Lower Clark Fork Watershed Advisory Group

May 22, 2006

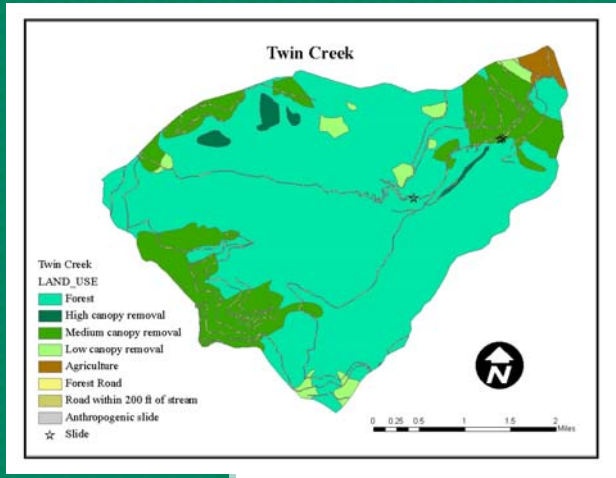
Distributing Sediment Load reductions amongst Land managers and Land owners

- **Step 1** Determine land use acres within the watershed and current load
- **Step 2** Determine percent reductions from current conditions to achieve sediment target
- **Step 3** Required reduction
- **Step 4** Reductions from non-natural land use types
- **Step 5** Reductions from land use types
- **Step 6** Percent land managed or owned by land use type
- **Step 7** Reductions from land use type by land manager and owner

Step 1

Determine land use acres within the watershed and current load

Twin Creek



Land Use Type	Acres of land use type and number of slides	Load (t/a/y)	Estimation Method
High Canopy Removal	106	22	Modeled
Medium Canopy Removal	1,290	90	Modeled
Low Canopy Removal	188	5	Modeled
Forest (natural background)*	5,716	132	Modeled
Agriculture	76	4	Modeled
Forest road	171	12	Modeled
Forest road within 200 feet of stream	19	21	Modeled
Anthropogenic slide	3	12	Modeled
Total	**-**	**297**	**-**

Modeled land uses within watershed

Step 2

Determine percent reductions from current conditions to achieve sediment target

Load capacity at sediment target = (Natural background x target) + natural background

174 (tons/year) x 0.54 = 94 (tons/year)

Natural background | Target 54% | 54% of natural background

94 (tons/year) + 174 (tons/year) = 268 (tons/year)

Load Capacity at 54% above natural background 268 tons/year

Step 3

Required reduction

Modeled existing load – Load capacity at sediment target

297 (tons/year) – 268 (tons/year) = 29 (tons/year)

Step 4

Reductions from non-natural land use types

(Current total load from non naturally occurring land use types/Total load from land use type other than natural background) x 100 = % reduction from land use type

(22 (tons/year)/166 (tons/year)) x 100% = 13%

Land use type	Load	Reducible %	Reduction from land use type
High canopy removal	22	13%	4
Medium canopy removal	90	55%	15
Low canopy removal	5	3%	1
Agriculture	4	2%	1
Forest road	12	7%	2
Forest road within 200 feet of stream	21	13%	4
Anthropogenic slide	12	7%	2
Total	**166**	**100%**	**29**

Step 5

Reductions from land use types

Reducible % x Total Reduction Required

13% x 29 (tons/year) = 4 (tons/year)

Land use type	Load	Reducible %	Reduction from land use type
High canopy removal	22	13%	4
Medium canopy removal	90	55%	15
Low canopy removal	5	3%	1
Agriculture	4	2%	1
Forest road	12	7%	2
Forest road within 200 feet of stream	21	13%	4
Anthropogenic slide	12	7%	2
Total	**166**	**100%**	**29**

Step 6

Percent land managed or owned by land use type

Land use type acreage owned or managed / Total land use acreage within watershed) x 100% = Percent land owned by land use type

(18 acres / 105 acres) x 100 = 17%

Land use type	Acres	% Land use type by owner	Reduction (tons/year)
Agriculture	76	100%	1
Anthropogenic Slides (number of events)	2	67%	1
Forest (natural background)	411	7%	na
Forest roads	33	19%	<1
Forest roads within 200 feet of stream	11	58%	2
High canopy removal	18	17%	<1
Medium canopy removal	417	32%	5
Low canopy removal	27	14%	<1
Total	**995**	**na**	**9**

