Lower Clark Fork Watershed Advisory Group

April 6, 2006

Sediment Model

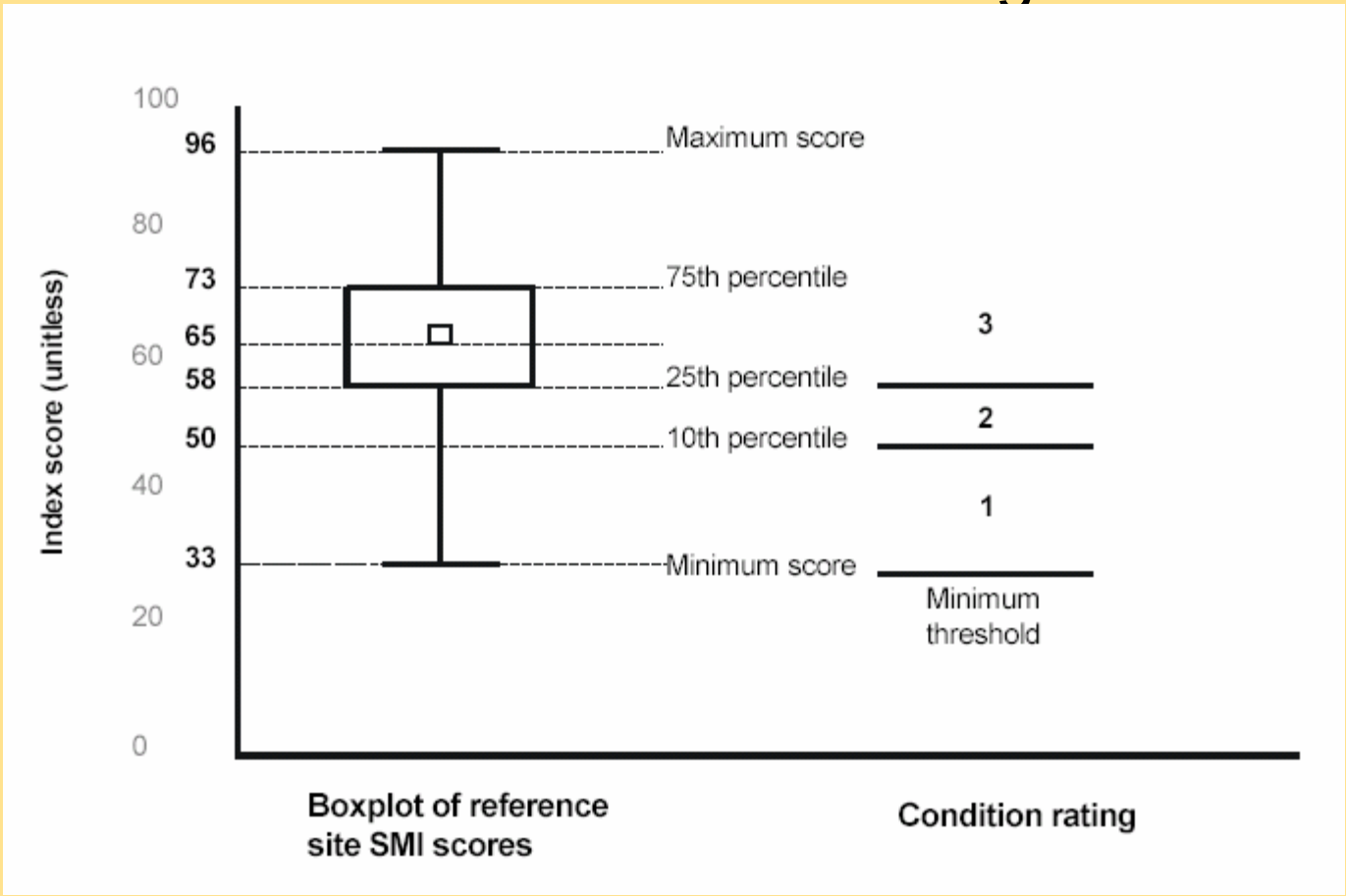
- GIS based estimates of sediment delivery to stream based on land use activity and natural processes (landslides, fire)
- Goals:
  - Determine relative background level of sediment delivery
  - Determine % above background target sediment delivery that still supports beneficial uses based on reference conditions

