5 HUC/Unit Classification

5.1 Aquatic Systems

5.1.1 Methods

To help us classify 6th field HUCs within the subbasin according to the degree to which each area has been modified and its potential for restoration, we used a spreadsheet tool called Qualitative Habitat Assessment (QHA). Dr. Chip McConnaha of Mobrand Biometrics and Drew Parkin, a private consultant contracted at the time with the Northwest Power and Conservation Council, designed and built QHA specifically in response to requests from the Kootenai and Flathead Subbasin Coordinators. Developed principally for resident salmonids in stream environments, QHA provides a means of capturing, in a systematic and consistent way, aquatic-habitat information. It is a mechanism for objectively and transparently combining opinions from multiple scientists (in our case twenty biologists and hydrologists). Dr. Paul Anders and Dr. McConnaha, also constructed a lacustrine or lake version of QHA, called LQHA. It works like the stream version, but uses habitat attributes appropriate to lentic environments. We used LQHA to assess selected lakes (table 5.1) within the subbasin (lakes that the Technical Team could foresee doing BPA-related management actions on in the future). Both tools use a hypothesis developed by our Technical Team to characterize the relationship between a fish population and its habitat. Both provide an indication of the relative restoration and protection value for each HUC-6 or lake with respect to a focal species. Both also yield a ranking of the condition of habitat attributes for each focal species. QHA also allows users to document the decision process and describe the level of confidence users have in their various ratings.

LINKS

For a more detailed description of QHA and how it works, go to Appendix 85.

Click Here

QHA habitat attribute scores are in Appendices 32 and 33.

Click Here

Appendix 7 is an electronic map of the HUCs used in QHA.

Click Here

Table 5.1. Lakes assessed in the Kootenai Subbasin using the Lacustrine QHA (LQHA) spreadsheet tool.

Lake	Location
Kootenay Lake	Canada
Moyie Lakes	Canada
Duncan Lake	Canada
Trout Lake	Canada
Koocanusa Reservoir	U.S./Canada
Kilbrennan	U.S.
Loon Lake	U.S.
Bull Lake	U.S.
Sophie Lake	U.S.
Boulder Lake	U.S.
Granite Lake	U.S.
Leigh Lake	U.S.
Therriault Lake	U.S.
McArthur Lake	U.S.

Several biological and management-oriented modifiers were subsequently added to QHA to further inform the habitat-based rankings. These include: genetic purity, presence of nonnative species, and fish pathogens.

QHA, with its modifiers, relies on a combination of data and the expert knowledge and judgement of people intimately familiar with the streams being rated. QHA does not result in a detailed assessment of any waterbody. Rather it is a tool for capturing data and professional knowledge about streams and organizing that information in such a way as to show *how watersheds and habitat attributes within a subbasin compare to each other*.

While QHA relies on a similar conceptual framework as the Ecosystem Diagnosis and Treatment (EDT) model, there are significant differences. Most significantly, EDT is a model that produces a series of numerical products to estimate productivity, abundance, and related factors that predict how well habitat supports fish. EDT is intended to result in a detailed assessment of a stream or group of watersheds—how many fish they can support and what specific habitat factors are limiting the population. QHA, on the other hand, simply provides the user with *a relative ranking of the streams and habitat attributes in a subbasin* based on the characteristics being evaluated—for example, the aquatic habitat for resident salmonids in Camp Creek is substantially more degraded than that of Bear Creek or riparian condition is more limiting for a given focal species than temperature.

At the end of May, 2003, technical team members from the Kootenai Subbasin held a four-day meeting in Whitefish, Montana to conduct our HUC6-by-HUC6 aquatic assessment using QHA. Fisheries biologists, hydrologists, data managers and GIS professionals from Kootenai Tribe of Idaho, Montana Fish, Wildlife & Parks, Idaho Fish and Game, US Army Corps of Engineers, US Fish and Wildlife Service, the Kootenai National Forest, the Idaho Panhandle National Forests, Idaho Department of Environmental Quality, the B.C. Ministry of Sustainable Resource Management, the B.C. Ministry of Water, Land, and Air Protection, and a private consulting firm evaluated habitat parameters (tables 4.12 and 4.13) on all the sixth code HUCs in the Kootenai Subbasin, including those within the Canadian portion[1]. Later, other non-habitat modifiers—genetic purity, presence of nonnatives, pathogens—and additional factors such as ESA status, physiographic vulnerability, landownership, and cultural values—were considered, and streams at the HUC-6 scale and selected lakes were then grouped into classification schemes adapted from *Upstream* (National Research Council

[1] *In the U.S. portion of the subbasin, some valley HUCs were lumped. In the Canadian portions of the subbasin, time limitations prevented the use of 6th-code HUCs. Instead, the Canadian members of the team used analogous watershed units developed during a previous watershed restoration planning exercise in B.C.*

Table 5.2 Protection/restoration aquatic classification system used to classify streams in the Kootenai Subbasin (adapted from the system presented Upstream by the National Research Council (1996)).

Stream Aquatic Classification
Class 1 Waters **Most intact stream habitats; high protection value** Bear the closest resemblance to waters unaltered by modern human activities, contain a complete set of native biota, and have a high degree of natural protection. **Management Goal:** Keep as pristine as possible, recognizing that some biotic change is inevitable or necessary. Conduct restoration as necessary to perpetuate values.
Class 2 Waters **Low to moderate degree of degradation; high to moderate protection value** Low to moderate degree of modification by human activity. Contain mainly native organisms and have reasonable potential to be restored to Class 1. **Management Goal:** Restore degraded areas, maintain natural diversity, and prevent further degradation.
Class 2.5 Waters **High restoration priority driven by ESA needs or the needs of species of concern** Habitat heavily modified by human activity; may contain many nonnative species and may require significant investment of time and money to be restored, but are restoration priorities because of their value to ESA-listed species. **Management Goal** Manage for protection of listed species, prevent further degradation and restore degraded habitat to extent possible.
Class 3 Waters **Moderate to high degree of degradation; low protection value** Appear natural, but their biotic communities have been significantly and possibly irreversibly altered. Difficult to restore to Class 1 given current technology, but can be refuges for native species or migration corridors for adfluvial species. Vulnerable to change and current condition cannot be relied upon for long-term preservation of species. **Management Goal:** Prevent further degradation. Restore areas as opportunities arise. Maintain supplemental populations and gene pools, sources of organisms to stock restored waters, and wild areas that can sustain fairly heavy public use.
Class 3.5 Waters **High degree of degradation; low protection value** Highly altered waters that do not appear natural, and their biotic communities have been irreversibly altered. Very unlikely ever to be restored to Class 1 given current technology, but can be refuges for native species or migration corridors for adfluvial species. Cannot be relied upon for long-term preservation of species. **Management Goal:** Maintain value as migration corridor and, to extent possible, utilize for recreational fishery to relieve pressure on native populations. Prevent further degradation. Consider restoration projects only if cost effective and benefits can be clearly demonstrated.