Privately owned land in the Twin Creek watershed

Step 7

Reductions from land use type by land manager and owner

Step 6 x Reduction required from land use type

17% x 4 tons/year = 0.52 tons/year

<1 ton/year reduction required for modeled High Canopy Alteration within the Twin Creek watershed

Temperature TMDL Review

- Based on potential natural vegetation model with target at background vegetation based on estimated shade at:
  - Natural stream width and
  - Mature stand of potential trees for soil, aspect
- Potential shade converted to kwh/day to establish TMDL
- Practical implementation – designate % increase in shade to meet desired % reduction in temperature

Temperature TMDL

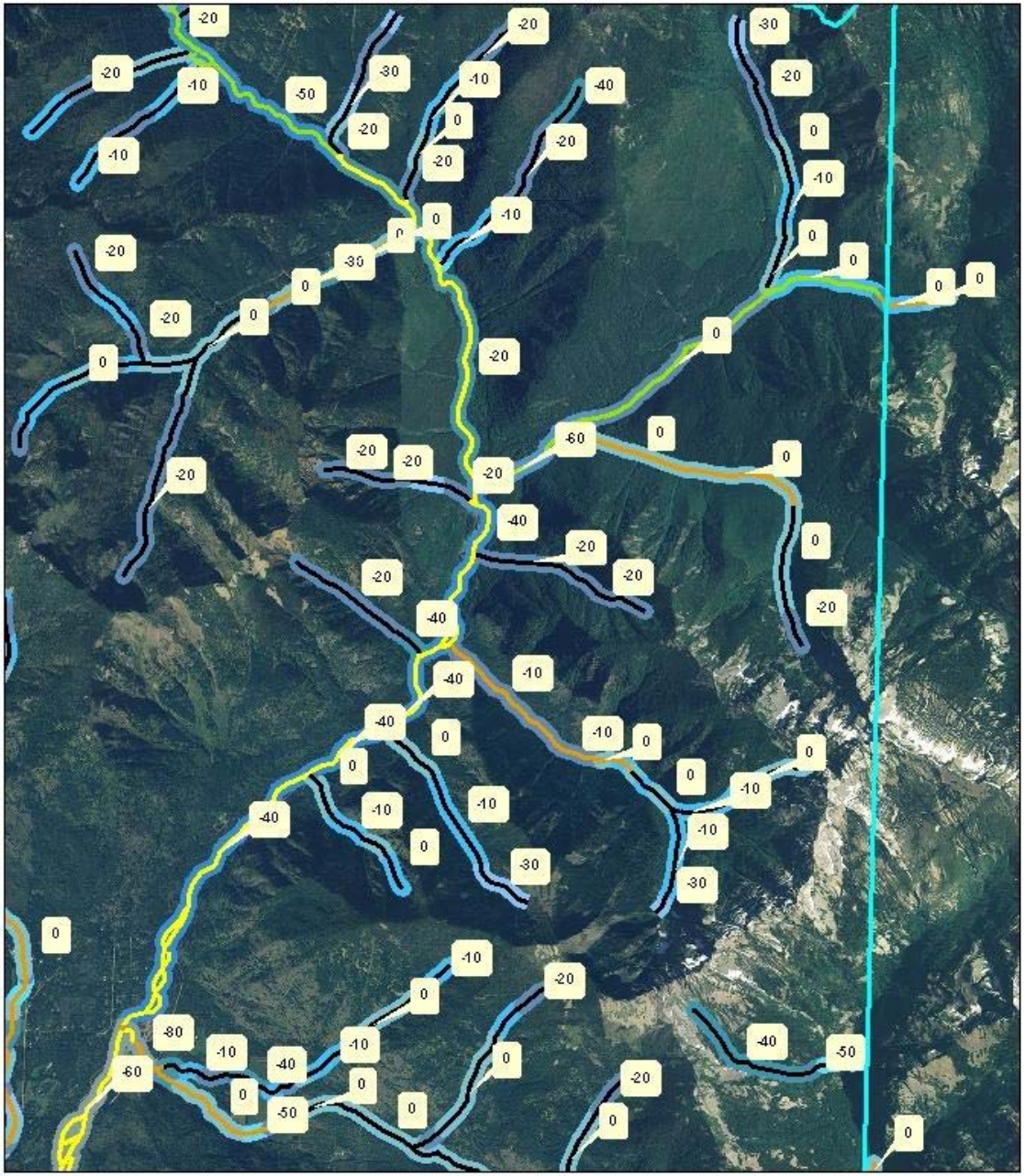
- Updated Loading Tables
  - Based on the Salmon River Trestle Creek Model
  - IDL regional curve based on Lower Clark Fork mainstem, Pack River, Priest River near Coolin and Binarch Creek gaging stations. These points can lead to different curves, have more confidence in DEQ model at this time to fit this drainages.
- Sample figures to show allocation on the ground – Target, Existing Shade and Difference
- Goal: Realty check of estimated load reductions and approval to move forward with public comment draft