Estimating Sediment Delivery to Streams

- Background
  - Forested landscape sediment production
  - Fire
  - Mass wasting delivery to streams not associated with a clearcut or road*
- Anthropogenic
  - Harvested areas
  - Mass wasting delivery to streams associated with clearcuts or roads*
  - Roads

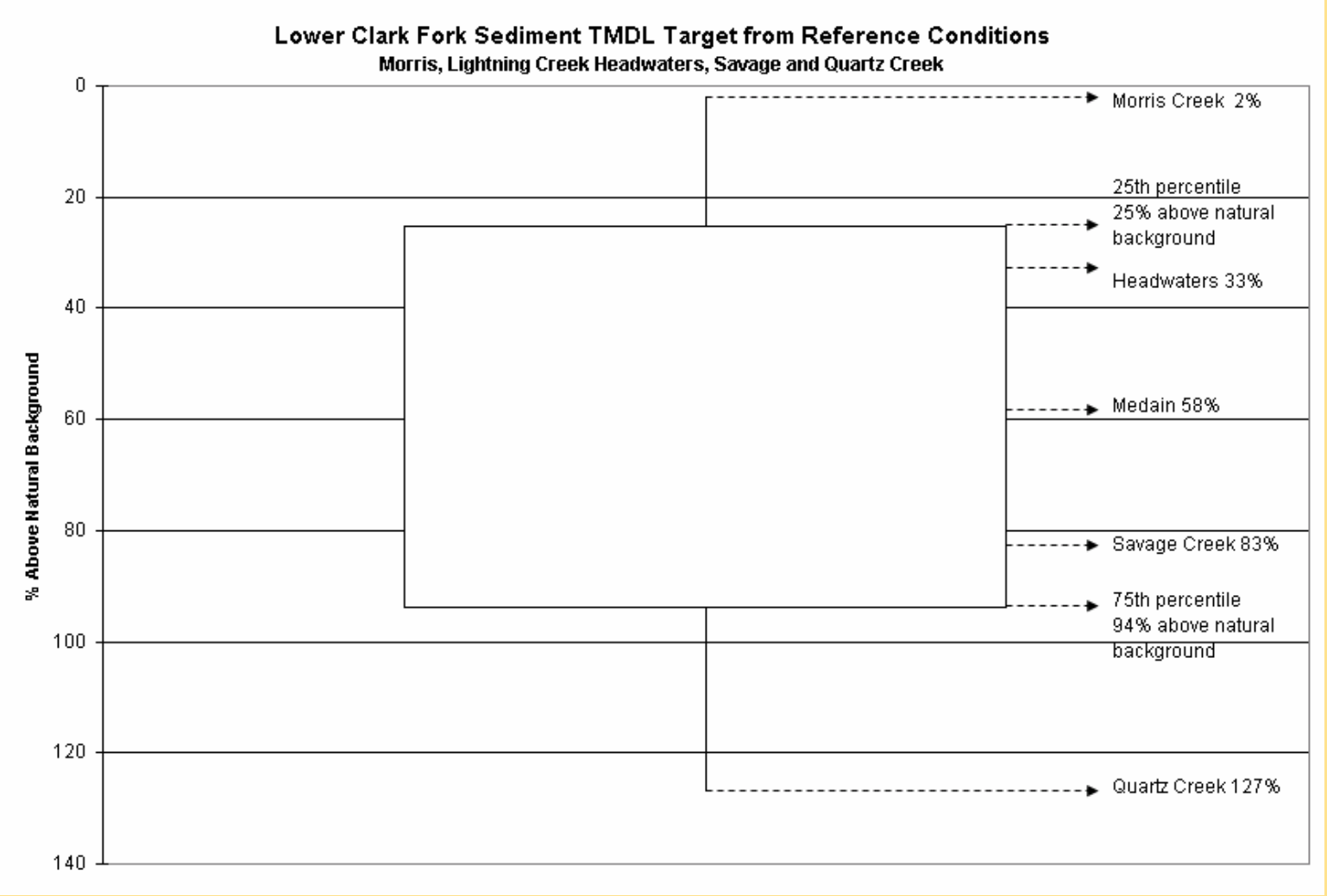
*Source Cacek, 1989 and IDL CWE Reports

Developing the Target: Example of Multimetric Scoring Method for SMI in the Central and Southern Mountains Region