Table 5.3. Protection/restoration aquatic classification system used to classify lakes in the Kootenai Subbasin (adapted Upstream by the National Research Council (1996)).

Lake Aquatic Classification
Class 1 Waters **Most intact lake habitats; high protection value** Lake habitat and native species complex (biota) both nearly unaltered and both with a high degree of protection. Large enough system with well-connected stream habitat to maintain viable native species population stronghold for the foreseeable future. **Management Goal:** Keep pristine, avoid invasion of nonnative species as highest priority. Conduct restoration as necessary to perpetuate values.
Class 2 Waters **Low to moderate degree of degradation; high to moderate protection value** Lake habitat relatively intact but may have some limited impacts due to human development. Mostly native biota, or with sufficient habitat quality in lake and interconnected stream system for restoration to Class 1 status if nonnative species issues can be mitigated. **Management Goal:** Restore degraded areas, maintain native biota (genetic reserve) at sufficient level to avoid further degradation and allow future recovery.
Class 2.5 Waters **High restoration priority driven by ESA needs or the needs of species of concern** Habitat may be heavily altered or native salmonid complexes may be extensively compromised by non-native and may require considerable investment to maintain or improve on the status quo. These systems are a high priority for long-term maintenance or restoration due to the size, scope, or position of the watershed and its interconnected stream system and because of their overall importance to ESA-listed species or species of concern. **Management Goal:** Protect viable native gene pool and prevent further erosion and degradation of either aquatic habitat or native species complexes. Restore degraded habitat to extent possible.
Class 3 Waters **Moderate to high degree of degradation; low protection value** May appear natural, but interconnected spawning and rearing habitat and/or the aquatic communities in these lakes have been significantly and potentially irreversibly altered. Difficult to restore to Class 1 given current technology. Current condition cannot be relied upon for long-term preservation of native species. **Management Goal:** Potential to be useful in the future as supplemental habitat for native populations or gene pools if restored, though highest current value is likely for supporting public use. Preclude any fish stocking or other uses that will directly impact native species in interconnected offsite waters. Prevent further habitat degradation. Restore areas as opportunities arise.
Class 3.5 Waters **Low restoration potential, low protection value.** Highly altered habitat and/or restricted interconnected spawning and rearing habitat. Dominant nonnative species component. Very problematic for support of native species beyond potential function as a migratory corridor (in some cases). **Management Goal:** Maintain as a recreational fishery while protecting any values that support limited use by native species. Preclude any fish stocking or other uses that will directly impact native species in interconnected offsite waters. Consider restoration projects only if cost effective and benefits can be clearly demonstrated.

1996) (tables 5.2 and 5.3). The technical team then reviewed the resulting classification using professional knowledge and judgment and comparing it to other recent assessments that utilized different methodologies. When appropriate, team members reclassified streams or lakes and documented the reasons. The two analytical methods, QHA (the expert system) and expert opinion gave us our final stream and lake classification.

An important advantage of QHA is that it allows for assessments at multiple scales as recommended by the Independent Scientific Advisory Board (ISAB) in their *Review of Strategies for Recovering Tributary Habitat* (2003). Specifically we are able to view habitat conditions, life history needs, and limiting factors at the HUC-6, HUC-4, and subbasin scales. These analyses appear throughout this assessment.

Classification Strategy

When viewing the restoration scores from QHA, it is important to keep in mind that the term restoration in the QHA spreadsheet tool actually means the extent to which a stream is degraded. The formula QHA uses is:

Restoration Score = Reference - Current x Lifestage Weight

So in QHA, the higher the restoration score, the more degraded the stream and the more important it is to the focal species. But in most cases, near-term restoration opportunities are not the most degraded streams. Restoration potential measured as biological gain per unit of investment, is not a linear function of the difference between the reference and current conditions. It is a dome-shaped function (figure 5.1), limited at the small-impact end by the fact that present, high quality habitat cannot be improved much, and limited at the high-impact

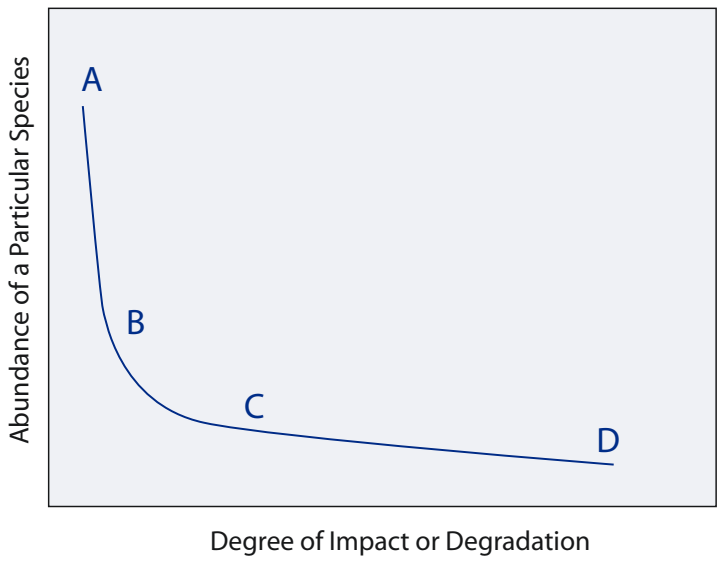

Figure 5.1. Relationship between degree of degradation and productivity.

end by intractable ecological complications and irreversible constraints (such as introduced species) that cap what can be regained through restoration action (Dr. Chris Frissell, pers. comm. 2003). In other words, going from D to B or A in figure 5.1, if it is possible at all, requires enormous capital investment and often very long periods of time. On the other hand, going from C to B or A is often quite possible and requires much less in the way of investments of capital and time.