East Fork Creek Example

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 minus Existing Load (kWh/day)	**East Fork Creek Drainage**
4	4	2,560	5,632	2,560	1,408	-4,224	tributary
4	4	4,360	7,194	4,360	2,398	-4,796	tributary
5	5	2,600	1,430	2,600	1,430	0	tributary
5	5	2,700	2,970	2,700	1,485	-1,485	tributary
5	5	4,300	2,365	4,300	2,365	0	tributary
3	3	1,335	2,203	1,335	734	-1,469	Savage
8	4	11,840	6,512	5,920	3,256	-3,256	Savage
13	7	44,720	24,596	24,080	26,488	1,892	pathfinder = 91.9%
10	9	3,000	1,650	2,700	2,970	1,320	
10	9	4,800	5,280	4,320	4,752	-528	
12	9	1,920	5,280	1,440	1,584	-3,696	
14	11	19,460	21,406	15,290	25,229	3,823	
16	12	39,360	64,944	29,520	48,708	-16,236	pathfinder = 70.7%
20	14	35,200	174,240	24,640	40,656	-133,584	pathfinder = 15.2%
	Total	**178,155**	**325,702**	**125,765**	**163,463**	**-162,239**	**-50**

*Note Existing Stream width and natural stream width differences for all tables.

East Fork and Morris Creek Area



Lower Clark Fork Subbasin

Target Shade Cover

- 25
- 65
- 75
- 85
- 95

Existing Shade Cover

- 5
- 15
- 25
- 35
- 45
- 55
- 65
- 75
- 85
- 95

N
W E
S

0 550 1,100 2,200 3,300 4,400
Meters

Lightning Creek Loading Table Summary

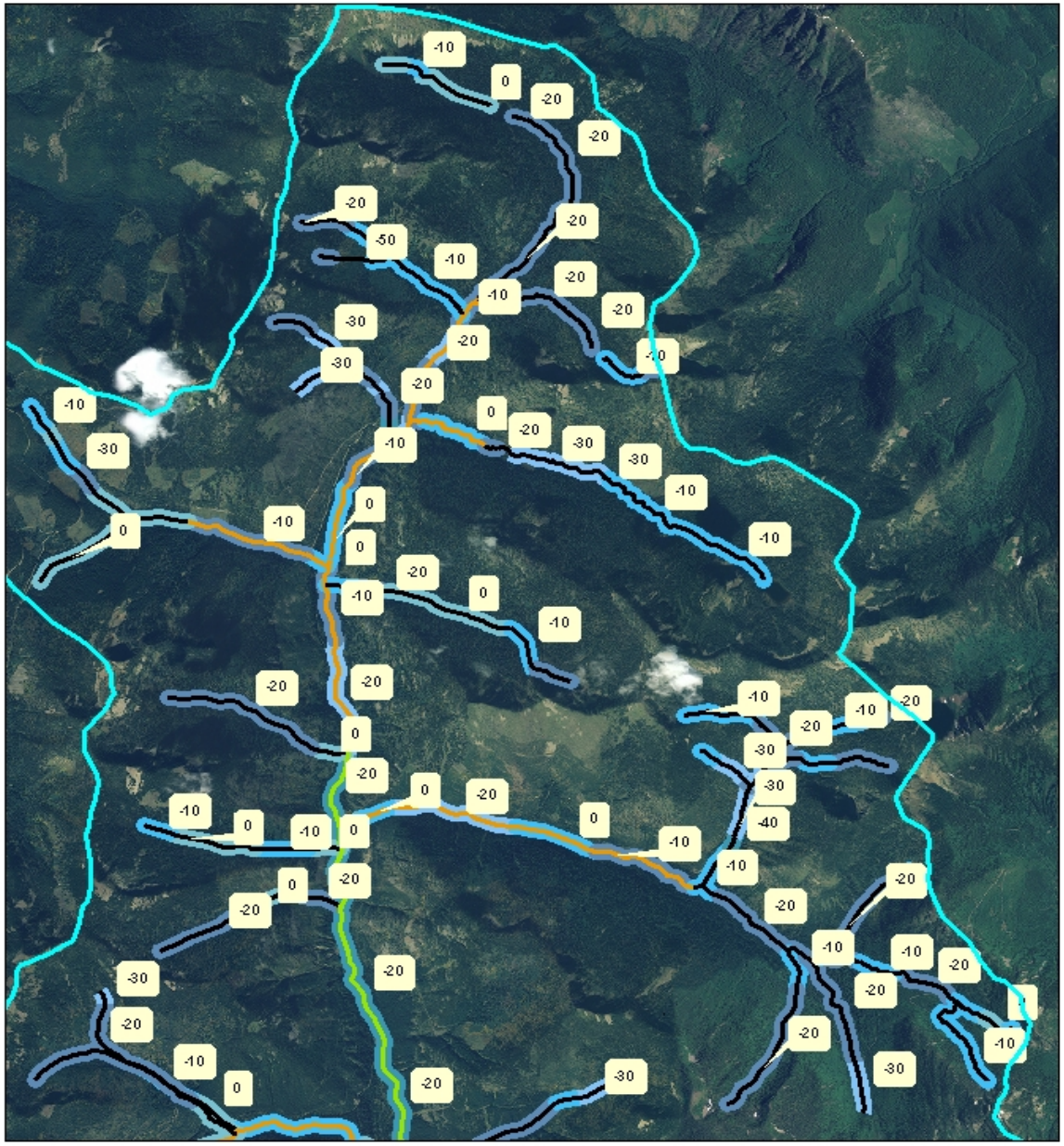
Stream Name	Existing Segment Area (m^2)	Existing Summer Load (kWh/day)	Natural Segment Area (m^2)	Potential Summer Load (kWh/day)	Potential Load minus Existing Load (kWh/day)	% Reduction Required
Lightning Creek	1,748,955	7,449,730	932,534	1,833,168	-5,616,562	-75
Lightning Creek Tribs						
Gordon Creek	9,555	13,857	9,555	5,255	-8,602	-62
Gem Creek	5,575	8,896	5,575	3,066	-5,830	-66
