

**Range-Wide Status Assessment for
Yellowstone Cutthroat Trout
(*Oncorhynchus clarkii bouvieri*): 2006**



July 2007

Dedication

His peers on the Yellowstone Cutthroat Trout Interagency Coordination Group dedicate this report to Bruce May. Bruce was the lead author and driving force behind this report. He has long championed the cause of status assessments for cutthroat trout throughout the west, highlighting the need for improvement in our capabilities to measure progress in restoration and conservation efforts. The future of cutthroat trout is in better hands today, in part because of the efforts of Bruce May.

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Executive Summary

The distribution and abundance of Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*; YCT) has changed substantially from the historical conditions that existed when European “discovery” of the western portion of North America occurred in the early 1800’s. Factors associated with these changes have been linked to anthropogenic influences that accompanied early settlement of the west. In recent years, there have been numerous efforts to describe the changes that have occurred. Early status assessments for YCT described the changes in general, qualitative terms; however, few assessments applied a quantitative approach that could be replicated through time. A detailed description of the changes in the assessment methods through time can be found in Appendix A.

This (2006) status assessment represents the second iteration of an assessment approach designed to provide comparable information through time. Thirty-two fisheries professionals who had personal knowledge of YCT within the assessment area provided the information for this status assessment. These biologists served as representatives of 10 agencies and they had a combined level of professional experience of 480 years, of which 365 years were directly applicable to YCT conservation and management. Information associated with YCT was obtained through application of a consistent methodology that was developed specifically to provide information pertinent to cutthroat trout conservation. This status assessment used the National Hydrography Dataset (NHD), at the 1:24,000 map scale, coupled with geographic information system (GIS) tools and personal geo-database compatible with ArcGIS 9.0 as the base foundation for the status assessment. Fourth level hydrologic units (HUC) were used as accounting units for data storage and retrieval. YCT information for the status assessment was obtained during two workshops where groups of biologists (Appendix B) and data entry personnel completed the questions contained in the status protocol (Appendix C) and the information was entered into a geo-database. The status assessment also evaluated foreseeable population risks linked to disease and the maintenance of genetic integrity. A general population health evaluation was also completed for each conservation population of YCT.

Historical habitat for YCT was estimated to include 17,721 miles of stream and 61 lakes. These historical habitat estimates represented a refinement of historical estimates obtained in 2001 (i.e., 17,393 miles; 118 lakes). The estimate of currently occupied (conservation and sportfishing populations) habitat was 7,527 miles (43%) of historical habitat. The number of lakes currently occupied by YCT was estimated to be 205. The amount of stream habitat with genetic testing data increased to 4,052 miles (a 34% increase). Results showed that a substantial number of YCT occur in a genetically unaltered condition. In addition, there were another 1,854 miles of stream that were classified as untested and suspected to be unaltered based on the absence of hybridizing fish in close proximity to the YCT. Most YCT represent aboriginal populations and most occupied habitat is judged to be in excellent (14%) and good (52%) condition. Slightly more than one half of stream dwelling YCT co-existed with non-native fish. YCT densities were mostly in the 1- to 151-fish/mile density range. Much of the habitat currently occupied by YCT (65%) was located within federal jurisdictions or under the authority of tribal governments (e.g., Forest Service, National Park Service, the Crow Tribe, etc.). Eleven hundred and forty six miles were administered as wilderness.

A total of 383 separate YCT conservation populations (7,204 miles) were identified in the 2006 status assessment. This number was almost 100% higher than the number of populations identified in 2001. YCT conservation populations occurred in 35 of the 39 historical watersheds. Two hundred and sixty one (261) YCT populations were associated with only stream environments, 45 populations were associated with habitat that was composed of both stream and lake environments, and 76 YCT populations were associated with only lake environments. Many populations occupied less than 1 mile of stream habitat. Population numbers were variable and ranged from a few fish to nearly 100,000 fish. An evaluation of risk to genetic integrity indicated that populations occupying smaller less complex habitats were less likely to be at risk from hybridization. The majority of populations occupied less than 10 miles of habitat. These population were, however, much more likely to have smaller population sizes, reduced temporal variability and more apt to have simple habitat networks (e.g., non-networks or weak networks). The converse of these conditions was evident for populations occupying larger units of habitat. These populations tended to have higher population numbers and they occupied larger habitat networks resulting in higher temporal variability scores. These populations tended to be at higher risk to compromised genetic integrity. The risk of disease was judged as being minimal to low for most YCT populations regardless what other conditions prevailed.