Therefore, our Technical Team has generally made our near-term opportunities for restoration those waterbodies that have a moderate to high value for a given focal species and that have been only slightly to moderately degraded. These are primarily our Class 2 Waters (table 5.2 and 5.3). Within Class 2 waters, streams and lakes with ESA-listed species will have a higher priority for restoration than those without ESA-listed species. For those cases where a waterbody is severely degraded, but its restoration is considered key to an ESA-listed-species' recovery or the recovery of a species of concern, we have created a separate class, Class 2.5, which we also consider near-term restoration opportunities. Tables 5.2 and 5.3 describe these and the other classes. Figure 5.2 shows the desired path of reaches within each class with regard to restoration and protection.

5.1.2 HUC Classifications

LINKS

For a 6th-field HUC interactive hydrologic map of the Kootenai Subbasin go to Appendix 7.

Click Here

Tables 5.5 to 5.22 list the Kootenai Subbasin HUC-6s in each of the five restoration/protection classes by salmonid focal species. Tables 5.23 to 5.26 list the selected lakes in each of the classes for the salmonid focal species. Tables 5.27 and 5.28 list the mainstem river reaches and selected lakes in each of the classes for burbot and white sturgeon. It should be noted that the Technical Team views this classification or ranking as dynamic, and if conditions change for any given HUC-6 in the future (for example, if a major forest fire should occur that changes aquatic habitat conditions), that HUC may be re-scored and reclassified. Also, the Technical Team only scored the lakes in the subbasin that they could foresee doing BPA-related mitigation activities on in the future. As additional information becomes available or as circumstances change, other lakes may be added to the various classes.

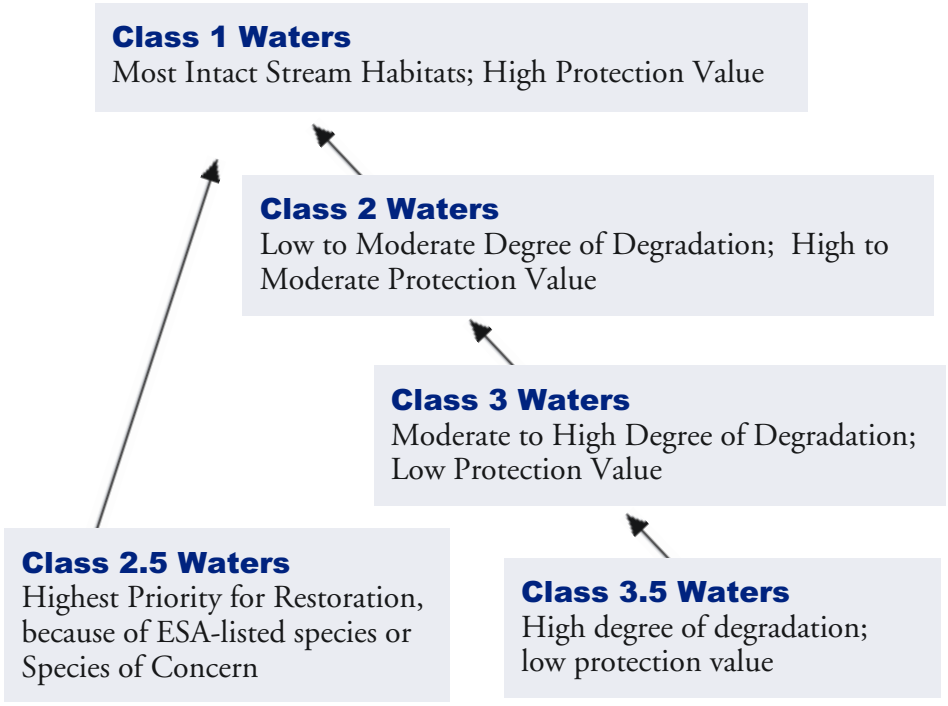

Figure 5.2. The desired path of reaches within each class with regard to restoration and protection. Class 3.5 waters have low protection value and a high degree of degradation, but with passive restoration and improved management, they may improve enough to become Class 3 waters.

Table 5.4. Class 1 waters for bull trout.

Class 1 Bull Trout Streams	
Upper Kootenai	
Kootenai River 1 / Koocanusa	Kootenai River 5
Kootenai River 2 / Koocanusa	Lake Koocanusa Valley
Kootenai River 3 / Koocanusa	Ross Creek
Kootenai River 4 / Koocanusa	
Lower Kootenai	
Long Canyon Creek	Trout Creek
Parker Creek	
Bull River	
Kikomun Creek	
Duncan Lake	
Cooper and Meadow Creeks	Lardeau Creek
East Creek	Mobbs and Tenderfoot Creeks
Glacier Creek	Poplar and Cascade Creeks
Hamill Creek	Rapid Creek
Healy Creek	Westfall River
Houston Creek	Wilkie Creek
Lake Creek	
Elk	
Brule Creek	Sparwood
Cummings Creek	Upper East Elk
Grave Greek	Upper West Elk
Lizard Creek	Wigwam River
Morrissey Creek	
Kootenay Lake	
Crawford and Gray Creeks	Kokanee and Redfish Creeks
Cultus and Next Creeks	Lasca and Five Mile Creeks
Fry Creek	Midge Creek
Grohman, Duhamel, Sitkum and Sproule Creeks	La France, Lockhart, Akokli and Sanca Creeks
Harrop Creek	Powder and Cambell Creek
Kaslo River	Summit and Corn Creeks
Kootenay River	
Elk Creek	Simpson River
Meadow Creek	Tokumm Creek
Ochre Creek	Upper Kootenay River
Slocan	
Bonanza Creek	Seaton and Carpenter Creeks
Hoder Creek	Wilson Creek
Koch Creek	
St. Mary	
Dewar Creek	Norbury Creek
Findlay Creek	Redding and Meachen Creeks

Table 5.5. Class 2 waters for bull trout.