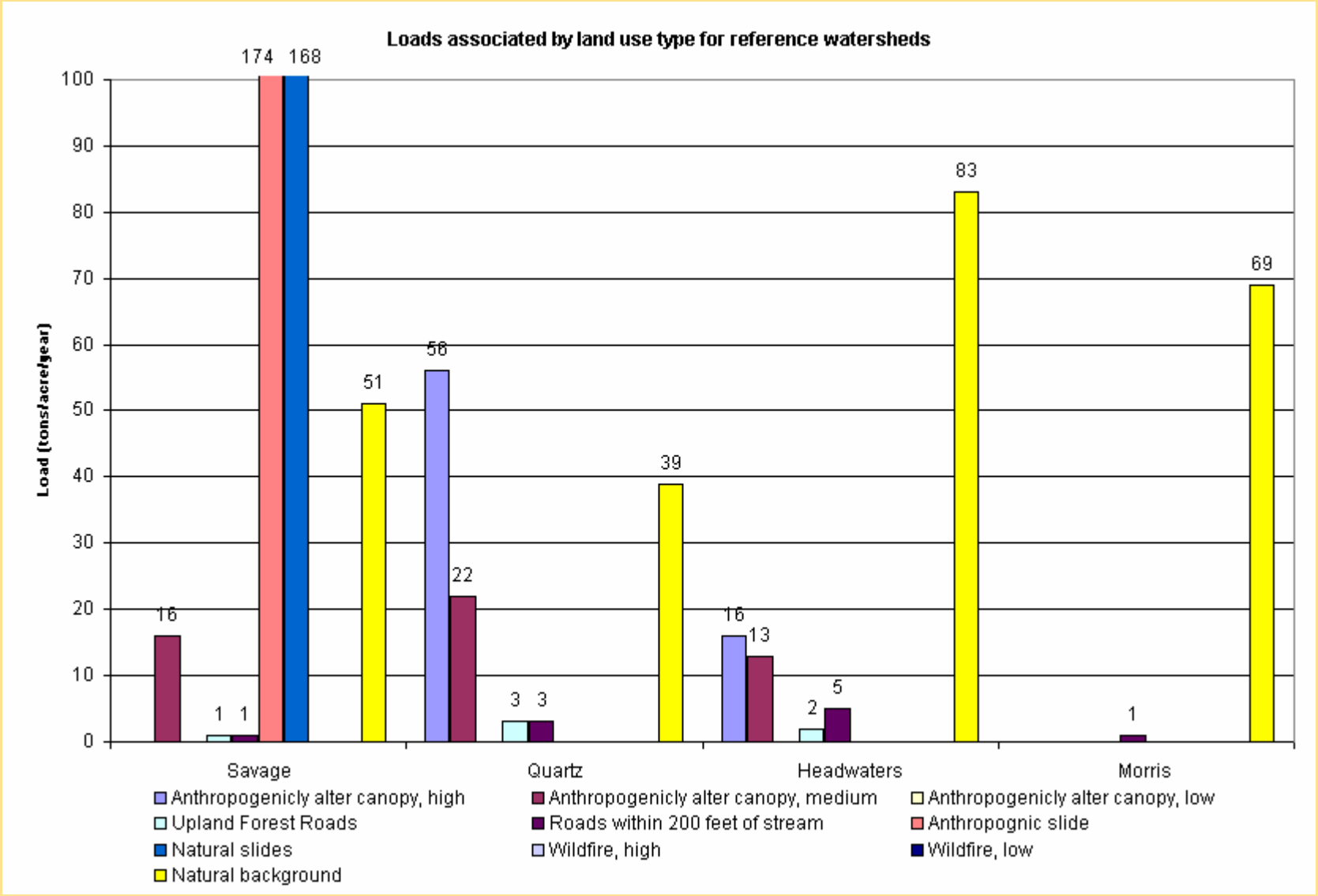


From DEQ Water Body Assessment Guidance Second