Lunch Creek	4,752	9,772	4,752	2,614	-7,158	-73
Moose Creek	13,985	23,416	13,985	10,687	-12,730	-54
Quartz Creek	17,888	19,810	17,888	14,458	-5,352	-27
Deer Creek	9,440	8,982	9,440	5,192	-3,790	-42
Fall/Sheep/Bear Creeks	21,775	25,946	21,775	11,976	-13,970	-54
Rattle Creek	94,005	150,706	75,300	58,473	-92,232	-61
Wellington Creek	66,800	69,515	62,130	51,986	-17,529	-25
Mud to Trapper Creek	33,759	49,217	33,759	18,567	-30,649	-62
Porcupine Creek	57,310	62,942	45,650	40,799	-22,143	-35
East Fork Creek	178,155	325,702	125,765	163,463	-162,239	-50
Unnamed between EF and Morris	16,080	28,996	16,080	8,844	-20,152	-69
Morris Creek	35,885	49,187	26,850	24,558	-24,629	-50
Regal Creek	11,455	10,483	11,455	6,300	-4,183	-40
Cascade Creek	39,543	56,322	39,543	27,884	-28,438	-50
Spring Creek	79,030	102,688	79,030	72,053	-30,635	-30

LCF Trib Loading Table Summary

Stream Name	Existing Segment Area (m^2)	Existing Summer Load (kWh/day)	Natural Segment Area (m^2)	Potential Summer Load (kWh/day)	Potential Load minus Existing Load (kWh/day)	% Reduction Required
LCF Tribs						
Mosquito Creek	60,025	100,771	60,025	61,223	-39,548	-39
Johnson Creek	30,135	50,130	30,135	20,501	-29,629	-59
Derr Creek	135,935	615,469	135,935	441,053	-174,416	-28
Twin Creek	124,720	243,227	124,720	148,291	-94,936	-39
Dry Creek	63,285	80,226	63,285	57,497	-22,729	-28
Gold Creek (includes MT portion)	50,360	109,843	50,360	49,187	-60,657	-55
WF Blue Creek	49,140	71,973	49,140	58,773	-13,200	-18
Unnamed new MT border	19,235	39,265	19,235	22,580	-16,684	-42

Tribs in italics are thought to be intermittent in Idaho. DEQ evaluating appropriateness of shade targets.