Class 2 Bull Trout Streams	
Upper Kootenai	
Big Cherry Creek 1	Lake Creek 1
Big Creek	Lake Creek 2
Big Creek South Fork	Libby Creek 1
Big Creek South Fork East Branch	Libby Creek 2
Callahan Creek	North Callahan Creek
Fortine Creek 3	OBrien Creek
Granite Creek	Phillips Creek
Grave Creek 1	Pipe Creek
Grave Creek 2	Pipe Creek 1
Keeler Creek	Pipe Creek 2
Kootenai River 5 Valley	Quartz Creek
Kootenai River 6	South Callahan Creek
Kootenai River 7	Therriault Creek
Kootenai River 8	Wigwam River
Fisher	
Fisher River 1	Silver Butte Fisher River
Fisher River 2	West Fisher Creek
Fisher River 3	
Lower Kootenai	
Ball Creek	Grass Creek
Boulder Creek 2	Kootenai River 10
Boundary Creek	Kootenai River 9
Caribou Creek	Myrtle Creek
Cow Creek	Snow Creek
Fall Creek	
Moyie	
Deer Creek	Moyie Tributaries
Lower Moyie River Tributaries	Round Prairie
Moyie River Valley 1	Round Prairie Tributaries
Moyie River Valley 2	
Bull River	
Bull Below Dam	Phillipps Creek
Gold Creek	Sand Creek
Linklater Creek	
Elk	
Coal Creek	Michel Creek
Fording River	
Kootenay Lake	
Woodbury and Coffee Creeks	
Kootenay River	
Cochran Creek	
Slocan	
Silverton, Enterprise and Lemon Creeks	
St. Mary	
Hellroaring and Perry Creeks	Mather and Lost Dog Creeks
Joseph Creek	Matthew Creek
Lussier River	Wild Horse River

Table 5.6. Class 2.5 waters for bull trout.

Class 2.5 Bull Trout Streams	
Upper Kootenai	
Libby Creek 2 Valley	
Fisher	
Mainstem Fisher River Valley	
Lower Kootenai	
Blue Joe Creek	Kootenai River 10 Valley
Kootenai River 9 Valley	
Elk	
Wigwam River	
Kootenay Lake	
Moyie River	
Kootenay River	
Blackfoot, Thunder and East White	North White River
Middle Fork White River	
St. Mary	
Skookumchuck Creek	Upper St. Mary River

Table 5.7. Class 3 waters for bull trout.

Class 3 Bull Trout Streams	
Lower Kootenai	
Curley Creek	Twentymile Creek
Deep Creek 2	Deep Creek 3 Valley
Kootenay Lake	
Boundary Creek and Creston	Upper Moyie River and Lamb Creek

Table 5.8. Class 3.5 waters for bull trout.

Class 3.5 Bull Trout Streams	
Lower Kootenai	
Deep Creek 1	
Duncan Lake	
Lower Lardeau River	Upper Duncan River
Lower Trout	Upper Trout
Elk	
East Fernie	Hosmer East
East Fernie	Hosmer West
Grave Greek	West Fernie
Kootenay Lake	
West Moyie	
Kootenay River	
Daer Creek	Nine Mile Creek
Lower East White River	Nixon Creek
Lower West White River	West Upper Kootenay River
Mid Vermillion	
Slocan	
Slocan	Slocan River
St. Mary River	
East Canal Flats	Wasa
St. Mary River	West Canal Flats

Table 5.9. Class 1 waters for westslope cutthroat trout.

Class 1 Westslope Cutthroat Trout Streams	
Upper Kootenai	
Kootenai River 1 / Koocanusa	Kootenai River 4 / Koocanusa
Kootenai River 2 / Koocanusa	Kootenai River 5
Kootenai River 3 / Koocanusa	Ross Creek
Lower Kootenai	
Long Canyon Creek	Trout Creek
Parker Creek	
Moyie	
American Creek Headwaters	
Bull River	
Quinn Creek	Upper West Bull
Upper East Bull	
Elk	
Brule Creek	Lizard Creek
Cummings Creek	Mid East Elk
East Fernie	Upper East Elk
East Fernie	Upper West Elk
Grave Greek	West Fernie
Kootenay Lake	
Arrow/Duck	Moyie River
Kamma and Leadville Creeks	Sullivan Creek
Kianuka Creek	Sunrise and Sundown Creeks
Kid Creek	West Moyie
Kokanee and Redfish Creeks	Woodbury and Coffee Creeks
Lasca and Five Mile Creeks	
Kootenay River	
Daer Creek	North White River
Fenwick Creek	Ochre Creek
Lower West White River	Simpson River
Meadow Creek	Tokumm Creek
Mid Vermillion	Upper Kootenay River
Nixon Creek	Whiteswan
St. Mary	
Dewar Creek	St. Mary River
East Canal Flats	Upper St. Mary River
Skookumchuck Creek	West Canal Flats

Table 5.10. Class 2 waters for westslope cutthroat trout.

Class 2 Westslope Cutthroat Trout Streams	
Upper Kootenai	
Barron Creek	Kootenai River 8
Big Cherry Creek 1	Lake Creek 1
Big Creek	Lake Creek 2
Big Creek South Fork	Libby Creek 2
Big Creek South Fork East Branch	Libby Creek 2 Valley
Bobtail Creek	McGuire Creek
Boulder Creek	Meadow Creek
Bristow Creek	Middle Fork Parsnip Creek
Deep Creek	OBrien Creek
Dodge Creek	Paramenter Creek
Dunn Creek	Phillips Creek
Fivemile Creek	Pipe Creek
Flower Creek	Pipe Creek 1
Fortine Creek 1	Pipe Creek 2
Fortine Creek 2	Quartz Creek
Fortine Creek 3	Ruby Creek
Granite Creek	Sinclair Creek
Grave Creek 1	Star Creek
Grave Creek 2	Sullivan Creek
Indian Creek	Sutton Creek
Jackson Creek	Therriault Creek
Keeler Creek	Tobacco River
Kootenai River 5 Valley	Tobacco River Valley
Kootenai River 6	Wigwam River
Kootenai River 7	Young Creek
Fisher	
East Fisher Creek	McKillop Creek
Elk Creek	Silver Butte Fisher River
Fisher River 1	West Fisher Creek
Fisher River 2	Wolf Creek 1
Yaak	
Burnt Creek	Yaak River 3
Pete Creek	Yaak River 4
Seventeenmile Creek 1	Yaak River 5
Seventeenmile Creek 2	Yaak River East Fork
South Fork Yaak River	Yaak River Upper West Fork
Spread Creek	Yaak Rvr. 2 Valley
Yaak River 2	

Table 5.10 (cont.). Class 2 waters for westslope cutthroat trout.