Edition, January 2002

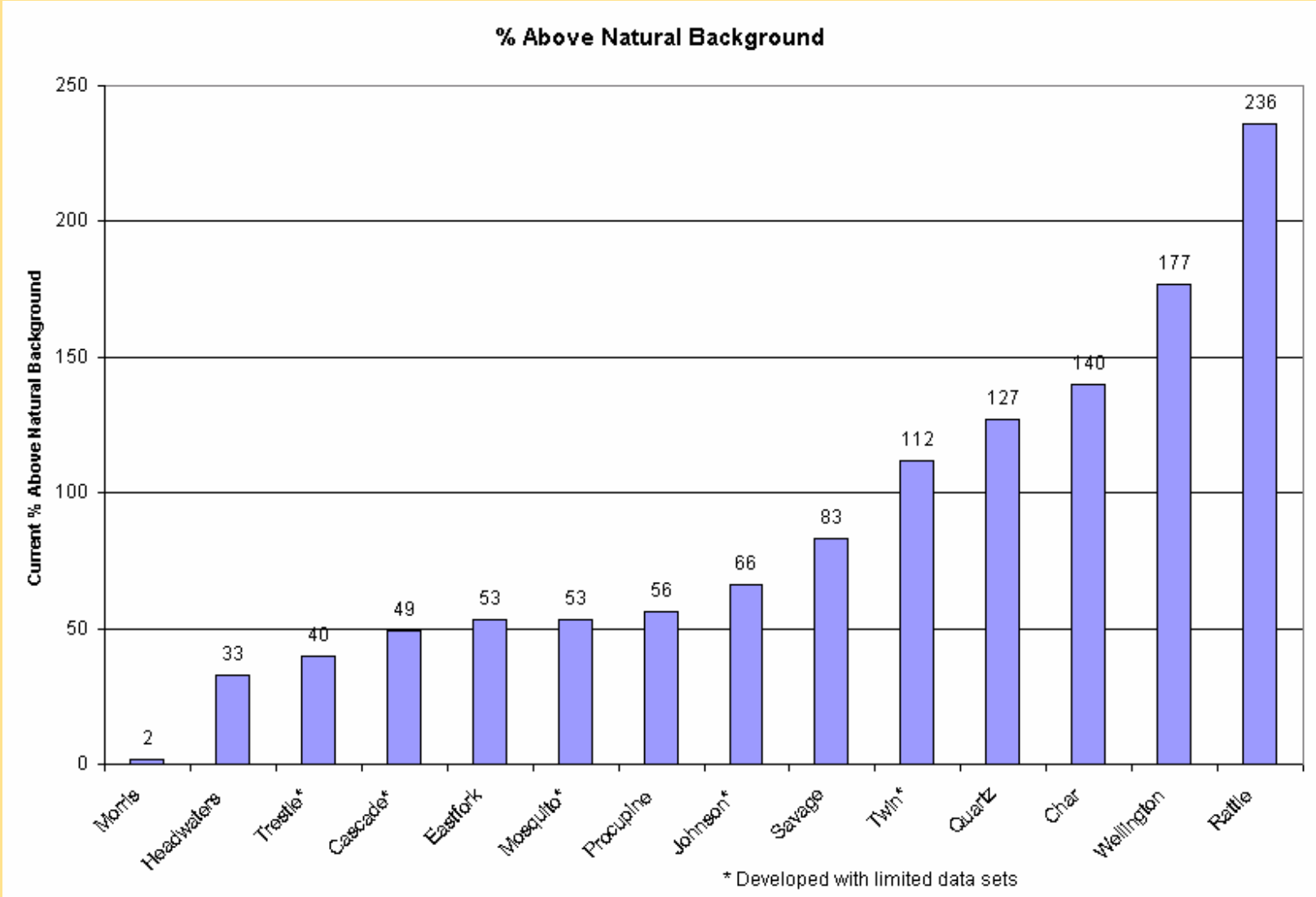
Selecting a Sediment Target