Evaluation of restoration and expansion opportunities indicated that some options were potentially available. An appraisal of restoration or expansion potential for 6,970 miles of suitable habitat was completed as a component of the status assessment. The analysis indicated that between 15 to 40 % of the suitable habitat provided a reasonable opportunity for population restoration or expansion.

The 2006 status assessment substantiated that genetically unaltered YCT currently occupy significant portions of the historical habitat. Even though YCT tend to have a higher presence within the central core of the range, they do exist within many watersheds on the perimeter of the historical range. Data on conservation populations suggest that two different conservation strategies are reflected in the characterizations associated with the populations. One strategy is associated with reduced risks to genetic integrity and competition from non-native species, but the approach is also associated with lower population health conditions due to lower temporal variability and population size. The other strategy is associated with larger populations that occupied more diverse habitat networks. These larger populations have higher health scores associated with temporal variables and larger population size, but they reflect a greater risk to genetic integrity. Most populations were identified as having a minimal or low risk from disease.

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Introduction

This status assessment for Yellowstone cutthroat trout (*Oncorhynchus clarkii bowvieri* YCT) was designed to compliment and expand upon the status assessment completed in 2001 (May et al. 2003). Like the former status assessment, this assessment provides a range-wide perspective built upon information obtained from several perspectives and at multiple scales or levels. The perspectives included a historical point of view, a current distribution perspective based on habitat occupancy of phenotypically correct YCT (e.g., cutthroat trout with an outward appearance of Yellowstone cutthroat trout), an effort to delineate discrete populations of YCT, and a perspective related to the potential for restoration or expansion of conservation populations. The various scales or levels, in ascending order, from which the information was developed included: the habitat feature level (e.g., a specific barrier); the habitat segment scale level for a given stream or lake; the complete stream or lake level; the watershed level based on hydrologic units (HUC) at different scales; the geographical management unit scale (GMU); the various administrative units (e.g., state and/or agency boundaries); and, the range-wide perspective.

Most previous YCT status assessments had various limitations based on a number of considerations (May et al. 2003). Those limitations included the following: 1) an assessment was conducted for only a portion of YCT historic range, 2) the assessment provided a range-wide perspective based on information extrapolated from a few localized areas from within the range-wide area, or, 3) the assessment suffered from a lack of consistency in how the information was obtained and applied. This assessment utilized a format and procedure initiated in 1993 (May 1996) and improved and expanded through application over a 13-year period of time¹ (Shepard et al. 2003; May et al. 2003; May and Albeke 2005; Hirsch et al. 2006)². Environmental Site Assessment (ESA) listing findings (USFWS 2003; USFWS 2006) utilized information obtained through application of the status assessment procedure to a significant extent. Even though this assessment protocol (Appendix C) added a substantial number of new attributes and characterizations, a concerted effort was made to maintain a level of comparability for certain parameters of significance in evaluating the effectiveness of the conservation effort for YCT over the long term.

This status assessment was designed to utilize the collective knowledge of professional biologists involved in YCT conservation including fisheries professionals from Montana, Idaho, Wyoming, Utah and Nevada (i.e., state agencies, Park Service, U.S. Forest Service (USFS), Bureau of Land Management (BLM), Tribal, private, etc.; Appendix B).

In this assessment, we further fine-tune estimates of the historically occupied range and current distribution for YCT. YCT conservation populations identified in 2001 were re-validated and additional conservation populations were identified and incorporated into the database. Additional information and attributes (e.g., for lakes and streams) associated with the current distribution of YCT and the identified conservation populations were added to the database. A significant addition was the evaluation and prioritization of population restoration and expansion

¹ Executive summary of YCT status for Montana, 1999. Author: Bruce E. May

² Applied to Rio Grande cutthroat in 2006 with report pending. Personal communication Shannon Albeke, SEAM Biometrics.

potentials. While this and the earlier YCT status assessment can be used to provide consistent information to the U.S. Fish Wildlife & Service (FWS) for ESA decisions, the longer-term and probably more significant use of these status updates continues to be as an information base to be used by individual states and other agencies, working collaboratively to assess, plan and prioritize ongoing and future YCT conservation efforts.