Class 2 Westslope Cutthroat Trout Streams (cont.)	
Lower Kootenai	
Ball Creek	Fall Creek
Boulder Creek 1	Grass Creek
Boulder Creek 2	Kootenai River 10
Boundary Creek	Kootenai River 9
Caribou Creek	Mission Creek
Cow Creek	Smith Creek 1
Deep Creek 1	Smith Creek 2
Deep Creek 3	Snow Creek
Bull River	
Bull Below Dam	Mid Bull
Galbraith Creek	Phillipps Creek
Gold Creek	Plumbob and Chipka Creeks
Ha Ha Creek	Sulphur Creek
Kikomun Creek	West Bull (above dam)
Elk	
Hosmer East	Sparwood
Hosmer West	Wigwam River
Morrissey Creek	
Kootenay Lake	
Boundary Creek and Creston	Hawkins Creek
Goat River	
Kootenay River	
Albert River	Lower East White River
White	Middle Fork White River
Cross River	Nine Mile Creek
Elk Creek	Palliser River
Grave Greek	West Upper Kootenay River
St. Mary	
Findlay Creek	Norbury Creek
Mark Creek	Redding and Meachen Creeks
Mather and Lost Dog Creeks	Wasa
Matthew Creek	

Table 5.11. Class 2.5 waters for westslope cutthroat trout.

Class 2.5 Westslope Cutthroat Trout Streams	
Fisher	
Fisher River 3	Mainstem Fisher River Valley
Lower Kootenai	
Blue Joe Creek	Kootenai River 10 Valley
East Fork Boulder Creek	Myrtle Creek
Kootenai River 9 Valley	
Moyie	
Canuck Creek	Moyie River Valley 2
Deer Creek	Moyie Tributaries
Lower Moyie River Tributaries	Round Prairie Tributaries
Moyie River Valley 1	

Table 5.12. Class 3 waters for westslope cutthroat trout.

Class 3 Westslope Cutthroat Trout Streams	
Upper Kootenai	
Canyon Creek	Rainy Creek
Cripple Horse Creek	Swamp Creek
Edna Creek	Warland Creek
Fisher	
Bear Springs Creek	MCGinnis Creek
Lower Kootenai	
Curley Creek	Deep Creek 3 Valley
Deep Creek 2	Twentymile Creek
Bull River	
Englishman Creek	Linklater Creek
Iron Creek	Sand Creek
Elk	
Coal Creek	Lower Elk
Fording River	Michel Creek
Kootenay Lake	
Creek	Yahk and Gilnockie
Kootenay River	
Cochran Creek	
St. Mary River	
Hellroaring and Perry Creeks	Lussier River
Joseph Creek	Wild Horse River

Table 5.13. Class 3.5 waters for westslope cutthroat trout.

Class 3.5 Westslope Cutthroat Trout Streams	
Upper Kootenai	
Pinkham Creek 2	Tenmile Creek
Fisher	
Cow Creek	
Yaak	
Pine Creek	
Moyie	
Round Prairie	

Table 5.14. Class 1 waters for Columbia River redband trout.

Class 1 Redband Trout Streams	
Lower Kootenai	
Long Canyon Creek	Trout Creek
Parker Creek	
Duncan Lake	
Asher Creek	Lower Lardeau River
Cooper and Meadow Creeks	Lower Trout
Duncan Lake Tribs.	Mobbs and Tenderfoot Creeks
East Creek	Poplar and Cascade Creeks
Ferguson Creek	Rapid Creek
Glacier Creek	Stevens and Hall Creeks
Hamill Creek	Upper Duncan River
Healy Creek	Upper Trout
Houston Creek	Westfall River
Howser Creek	Wilkie Creek
Lardeau Creek	
Kootenay Lake	
Arrow/Duck	Moyie River
Cultus and Next Creeks	North Kootenay Lake
Fletcher and Bjerkness Creeks	Powder and Cambell Creek
Fry Creek	South Arm Kootenay Lake
Grohman, Duhamel, Sitkum and Sproule Creeks	La France, Lockhart, Akokli and Sanca Creeks
Harrop Creek	Sullivan Creek
Kokanee and Redfish Creeks	Summit and Corn Creeks
Lasca and Five Mile Creeks	Upper Moyie River and Lamb Creek
Midge Creek	West Moyie
Kootenay River	
Fenwick Creek	Palliser River
Middle Fork White River	West Upper Kootenay River
Slocan	
Bonanza Creek	Seaton and Carpenter Creeks
Hoder Creek	Slocan
Koch Creek	Winlaw Creek
Nemo, Beatrice, Evans and Gwillim Creeks	

Table 5.15. Class 2 waters for Columbia River redband trout.

Class 2 Redband Trout Streams	
Upper Kootenai	
Big Cherry Creek 1	Kootenai River 8
Callahan Creek	Libby Creek 2
Granite Creek	Libby Creek 2 Valley
Kootenai River 5 Valley	North Callahan Creek
Kootenai River 6	South Callahan Creek
Kootenai River 7	
Fisher	
Bear Springs Creek	Pleasant Valley Creek
Cow Creek	Pleasant Valley Fisher River
East Fisher Creek	Pleasant Valley Fisher River 1
Elk Creek	Pleasant Valley Fisher River 2
Fisher River 1	Silver Butte Fisher River
Fisher River 2	West Fisher Creek
Fisher River 2 Valley	Wolf Creek 1
Island Creek	Wolf Creek 2
Little Wolf Creek	Wolf Creek 2 Valley
MCGinnis Creek	Wolf Creek 3
McKillop Creek	
Yaak	
Basin Creek	Yaak River 2
Hellroaring Creek	Yaak River 3
Pete Creek	Yaak River 4
Seventeenmile Creek 2	Yaak River 5
Spread Creek	Yaak River East Fork
Yaak River 1	Yaak Rvr. 2 Valley
Lower Kootenai	
Boulder Creek 1	Fall Creek
Boulder Creek 2	Grass Creek
Boundary Creek	Kootenai River 10
Deep Creek 1	Kootenai River 10 Valley
Deep Creek 2	Kootenai River 9 Valley
Deep Creek 3 Valley	Kootenai River 9
Deep Creek 3	Twentymile Creek
East Fork Boulder Creek	
Kootenay Lake	
Boundary Creek and Creston	Kaslo River
Cottonwood Creek	Lower West Arm below Brilliant Dam
Crawford and Gray Creeks	Woodbury and Coffee Creeks
Slocan	
Goose Creek	Slocan River
Silverton, Enterprise and Lemon Creeks	Wilson Creek

Table 5.16. Class 2.5 waters for Columbia River redband trout.

Class 2.5 RedbandTrout Streams	
Fisher	
Fisher River 3	Pleasant Valley / Fisher River
Mainstem Fisher River Valley	Weigel Creek
Lower Kootenai	
Ball Creek	Twentymile Creek
Blue Joe Creek	

Table 5.17. Class 3 waters for Columbia River redband trout.

Class 3 Redband Trout Streams
None

Table 5.18. Class 3.5 waters for Columbia River redband trout.