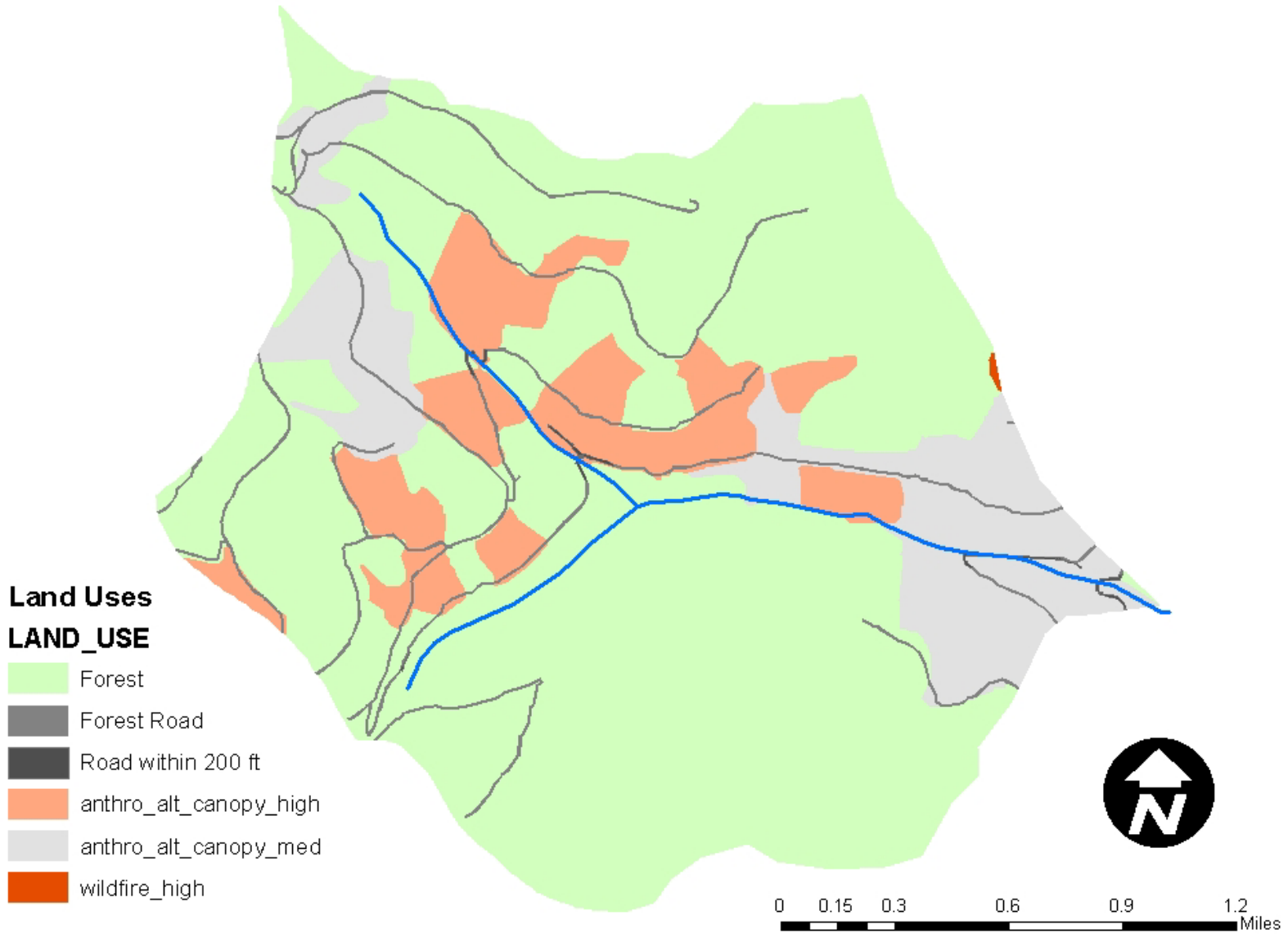
Sediment sources of Reference Watersheds