As is the case for most databases, especially of the size and complexity of this one, some information will be incorrect. Data entry errors and/or lack of full understanding of the assessment protocol by some fishery biologists are likely contributors to any incorrect information. It is imperative that subsequent status updates aggressively seek to correct these inconsistencies and errors. This report presents the YCT information as it currently exists in the database. As possible errors and inconsistencies were encountered, they were noted to facilitate future correction. Finally, it should be noted that this report does not address all the information contained in the database. The sheer volume of information that has been amassed makes it impractical to identify, analyze, and interpret all the information in a single report.

Analysis Area

The analysis area included all of the historical range of YCT within the western United States as identified in May et al. (2003). This area included, from east to west, the upper portions of the Yellowstone River Drainage within Montana and Wyoming and the upper Snake River Drainage in Idaho, Wyoming, Nevada and Utah. There were 39 4th level hydrological units associated with the historical range (Appendix D). Similar to the 2001 assessment, this status assessment does not include information for YCT that have been introduced into areas outside of the watersheds of the historical range.

Within the assessment area two forms of YCT have been identified, a large-spotted form dominant in most of the upper Yellowstone River Basin and the lower Snake River Basin and a fine-spotted form dominant in portions of four watersheds in the upper Snake River Basin. In certain portions of the historical range, YCT representing both spotting patterns reside together in some habitat segments. This assessment, like the 2001 and other assessments, does not attempt to address or resolve the issue of whether the two differing morphologies represent different species or subspecies. That issue is beyond the scope of this assessment. What can be said is that genetic differentiation, based on spotting pattern, has not been conclusive at this point in time. The assessment protocol allowed for tracking and evaluating information based on spotting pattern. Using primarily empirical information, this report will provide information on the status of YCT from several perspectives including a broad overview of the entire assessment area based on information obtained at the site specific stream or lake segment level, a review of some information for the large and fine-spotted forms, a summary of specific conservation population status information, and a review of expansion and restoration potentials. To the extent practicable, the report discusses the change in conditions between the 2001 status assessment and this 2006 assessment. As acknowledged in the introduction, this report does not include or address all information that is contained in the database.

Methods

This status assessment used a standardized approach (Appendix A and C) with comparable protocols based on the foundation approach used in 2001 (May et al. 2003). The empirical information for this report was primarily provided by biologists who attended two workshops (Appendix B). Even though information sources varied from professional judgment to detailed aquatic sampling, consistency in application of the protocol was maintained by having one or two individuals attend each workshop to facilitate data entry, answer questions and settle disputes raised by workshop participants. We acknowledge that the approach applied was not designed to be random, nor were the sources completely independent; therefore, there are undoubtedly biases associated with some information. An effort to qualify and disclose the nature of the information, either by citation or application of an information source rating system (e.g., identifying information primarily based on professional judgment versus information provided by detailed level field observation and data collection) was applied to most characterizations. Data source tables were included in the database (Table 1). Information associated with judgment calls and anecdotal sources, in general, could be viewed as being less reliable and/or accurate than information developed as part of detailed surveys and studies that have undergone substantial analysis and review.

Geographic Information System and Database

The status assessment used the National Hydrography Dataset (NHD) as the base for the assessment (see <http://nhd.usgs.gov/> for more information on NHD). The 1:24,000 scale NHD was used for all waters within the analysis area. The USDA Forest Service's Natural Resource Information System (NRIS) provided an ArcGIS event creation tool to geo-reference YCT population segments. The tool utilized a "point-and-click" user interface to reference these population segments against the NHD networks by creating route events. This assessment used GIS tools and personal geo-databases compatible with ArcGIS 9.0. To increase continuity and consistency only streams, primarily perennial, and lakes identified on the NHD data set had information entered into the database. We acknowledge that intermittent and ephemeral streams may provide habitat used by YCT during specific time periods. We also fully anticipate that some perennial streams that support YCT were not part of the NHD stream layer and were not included in this assessment. It is anticipated that these streams will be added as efforts to improve NHD occur. Based on the above protocol decisions and NHD stream layer limitations, this assessment provides for more conservative estimates of YCT distribution.

We used the 4th level hydrologic units (8-digit EPA designation) as the primary units for organizing data input from the fisheries professionals. We summarized historical range and current distribution information using this stratification. The U.S. Geological Survey (USGS) created the HUC system for the United States in the 1970's. This system divides the country into 21 Regions, 222 Sub-regions, 352 Accounting Units, and 2,149 cataloging units based on surface hydrologic features (Hydrologic Units Maps of the Conterminous United States 2002).

