	32.52658	tons/year

Recession Rate Calculation Worksheet

Slope Factor	Rating
Bank Stability (0-3)	1
Bank Condition (0-3)	0
Vegetative/cover on Banks (0-3)	1
Bank/Channel Shape - downcutting (0-3)	3
Channel Bottom (0-2)	1
Deposition (0-1)	1
Total = Slight (0-4); Moderate (5-8); Severe (9+)	7
Recession Rate	**0.12**

Sediment Allocation by Source

Source	Existing Load (t/yr)	Load Capacity (t/yr)	Reduction (%)
Stream banks	753	339	55
Roads	270	135	50
Mass failure	7	3.5	50
Total	1030	477.5	54

Watershed Sediment Reduction

- Watershed as a whole above the reservation requires a sediment reduction of 54% to achieve loading capacity.

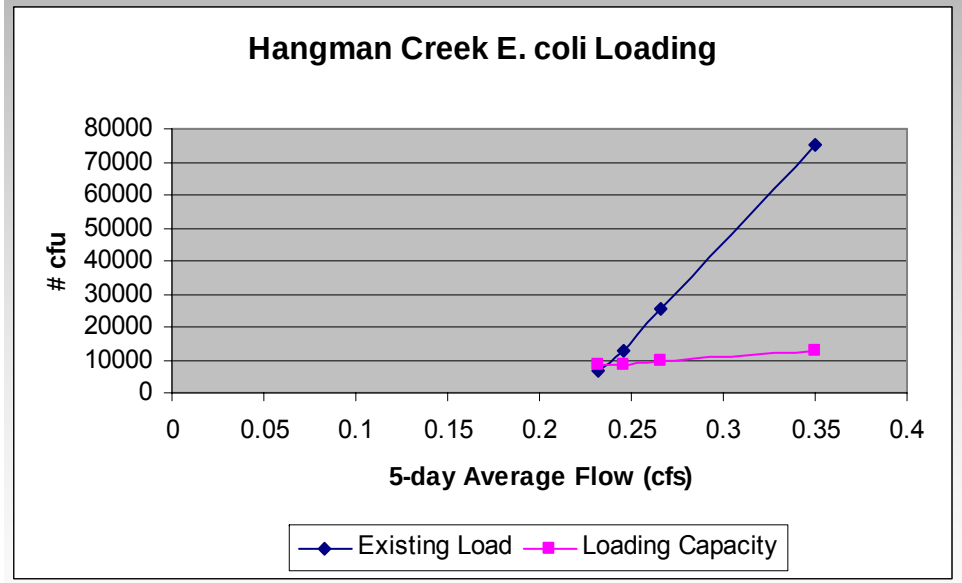
Total Existing Erosion	Total Proposed Erosion
752.6 tons/year	339.4 tons/year

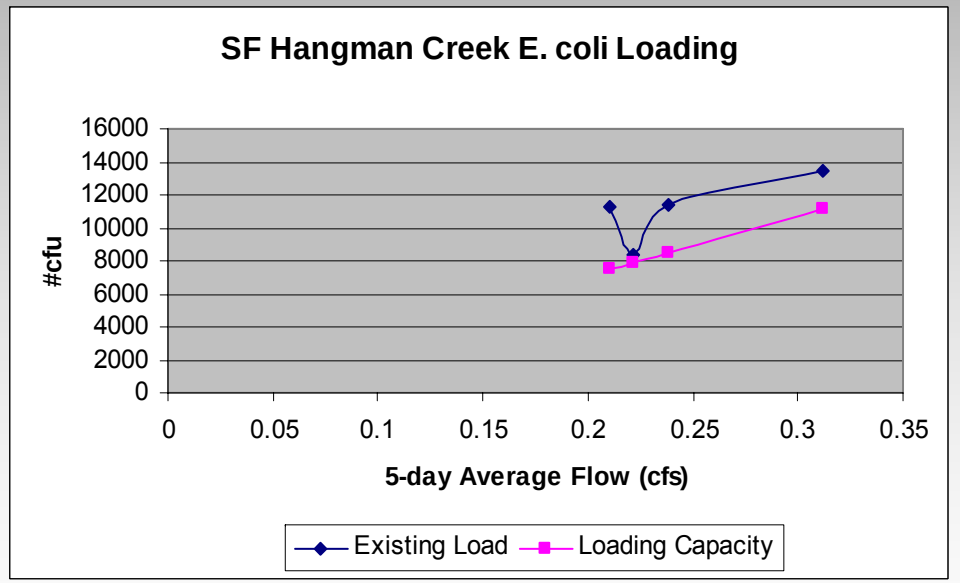
(339.4/752.6)-100 = 54%

Bacteria

E. coli standard is 126 cfu/100 ml

- Bacteria loading capacity is based on flow and standard.
- Flow converted to milliliters and then multiplied by 1.26.





Flows of 1cfs can contain 35,679 cfu of *E. coli* at loading capacity

Bacteria Load Capacity

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

TMDL Section 4
Past and Present Pollution Control Efforts

- Currently 2 paragraphs
- WAG input
  - List of known projects
  - List of future projects

Timeline and Milestones

- Continue with WAG meetings
  - October
  - November

Upcoming Meetings and Topics

- October
  - Comment of Draft TMDL findings
  - WAG reviews entire Draft TMDL and comments to DEQ
- November
  - WAG comments incorporated into TMDL
  - DEQ reports changes to WAG

Anticipating at least one if not two evening meetings

Upper Hangman Creek WAG Website

- Draft documents
- Meeting handouts
- Power point presentations
- Agendas
- Future meeting times

http://www.deq.idaho.gov/about/regions/upper_hangman_creek_wag/index.cfm

October Meeting