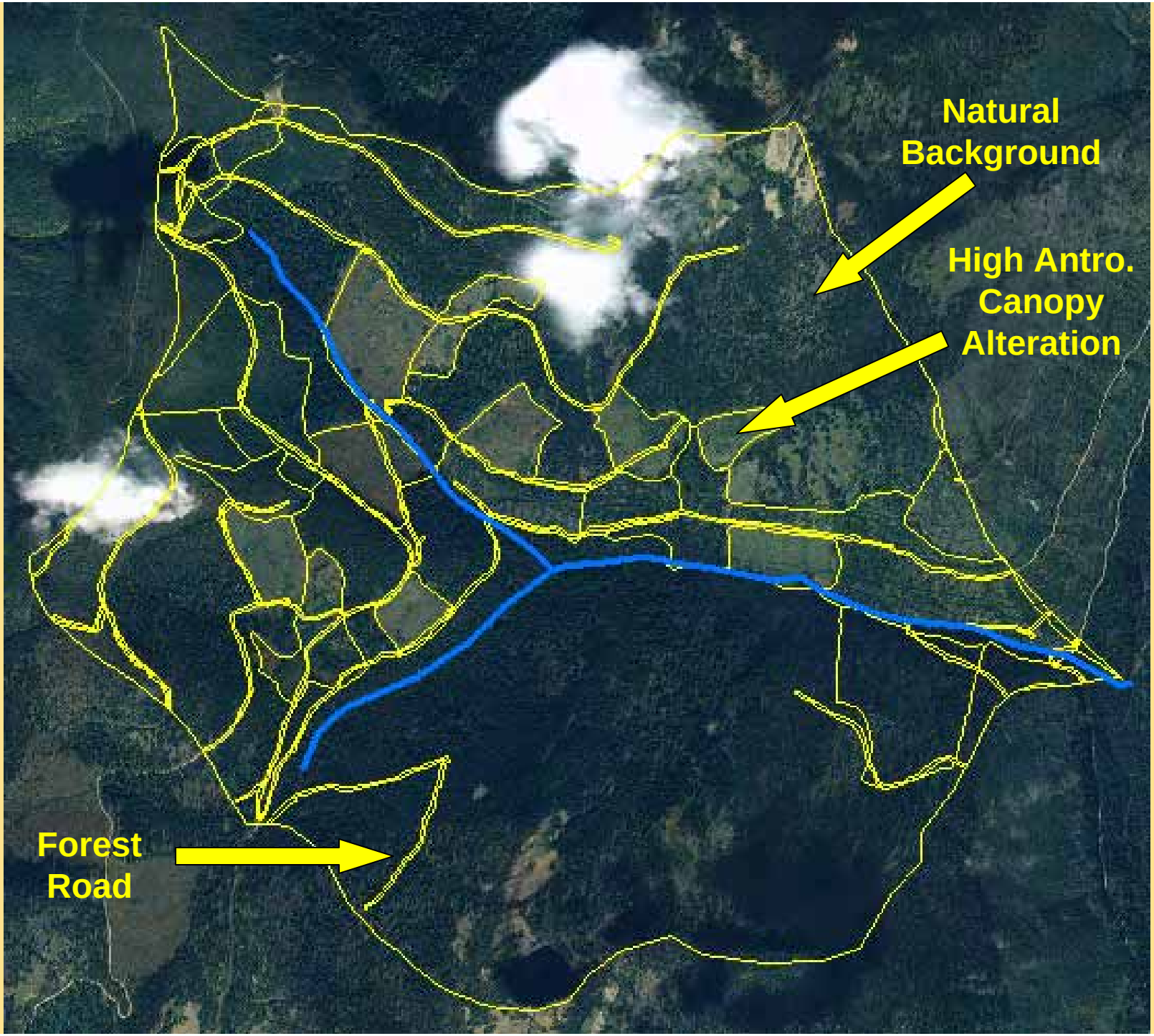


Currently Modeled Sediment Conditions for streams in the Lower Clark Fork Subbasin