Database Summaries

Data provided by the fishery professionals were summarized directly from the geo-database using queries built within Microsoft Access. Summarized data were then copied to Microsoft Excel spreadsheets. These data were further reduced to produce tables and figures for the report.

Information summaries were based on watershed boundaries, state boundaries and other administrative boundaries associated with the historical and current distribution of YCT. Additional summaries of associated conservation populations were also provided.

To better assess existing regulatory mechanisms associated with land management for the habitats currently occupied by YCT, the “Identity” tool within ArcGIS was used to overlay NHD layers with both an ownership layer and the USFS Wilderness Areas layer. Route events of the NHD-ownership/wilderness layers were then generated and intersected with the YCT currently occupied route events to identify segments occupied by YCT that were within designated Forest Service wilderness, designated Forest Service “primitive” areas, wilderness study areas, Wild and Scenic Rivers, Research Natural Areas, National Parks and other ownerships. Stream segment lengths occupied by YCT within the above land management designations were then calculated.

Finally, issues directly associated with the logistics of data generation, entering data and data quality control were handled by making the effort a “real time” exercise. Two workshops were held and within each workshop specific working groups, consisting of fishery biologists and GIS-data entry personnel, generated the status information. In order to assure consistency and completeness, each specific work group (team) completed the entire assessment for a given 4th level HUC before moving to another HUC. There were 39 4th level HUCs analyzed within the delineated historic range of YCT. During the completion of the assessment, the work teams were asked to employ a systematic approach to insure that all pertinent information was provided using an orderly process. The use of 4th level HUCs was for accounting purposes only. The actual stream layers, either as specific points, habitat segments or discrete populations, were attributed within a geo-referenced database.

Information Source	Relative Degree of Reliability
Professional Judgment	Lower
Anecdotal Information	Lower
News Accounts	Lower
Correspondence	Moderate
Data Files	Moderate
Agency Report	Moderate
Published Paper	Higher
Thesis or Dissertation	Higher

The geo-database was partitioned into four components. First, a historical component based on habitats believed to have been occupied by YCT at the time of the first European exploration (approximately 1800) of the Northern Rocky Mountains. The historical coverage map from the 2001 assessment was provided as a reference to initiate re-evaluation of historical distribution. Second, the current distribution of YCT based on habitat segments along with specific attributes (e.g., spotting pattern, fish density, genetic status, fish stocking history, presence of non-native species and habitat information) were re-evaluated and new information was entered in the geo-database. Current distribution information, from the 2001 status assessment, was provided to

initiate current distribution re-evaluation. The third component, of the 2006 status assessment, was associated with re-evaluation of previously identified conservation populations and the identification of new populations. New information relating to the conservation populations was added to the geo-databases (Appendix C). Conservation populations were identified primarily on the basis of known or perceived reproductive interaction within a group of YCT occupying either an individual stream or lake or a network of connected streams and/or lakes. For each identified conservation population, the reproductive interaction had to be two directional resulting in both upstream and downstream exchange of genetic material. In addition to identifying several attributes of importance to each conservation population, a relative health evaluation was completed for all populations that occupied stream habitat. The associated risks to each population from genetic introgression and diseases were also determined. Health and risk determinations were intended to represent relative conditions indicating higher or lower levels of concern. It is important to note that YCT populations supported entirely by annual or routine stocking were not included as part of the current distribution or conservation population evaluations. The only exception was for YCT serving as wild broods that might require periodic stocking to bring in new genetic material as part of a brood maintenance program. The fourth component of the assessment was associated with evaluating the potential for restoration or expansion of conservation populations within the historical portion of YCT range that is not currently occupied by conservation populations.

Assessment Teams and Workshops

Information for this status assessment was primarily collected at two workshops. One workshop was held in Idaho Falls, Idaho during the week of May 1, 2006 and the other workshop was held in Billings, Montana during the week of May 8, 2006. At each workshop a systematic application of the assessment protocol was undertaken. During each workshop, fishery professionals who had relevant information or knowledge within each 4th level HUC worked collaboratively, within assessment teams, to provide information that was entered into the geo-database by data entry professionals. All fishery professionals were asked to bring field data summaries and reports from their areas of responsibility as reference materials, but some information was provided after the workshops had ended.