Upper Lightning Creek and Rattle Creek Area



Lower Clark Fork Subbasin

Target Shade Cover

- 20
- 60
- 70
- 80
- 90

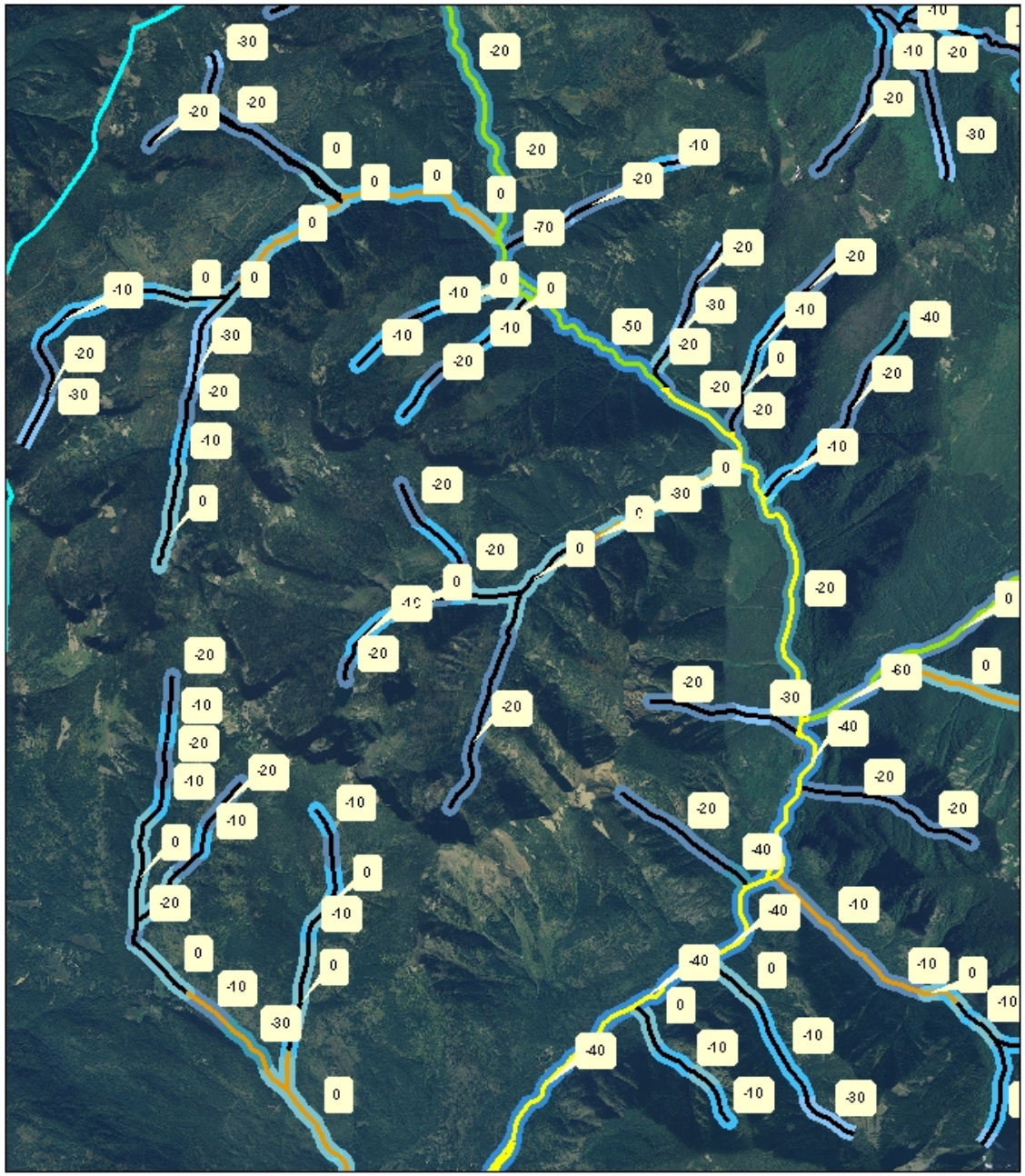
Existing Shade Cover

- 0
- 10
- 20
- 30
- 50
- 60
- 70
- 80
- 90

N
W E
S

0 550 1,100 2,200 3,300 4,400
Meters

Wellington to Porcupine Creek Area



Lower Clark Fork Subbasin

Target Shade Cover

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- 60
- 70
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- 90