Modeled Land types in the Quartz Creek watershed




Natural
Background
High Antro.
Canopy
Alteration
Forest
Road

Sediment Coefficients used to Determine Sediment Loads

Land use	Coefficient (tons/acre/year)	Reference
Anthropogenic canopy alteration high	0.21	Within ranges recorded for harvest activities.
Anthropogenic canopy alteration medium	0.07	Within ranges recorded for harvest activities.
Anthropogenic canopy alteration low	0.025	Within ranges recorded for harvest activities.
Anthropogenic slide	Volumes reported in cubic meters. Volume multiplied by 2.72 to convert to tons. Applied regression analysis to determine sediment contribution.	Stream delivery volume obtained from IDL CWE reports
Natural slide	Volumes reported in cubic meters. Volume multiplied by 2.72 to convert to tons. Applied regression analysis to determine sediment contribution.	Stream delivery volume obtained from IDL CWE reports
Forest Roads	McGreer equation used to determine sediment export from forest roads based on CWE scores, given 10% delivery.	Road scores obtained from CWE reports.
Forest Roads within 200 feet of stream	McGreer equation used to determine sediment export from forest roads based on CWE scores, given 100% delivery.	Road scores obtained from CWE reports.
Wild fire high (2000-1990)	0.10	Values derived from WAG input and from best professional judgment.
Wild fire low (1979-1970)	0.025	Values derived from WAG input and from best professional judgment.
Natural background (Forest)	0.023	Developed based on geology of the watershed and used in previously approved TMDL in northern Idaho.

Temperature TMDL Comments

- On segments where estimate of existing shade exceeds the target, adjust target to be existing shade (EPA)
- New figures that show existing and target shade on one figure, at the subwatershed level, will be incorporated into the document
- Temperature TMDLs were developed for some streams that are not currently listed as impaired
  - In the Lightning Creek drainage, everything is listed either individually, or as a portion of Lightning Creek AUs
  - Spring Creek and Mosquito Creek are currently not listed, but since the PNV models shows load reductions are needed, the TMDL will be considered “advisory” and still be included in the document

Temp TMDL (cont)

- References to pollutant trading in the introduction were removed. DEQ does not believe it is an appropriate strategy for temperature TMDLs under the PNV model
- More discussion of the idea that achieving reductions in solar load through increased shade in combination with activities that help restore a more stable hydrology (sediment reduction) will both be necessary – added discussion of sediment-temperature pollution interaction in TMDL
- In PNV discussion add mention of maintaining groundwater recharge (compared to surface runoff and impervious surface impacts) – will add this discussion.

Temp TMDL (cont)

- Natural Stream width estimates
  - There are now IDL regional specific shade curves available
  - Estimates used in the TMDL generate slightly narrower stream widths than IDL regional curves
    - E.g. Morris Creek
      - TMDL estimate: 23 feet
      - IDL curve estimate: 16 feet
      - Result: about 8% lower reduction necessary than with TMDL estimate
    - DEQ recommends leaving TMDL estimates because it is within 5-10%, which is within margin of error, but we can re-calculate if WAG wants
    - WAG decision – re-calculate based on IDL curves or use current TMDL estimate?
- Figures 1 and 2 will be updated to show curve used in TMDL, and more detail on Trestle Creek method will be added, if that is chosen

Temp TMDL (cont)

- Cover Class targets are referred to as the lower end of the range, versus the high end, or mid-range. While the target in a “90” cover class IS 90-100% shade necessary, does referring to the class as “90” imply that only 90% shade is necessary?
  - Discussion Question for WAG: Should we re-name to the cover classes to more accurately reflect the values in the class?

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

Pathfinder data example, Cover Classes

aerial class	pathfinder actual	pathfinder class	Delta	
70	67.9	60	10	
90	90.9	90	0	
80	56.9	50	30	
40	54.1	50	-10	
90	91.9	90	0	
80	86.9	80	0	
70	90.8	90	-20	
80	87.6	80	0	
0	7.1	0	0	
10	25.7	20	-10	
90	78.5	70	20	
10	50.3	50	-40	
90	73.3	70	20	
70	71.3	70	0	
60	68.4	60	0	
62	67	62	0	average

Temp TMDL (cont)

- 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%).

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 (%)	**90**	**90**	**80**	**80**	**80**	**70**	**70**	**60**	**60**	**50**	**50**	**50**	**40**	**30**

- 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

Metals TMDL Comments

- Different method of 7Q10 Max calculation provided by Avista, DEQ will evaluate most appropriate method and report back to WAG
- Data tables with number of samples and exceedences will be prepared
- Lead TMDL: While dates for TMDL data are 1990s-2003, data from 2004 and 2005 below Cabinet Gorge were examined. No exceedences were found. It is recommended that no Lead TMDL be completed.