Class 3.5 Redband Trout Streams
Yaak
Pine Creek

Table 5.19. Class 1 waters for kokanee.

Class 1 Kokanee Streams	
Duncan Lake	
Cooper and Meadow Creeks	Lower Lardeau River
Glacier Creek	Rapid Creek
Healy Creek	Upper Duncan River
Lake Creek	Wilkie Creek
Kootenay Lake	
Fletcher and Bjerkness Creeks	Midge Creek
Fry Creek	North Kootenay Lake
Sproule Creeks	Sanca Creeks
Kokanee and Redfish Creeks	Powder and Cambell Creek
Lasca and Five Mile Creeks	South Arm Kootenay Lake

Table 5.20. Class 2 waters for kokanee.

Class 2 Kokanee Streams	
Lower Kootenai	
Boulder Creek 2	
Moyie	
Moyie River Valley 2	
Duncan Lake	
Lardeau Creek	Mobbs and Tenderfoot Creeks
Lower Trout	Poplar and Cascade Creeks
Kootenay Lake	
Crawford and Gray Creeks	Kaslo River
Harrop Creek	Woodbury and Coffee Creeks

Table 5.21. Class 2.5 waters for kokanee.

Class 2.5 Kokanee Streams	
Lower Kootenai	
Kootenai River 9	Kootenai River 10
Kootenai River 9 Valley	Kootenai River 10 Valley

Table 5.22. Class 3 waters for kokanee.

Class 3 Kokanee Streams	
Lower Kootenai	
Deep Creek 3 Valley	
Kootenay Lake	
Arrow/Duck	Cultus and Next Creeks
Boundary Creek and Creston	Summit and Corn Creeks
Cottonwood Creek	

Table 5.23. Bull trout classification for lakes.

Class 1 Bull Trout Lakes	
Trout Lake	Moyie Lakes
Class 2 Bull Trout Lakes	
Bull Lake	Koocanusa Reservoir
Kootenay Lake	Duncan
Class 2.5 Bull Trout Lakes	
Sophie Lake	

Table 5.24. Westslope cutthroat trout classification for lakes.

Class 2 Westslope Cutthroat Trout Lakes	
Bull Lake	Leigh Lake
Boulder Lake	Moyie Lakes
Granite Lake	Therriault Lake
Koocanusa Reservoir	
Class 3 Westslope Cutthroat Trout Lakes	
Sophie Lake	
Class 3.5 Westslope Cutthroat Trout Lakes	
Loon	

Table 5.25. Columbia River redband trout classification for lakes.

Class 1 Redband Trout Lakes	
Trout Lake	
Class 2 Redband Trout Lakes	
Kootenay Lake	Duncan
Class 3 Redband Trout Lakes	
McArther	
Class 3.5 Redband Trout Lakes	
Kilbrennan	Loon

Table 5.26. Kokanee classification for lakes.

Class 1 Kokanee Lakes: Protection Priorities	
Trout Lake	
Class 2 Kokanee Lakes: Restoration Priorities	
Kootenay Lake	Duncan

Table 5.27. Burbot classification for streams and lakes.

Class 2 Burbot River Reaches	
Canyon (Idaho, MT Upstream to Kootenai Falls) & tributaries up to first barrier	Straight Reach (Highway 95 Bridge to Deep Creek) & tributaries up to first barrier
Meander Reach (Deep Creek to Kootenay Lake) & Tribs up to first barrier	
Class 1 Burbot Lakes	
Trout Lake	
Class 2 Burbot Lakes	
Duncan Lake	Koocanusa Reservoir
Kootenay Lake	

Table 5.28. White Sturgeon classification for streams and lakes.

Class 2.5 White Sturgeon River Reaches	
Braided Reach (Moyie River to Highway 95 Bridge)	Meander Reach (Deep Creek to Kootenay Lake)
Canyon (Idaho, MT Upstream to Kootenai Falls)	Straight Reach (Highway 95 Bridge to Deep Creek)
Class 2 White Sturgeon Lakes	
Duncan Lake	Kootenay Lake

5.2 Terrestrial Systems

5.2.1 Methods

To help us classify terrestrial subunits according to the degree to which each has been modified and each subunit's potential for restoration, Technical Team members[2] from the Kootenai and Flathead Subbasins led by Dr. Mike Panian developed a spreadsheet tool similar to the Aquatic QHA tool. The Terrestrial Biome Assessment (TBA) combines data and the expert knowledge of people intimately familiar with the areas being rated to qualitatively score the degree of impact or change from presettlement conditions. Unlike QHA, TBA is biome-based; the impacts assessed vary by biome and there is one worksheet for each of our target biomes: xeric forest, mesic forest, wetlands, grassland/shrub, and riparian.

LINKS

For the results of the Terrestrial Biome Assessment (TBA), go to Appendix 80.

Click Here

TBA is not a model, and it does not result in a detailed assessment of any geographical area. Rather, it is a tool for capturing data and professional opinion about general wildlife habitats and organizing that information in such a way as to show how the current conditions of subunits within a biome and within the subbasin as a whole compare to each other.

After the scores were entered, attributes were weighted and scores were normalized to a scale of 1 to 10. This resulted in a relative ranking of areas within each biome and of the biomes themselves based upon habitat condition. Other indices, such as the presence of listed and target species from point location datasets, general and specific KEF indices and other measures from IBIS were then added and weighted to yield a classification or grouping of subunits based on the degree of impact or percent of optimum (table 5.29).

5.2.2 Subunit Classifications

Tables 5.30 through 5.34 list the subunits in each of the three groups in the Kootenai Subbasin.

[2] *Technical Team members included wildlife biologists and GIS professionals from the states of Montana and Idaho, Forest Service, Canada, Kootenai Tribe of Idaho, Salish and Kootenai Tribes, and US Fish and Wildlife Service.*

Table 5.29. Protection/restoration classification of terrestrial biome subunits in the Kootenai Subbasin.