Existing Shade Cover

- 0
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- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90

N
W E
S

0 550 1,100 2,200 3,300 4,400
Meters

Spring, Cascade and Mosquito Creek Area

Lower Clark Fork Subbasin

Target Shade Cover Class

- 25
- 65
- 75
- 85
- 95

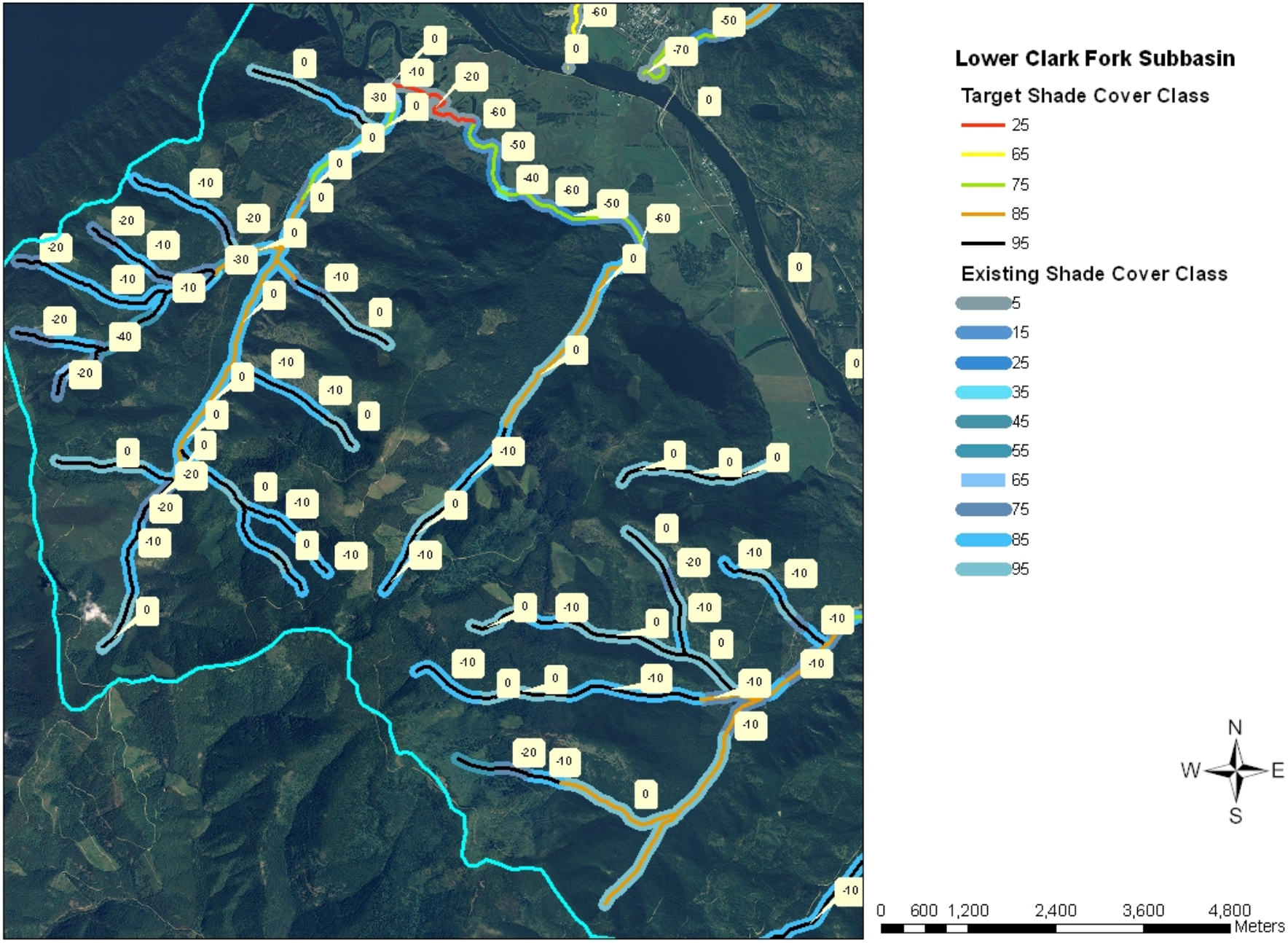
Existing Shade Cover Class

- 5
- 15
- 25
- 35
- 45
- 55
- 65
- 75
- 85
- 95

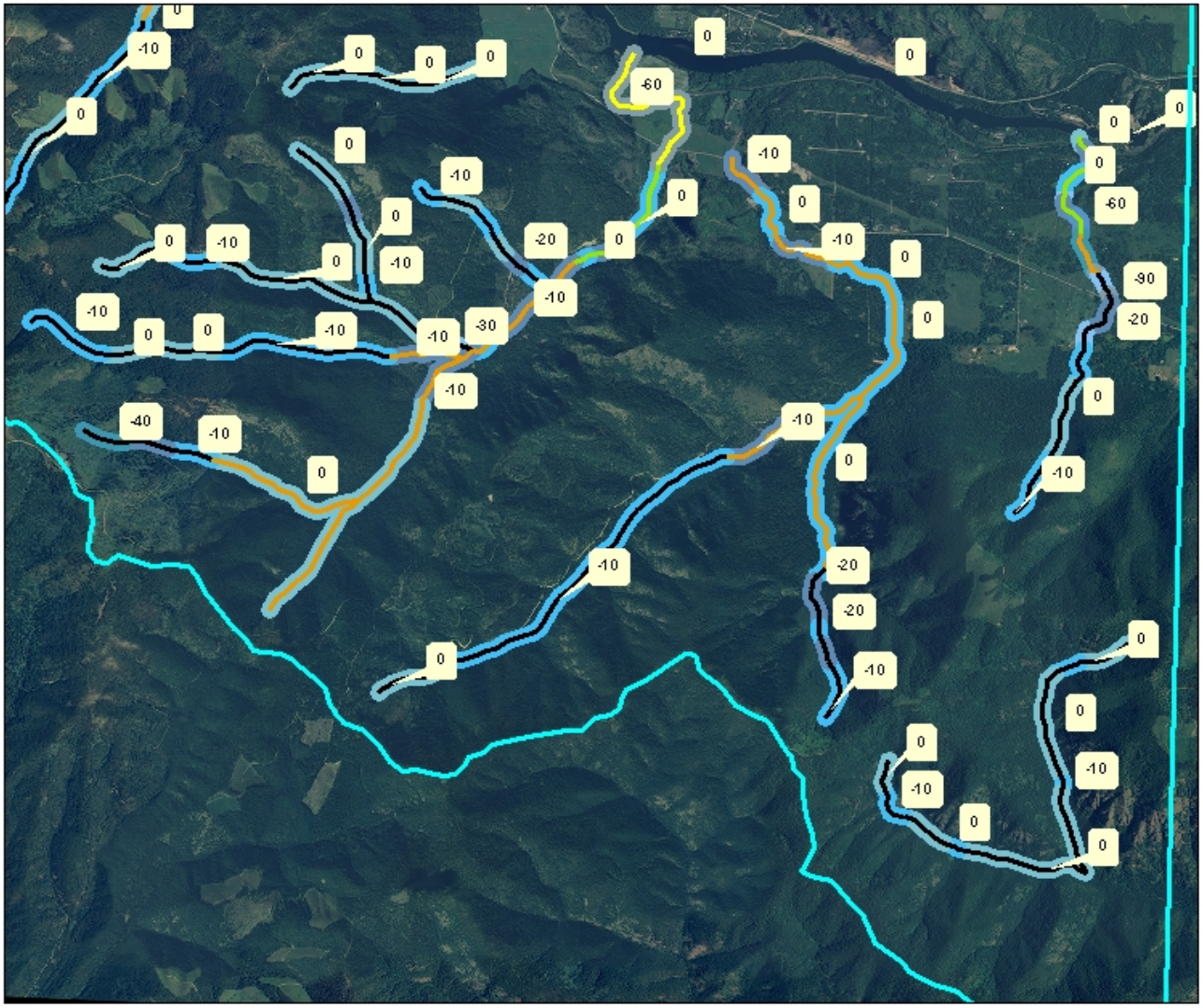
N
W E
S

0 600 1,200 2,400 3,600 4,800
Meters

Johnson/Derr Creek Area



Twin/Dry Area



Lower Clark Fork Subbasin

Target Shade Cover Class

- 25
- 65
- 75
- 85
- 95

Existing Shade Cover Class

- 5
- 15
- 25
- 35
- 45
- 55
- 65
- 75
- 85
- 95

0 700 1,400 2,800 4,200 5,600 Meters

N W E S

Temp TMDL Comments – Explain Vegetation Types

- 1) South Fork Clearwater River (IDEQ, 2004) VRU 8 (stream breaklands, cedar and grand fir),
- 2) South Fork Clearwater River (IDEQ, 2004) VRU 10 (uplands, alder, grand fir, and subalpine fir),
- 3) Mattole River (CRWQCB, 2002) redwood forest,
- 4) Willamette Basin (ODEQ, 2004a) Qalc (80% forest, ht.=88.2ft., density=71%).

New Vegetation Target Classes

Cover class	Typical vegetation type on 5m wide stream
5 = 0 – 9% cover	agricultural land, denuded areas
15 = 10 –19%	ag land, meadows, open areas, clearcuts