The Status Assessment Protocol

The 2006 status protocol closely mirrored the approach applied to status updates recently implemented for Bonneville cutthroat trout (May and Albeke 2005), Colorado River cutthroat trout (Hirsch et al. 2006), and Rio Grande cutthroat trout (In preparation). It was recognized that such assessments would contain substantial amounts of information based on expert opinion and that, particularly when historically occupied range was identified, the assessments would be qualitative and subjective.

Historical Range

Consistent with the 2001 YCT status assessment and other subspecies assessments, the period of European “discovery” of the West was set as the reference time period (~1800) for the historical range of YCT. It is likely that a pre-historical perspective of the distribution of YCT could have included expansions and contractions over geological time due to significant stochastic events (e.g., extended periods of abundant moisture or drought). For the time period between 1800 and the present time, we do have written documentation and personal accounts upon which to anchor

a recent historical distribution perspective (May 1996). This historic perspective also reduces the amount of speculation associated with stochastic events, and allows for a determination of the significance of deterministic influences that have occurred subsequent to 1800.

Using the historical delineation of YCT range identified in 2001 (May et al. 2003), each assessment team re-evaluated the historical distribution contained in the 39 4th level HUCs. In addition, lake environments believed to be part of the historical distribution were identified. Fishery professionals were asked to re-evaluate the historic distribution information in the geo-database and to make corrections and additions as appropriate. Four factors were considered in the historical distribution determination: 1) presence of complete geological barriers that would have limited YCT expansion; 2) tectonic or climatic conditions that could have made regions uninhabitable; 3) habitats where ancient populations may have been extirpated by stochastic events and the areas were unable to be re-colonized prior to 1800; and, 4) habitats judged as historically unsuitable were based primarily on judgment, thermal conditions, channel gradient, and/or insufficient stream flows (Appendix C). Important information sources were historical journals and scientific reports. Current occupancy of streams by cold-water biota was also used as a consideration in the rationale for inclusion of YCT within the historical range. This delineation of historical range refines the previous assessment completed in 2001. The projected historical distribution provided a baseline for comparison with information associated with current distribution, conservation populations and potentials for population restoration or expansion.

Barriers to Fish Movement

This status assessment re-verified barriers identified in 2001 and added to the barrier information with new information. Barriers to upstream fish movement have important implications for both historical and current status. Geological (i.e., bedrock waterfalls, naturally dry channel segments, etc.) and anthropogenic barriers were located and characterized. Geological barriers were re-evaluated for their influence on historical range. Other natural and anthropogenic barriers were re-evaluated when assessing current distributions and in re-evaluating various risks to conservation populations. Only barriers of believed significance were included in the geo-database (Appendix C).

Current Distribution

Using the current distribution map from 2001, current distributions of YCT for 2006 were re-evaluated. Only information from streams and lakes supporting YCT maintained entirely by natural recruitment were included in the geo-database. The exceptions were those habitats occupied by YCT that were part of a wild brood program. All YCT that occupied habitat included within the broad historical boundary were included regardless of level of genetic introgression and other considerations. Specific characterizations of the occupied habitat included genetic status, abundance, past stocking records, origin of YCT, migratory considerations, presence of competing species (principally non-native salmonids) and quality of habitat and relative width of stream habitat. Not all characterizations were applied to lake environments.

Genetic Considerations

For 2006, seven categories associated with genetic status were identified (Table 2). Five classes were associated with YCT that had been genetically tested and two categories were associated with YCT where no genetic testing had been completed. Genetic sampling involved many complex issues that made clear interpretation and reporting of genetic results difficult. For a more complete discussion regarding these complex issues we suggest reading Appendix D in Shepard et al. (2003).

Table 2. Genetic categories used for assessing genetic status of Yellowstone cutthroat trout in 2006.