Terrestrial Classification
Class 1 Subunits **Most intact wildlife habitats; high protection value** **Habitat Scores 60 to 85 Percent of Optimum** These areas are generally the most intact wildlife habitats within a given biome. Because they are the most intact, they typically contain many areas worthy of protection. But because they are only 60 to 85 percent of optimum, they also encompass areas that have a high priority for restoration. **Management Goal:** Protect to keep as intact as possible while restoring areas to enhance the subunit's biological value.
Class 2 Subunits **Moderate degree of degradation; high to moderate protection value** **Habitat Scores 40 to 60 Percent of Optimum** Relative to other subunits in the biome, these subunits have generally been moderately impacted. A given subunit may have areas within it that are worthy of protection, but most are in need of restoration. **Management Goal:** Restore areas to enhance the subunit's biological value while protecting any intact areas that remain.
Class 2.5 Subunits **High restoration priority driven by ESA needs or the needs of species of concern** **Habitat Scores less than 40 Percent of Optimum** Habitats heavily modified by human activity or exclusion of natural disturbances; may contain non-native species and may require significant investments of time and money to be restored, but are restoration priorities because of value to ESA-listed species. **Management Goal:** Manage for protection of listed species, prevent further degradation and restore degraded habitat to extent possible.
Class 3 Subunits **High degree of degradation; low protection value** **Habitat Scores less than 40 Percent of Optimum** These subunits are generally the most impacted or degraded wildlife habitats within a given biome. They may encompass areas that are economically feasible to restore and that should be restored because they are contiguous to adjacent habitats that are more intact, but generally, they are a lower priority for restoration and protection because of the cost and time required to achieve moderate gains and benefits. **Management Goal:** Prevent further degradation. Restore degraded habitats only when cost effective and clear benefits can be shown.

Table 5.30. Riparian Biome subunit classification.

Riparian Biome		Percent of Optimum
Unit	**Subunit**	
Class 1: 60 to 85 Percent of Optimum		
UPELK-for	All Upper Elk River	**69%**
PRCL-wild	Purcell Mtns in St Marys unit-Wilderness	**68%**
UPKOOT-np	All Upper Kootenai River-National Parks	**68%**
BULL-for	All Bull River	**66%**
KTLK-val	Other S half Kootenay Lk to US border	**66%**
KTLK-wild	All NE side of Kootenay Lk/Purcell Mtns	**65%**
Wigwam-for	All Wigwam Ck trib of Elk River	**64%**
WTRVR-for	All White River watershed-CFS	**62%**
KTLK-for	All NW side Kootenay Lk/Slocan	**62%**
Wigwam-bdr	All Wigwam Ck to CAN border	**62%**
YAAK-for	All riparian in Yaak River watershed	**61%**
MDLELK-for	All Middle Elk River	**61%**
MOYIE-bdr	All Upper Moyie River to US border	**61%**
Class 2: 40 to 60 Percent of Optimum		
YAHK-bdr	All Upper Yahk(Yaak) River to US border	**59%**
Bvrft-for	All Beaverfoot Range-CFS	**58%**
Fernie-val	All Fernie area on lower Elk River	**58%**
TP-for	All Teepee Ck watershed	**58%**
CABMTN-for	All riparian in Lake Ck watershed-USFS	**56%**
LOKOOT-for	Selkirks west of lower Kootenai River valley-USFS	**56%**
KTLKWA-for	All West Arm Kootenay Lk/Nelson	**56%**
Trench-val	All riparian St Marys Trench	**55%**
CABMTN-wild	All riparian in Libby Ck watershed-Wilderness	**54%**
MOYIE-for	All riparian in lower Moyie River watershed	**53%**
KTLK-val	CVWMA (Creston Valley Waterfowl Mgmt Area)	**51%**
KOCNUSA-for	All riparian West of Koocanusa Res.-USFS	**50%**
BNFRY-val	Deep Ck valley riparian wetlands	**48%**
UPFSHR-for	All Upper Fisher River/Paradise Valley	**45%**
TBCO-val	All Tobacco River watershed	**44%**
KOCNUSA-cval	All Canadian Koocanusa Res. unit	**42%**
BNFRY-val	Other riparian in Deep Ck/Bonners Ferry unit	**41%**
Class 2.5: Restoration Priority because of ESA Concerns		
LOKOOT-val	All Lower Kootenai River valley and bench	**28%**
Class 3: Less than 40 Percent of Optimum		
LOFSHR-for	All Lower Fisher River/Wolf Ck	**39%**
KOCNUSA-val	All Koocanusa Res. east	**32%**

Table 5.31. Wetland Biome subunit classification.

Wetland Biome Unit	Subunit	Percent of Optimum
Class 2: 40 to 60 Percent of Optimum		
Wigwam-bdr	All Wigwam Ck to CAN border	**59%**
CABMTN-for	Alpine wetlands in Lake Ck unit	**59%**
UPKOOT-np	All Upper Kootenai River-National Parks	**55%**
Bvrft-for	All Beaverfoot Range-CFS	**55%**
PRCL-wild	Purcell Mtns in St Marys unit-Wilderness	**54%**
BULL-for	All Bull River	**54%**
MDLELK-for	All Middle Elk River	**54%**
UPELK-for	All Upper Elk River	**53%**
WTRVR-for	All White River watershed-CFS	**53%**
KTLK-for	All NW side Kootenay Lk/Slocan	**53%**
BNFRY-val	Curley Ck watershed forested wetlands	**52%**
KTLK-wild	All NE side of Kootenay Lk/Purcell Mtns	**52%**
Fernie-val	All Fernie area on lower Elk River	**51%**
YAHK-bdr	All Upper Yahk(Yaak) River to US border	**51%**
MOYIE-for	Round Prairie wetland complex	**51%**
Wigwam-for	All Wigwam Ck trib of Elk River	**51%**
MOYIE-for	Other wetlands in lower Moyie River watershed	**50%**
YAAK-for	All wetlands in Yaak River watershed	**50%**
Stmry-np	All wetlands St Marys Trench	**50%**
LOKOOT-for	Selkirks west of lower Kootenai River valley-USFS	**49%**
KTLK-val	Other S half Kootenay Lk to US border	**49%**
CABMTN-for	Other wetlands in Lake Creek watershed-USFS	**48%**
KTLKWA-for	All West Arm Kootenay Lk/Nelson	**47%**
TP-for	All Teepee Ck watershed	**47%**
CABMTN-wild	All wetlands in Libby Ck watershed-Wilderness	**47%**
KOCNUSA-cval	All Canadian Koocanusa Res. unit	**47%**
UPFSHR-for	All Upper Fisher River/Paradise Valley	**46%**
MOYIE-bdr	All Upper Moyie River to US border	**45%**
KOCNUSA-for	West of Koocanusa Res.-USFS	**45%**
KTLK-val	CVWMA (Creston Valley Waterfowl Mgmt Area??)	**45%**
BNFRY-val	Other wetlands in Deep Ck/Bonners Ferry unit	**42%**
TBCO-val	All Tobacco River watershed	**42%**
LOFSHR-for	All Lower Fisher River/Wolf Ck	**40%**
Class 2.5: Restoration Priority because of ESA Concerns		
LOKOOT-val	All Lower Kootenai River valley and bench	**21%**
Class 3: Less than 40 Percent of Optimum		
KOCNUSA-val	All Koocanusa Res. east	**39%**

Table 5.32. Grassland/Shrub Biome subunit classification.