25 = 20 – 29%	ag land, meadows, open areas, clearcuts
35 = 30 – 39%	ag land, meadows, open areas, clearcuts
45 = 40 – 49%	shrublands/meadows
55 = 50 – 59%	shrublands/meadows, open forests
65 = 60 – 69%	shrublands/meadows, open forests
75 = 70 – 79%	forested and headwaters areas
85 = 80 – 89%	forested and headwaters areas
95 = 90 –100%	forested and headwaters areas

Total Dissolved Gas

- Water Quality Standard is TDG levels should not exceed 110%
- Current TDG levels can exceed 120% at the border and 140% below Cabinet Gorge Dam
- There are current efforts to achieve no net increase in TDG below Cabinet Gorge dam by 2010

TDG TMDL

- The load allocations are determined by the following equation:
- LC = LA (@Idaho/Montana border) + LA (Below Cabinet Gorge Dam) + MOS
- LC = 110% saturation
- LA Idaho/Montana border = 108% at Idaho/Montana Border (aggregate of non-point sources of TDG and background)
- LA Below Cabinet Gorge Dam = 0% (no net increase of TDG)
- MOS = 2%

Metals TMDL Status Report

- Draft TMDLs developed for Cadmium, Copper and Zinc
- Adding additional explanation of DEQ listing process and TMDL data requirements
- Inserting data tables of raw data considered in TMDL
- Load allocations discussed relative to flows.
- Target: Waters must meet Idaho water quality standards at the Idaho/Montana border