Grassland/Shrub Biome		Percent of Optimum
Unit	**Subunit**	
Class 1: 60 to 85 Percent of Optimum		
Trench-val	Old Kimberly Airport grasslands	**65%**
Wigwam-for	Wigwam Flats grassland	**64%**
Class 2: 40 to 60 Percent of Optimum		
Trench-val	Premier Ridge grasslands	**59%**
YAAK-for	Yaak River watershed S of CAN border	**56%**
LOKOOT-for	Selkirks west of lower Kootenai River valley-USFS	**53%**
CABMTN-for	Lake Ck watershed-USFS	**53%**
MOYIE-for	Lower Moyie River S of CAN border	**51%**
KOCNUSA-for	West of Koocanusa Res.-USFS	**51%**
UPFSHR-for	Upper Fisher River/Paradise Valley	**50%**
CABMTN-wild	Libby Ck watershed-Wilderness +	**49%**
KOCNUSA-val	Koocanusa Res. east/US border portion Tobacco Plains	**48%**
KOCNUSA-cval	Other Koocanusa Res. CAN grassland/shrub	**48%**
BNFRY-val	Deep Ck/Bonners Ferry south	**48%**
TBCO-val	Other Tobacco River grass/shrub	48%
Trench-val	Skookumchuck grasslands	47%
LOKOOT-val	Lower Kootenai River valley and bench	46%
KOCNUSA-cval	Tobacco Plains in Koocanusa Res. CAN unit	46%
LOFSHR-for	Lower Fisher River/Wolf Ck	45%
TBCO-val	Tabacco Plains in the Tobacco River unit	45%
Trench-val	Other St Marys Trench grassland/shrub	42%
Class 3: Less than 40 Percent of Optimum		
Fernie-val	All Fernie area on lower Elk River	**39%**
Trench-val	Wycliffe Prairie (in St. Marys Unit)	**34%**

Table 5.33. Xeric Forest Biome subunit classification.

Xeric Forest Biome Unit	Subunit	Percent of Optimum
Class 1: 60 to 85 Percent of Optimum		
WTRVR-for	White River watershed-CFS	**64%**
BULL-for	Bull River unit	**64%**
KTLK-val	S half Kootenay Lk to US border	**63%**
Wigwam-for	Wigwam Ck trib of Elk River	**62%**
PRCL-wild	Purcell Mtns in St Marys unit-Wilderness	**60%**
Class 2: 40 to 60 Percent of Optimum		
Wigwam-bdr	Wigwam Ck to CAN border	**59%**
LOKOOT-for	All Selkirks west of lower Kootenai River valley-USFS	**58%**
BNFRY-val	Deep Ck/Bonners Ferry south	**56%**
MOYIE-for	Lower Moyie River S of CAN border	**53%**
LOKOOT-val	Other Lower Kootenai River valley and E non-bench	**53%**
YAAK-for	Yaak River watershed S of CAN border	**52%**
KOCNUSA-cval	Koocanusa Res. CAN unit/CAN portion Tobacco Plains	**51%**
CABMTN-wild	Libby Ck watershed-Wilderness +	**51%**
KOCNUSA-val	Koocanusa Res. east/US border portion Tabacco Plains	**51%**
CABMTN-for	Lake Ck watershed-USFS	**51%**
Trench-val	St Marys Trench	**51%**
TBCO-val	Tobacco River watershed	**50%**
LOKOOT-val	Lower Kootenai River bench between valley and E mtns	**49%**
KOCNUSA-for	West of Koocanusa Res.-USFS	**48%**
UPFSHR-for	Upper Fisher River/Paradise Valley	**48%**
LOFSHR-for	Lower Fisher River/Wolf Ck	**46%**

Table 5.34. Mesic Mixed Forest Biome subunit classification.

Mesic Mixed Conifer Biome		Percent of Optimum
Unit	**Subunit**	
Class 1: 60 to 85 Percent of Optimum		
UPELK-for	Upper Elk River unit	**78%**
UPKOOT-np	Upper Kootenay River-National Parks	**76%**
BULL-for	Bull River	**76%**
Wigwam-for	Wigwam Ck trib of Elk River-border	**75%**
KTLK-wild	NE side of Kootenay Lk/Purcell Mtns	**75%**
KTLK-for	NW side Kootenay Lk/Slocan	**71%**
Wigwam-bdr	Wigwam Ck to CAN border	**71%**
WTRVR-for	White River watershed-CFS	**70%**
KTLK-val	S half Kootenay Lk to US border	**70%**
PRCL-wild	Purcell Mtns in St Marys unit-Wilderness	**70%**
KTLKWA-for	West Arm Kootenay Lk/Nelson	**69%**
MDLELK-for	Middle region Elk River	**67%**
KOCNUSA-val	Koocanusa Res. east	**67%**
YAHK-bdr	Upper Yahk(Yaak) River to US border	**67%**
Fernie-val	Fernie area on lower Elk River	**66%**
TBCO-val	Tobacco River watershed	**66%**
LOKOOT-for	Selkirks west of lower Kootenai River valley-USFS	**66%**
KOCNUSA-for	West of Koocanusa Res.-USFS	**65%**
YAAK-for	Yaak River watershed S of CAN border	**65%**
MOYIE-bdr	Upper Moyie River to US border	64%
CABMTN-for	Lake Ck watershed-USFS	62%
CABMTN-wild	Libby Ck watershed-Wilderness +	62%
UPFSHR-for	Upper Fisher River/Paradise Valley	62%
Trench-val	St Marys Trench	61%
BNFRY-val	Deep Ck/Bonners Ferry south	61%
LOFSHR-for	Lower Fisher River/Wolf Ck	61%
TP-for	Teepee Ck watershed	60%
Class 2: 40 to 60 Percent of Optimum		
Bvrft-for	Beaverfoot Range-CFS	59%
KOCNUSA-cval	Koocanusa Res. CAN unit	58%
MOYIE-for	Lower Moyie River S of CAN border	57%
LOKOOT-val	Lower Kootenai River valley and bench	55%

THIS PAGE INTENTIONALLY BLANK