Proposed Review Process

- Mid-June: WAG provided complete SBA and TMDL for final approval/review (including metals TMDL revisions)
- End-June: WAG meeting to discuss “final” draft version. Request for WAG approval to release TMDL for public comment
- July: Editorial review and WAG changes incorporated and released for 45-day public comment, public meeting(s)
- August: Public comment review
- September: WAG meeting to present final document and to discuss draft implementation priorities

Temp TMDL (cont)

Effective Shade Curves	Stream Width (m)													
	2	4	5	8	10	12	14	18	19	21	24	28	40	54
VRU 8	95	92	89	85	81	75	72	65	63	58	56	49	40	31
VRU 10	90	89	80	73	68	62	54	45	46	42	39	35	36	20
Mattole River	92	92	92	91	90	89	87	84	83	82	78	75	64	52
Willamette Basin	94	88	86	81	77	73	64	55	54	52	49	44	38	30
Target Class (%)	**95**	**95**	**85**	**85**	**85**	**75**	**75**	**65**	**65**	**55**	**55**	**55**	**45**	**35**

- Comment: Use vegetation types from Mattole River and VRU 8 only to reflect forested types in the Lower Clark Fork River to be more conservative in estimates, given that historically, there were old growth cedars
- DEQ believes that the combination of all four vegetation types as reflected in the TMDL most accurately estimates targets for the Lower Clark Fork forested drainages