Code	Genetic Status
1	Genetically unaltered (<1% introgression detected) as a result of introduced species interaction—tested via electrophoresis or DNA
2	≥1% to ≤10% introgression (hybridized) with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
3	>10% to ≤25% introgression (hybridized) with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
4	>25% introgression (hybridized) with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
5	Not genetically tested -- Suspected unaltered with no record of stocking or contaminating species present
6	Not genetically tested -- Potentially hybridized with records of introduced hybridizing species being stocked or occurring in stream
7	Hybridized and pure populations co-exist (sympatric mixed-stock) in stream (use only if there is evidence of reproductive isolation, non-random mating, and/or genetic testing has been completed)

The levels of introgression we assigned for genetically tested stream segments were based, in part, on the literature but they also linked to conservation planning considerations. For our genetically unaltered (“pure”) category, we selected less than 1% introgression as the basis for identifying genetically unaltered YCT. Most genetic sampling is designed to detect at least a 1% level of genetic introgression within a standard sample size of 25 fish (Utah Division of Wildlife Resources 2000). The next three levels (i.e., ≥1% to ≤10%, >10% and ≤25%, and >25% introgression) were assigned based primarily on conservation planning considerations. For the group tested from ≥1% to ≤10% introgression, there are indications that the phenotype and morphological characteristics of the YCT were not distinguishably different from individuals in populations known to be genetically unaltered (Leary et al. 1996; Campton and Kaeding 2005). YCT tested and found to fall within the >10% and ≤25% and even the >25% categories could still appear to be genetically unaltered to the untrained eye.

Abundance, Habitat Quality and Quantity, Fish Stocking, Origin of YCT, Migratory Life History, and Presence of Non-Native Fish

Density characterizations for YCT in the 2006 status information were changed from a purely qualitative determination (May et al. 2003) to determinations based on quantification of sexually mature YCT numbers for each occupied habitat segment (Table 3). YCT densities were based on number per mile. Sexually mature adults were defined as those YCT with minimum lengths of 15 cm for small streams and lakes with non-migratory fish to minimum lengths of 30 cm for

larger streams, rivers and lakes with non-migratory and migratory fish. Included were those YCT that utilized stream habitat to support recruitment to lake environments. In addition, several new characterizations were added to the 2006 status assessment. These characterizations provided information on fish stocking, habitat quality, stream width, origin of YCT, migratory life histories and presence of non-native fish. These characterizations were added to the geo-database for the current distribution.

The sources of current distribution characterizations were identified and entered into the geo-database. These new parameters associated with current distribution were discussed in Appendix C.

Table 3. Sexually mature YCT density ranges (Check the one that best applies).

Code	Mapping Segment Adult Fish Density
1	0 to 50 fish per mile (Specific density within this range, if available _____)
2	50 to 150 fish per mile (Specific density within this range, if available _____)
3	151 to 400 fish per mile (Specific density within this range, if available _____)
4	401 to 1000 fish per mile (Specific density within this range, if available _____)
5	Over 1000 fish per mile (Specific density within this range, if available _____)
6	1001 to 2000 fish per mile (Specific density within this range, if available _____)
7	Over 2000 fish per mile (Specific density if available _____)
8	Unknown

Conservation Population

Conservation populations were also re-evaluated in the 2006 database update. The 2001 information served as a reference for re-evaluation of YCT conservation populations. As with the 2001 status assessment, a determination was made relative to which occupied habitat segments supported discrete groupings of YCT. In many cases the populations identified in 2001 were re-affirmed and new attribute information was added to the geo-database for these populations. In other instances, a new population was identified and attribute information was added to the database.

The major criterion for identification of an individual conservation population continued to be associated with the potential for reproductive exchange within a grouping of occupied habitat segments (e.g., lakes and/or streams). Reproductive exchange (i.e., genetic drift) had to be associated with the potential for genetic material to be exchanged in both an upstream and downstream manner. As such a complete or total passage barrier could not subdivide a conservation population. Each conservation population was given a population qualifier characterization based on the interagency decisions contained in a genetic management position paper (Utah Division of Wildlife Resources 2000). Conservation populations were further characterized based on degree of within population connectedness into population networks (e.g., a single stream versus many streams). Conservation populations could be genetically unaltered (i.e., core conservation populations) or selected based on specific attributes of conservation significance in the presence of genetic introgression (i.e., conservation populations). The level of introgression was of secondary importance for non-core conservation populations.

For each conservation population a set of characterizations were added to the geo-database. These characterizations included qualitative identification of human influences associated with each population. Also identified were the conservation actions applied to each conservation population. Generalized risk evaluations for both genetic integrity and disease were completed for each population, as was a general or relative health evaluation (Appendix C).

Genetic Risks

Genetic risk was defined by the nature of potential or continued introgression of YCT genetics within a conservation population. Distance from potential sources of non-YCT genes and the presence of barriers between those sources and the conservation population were the two primary components of the genetic risk assessment (Table 4). Nonnative salmonids that could potentially hybridize with YCT were considered as posing a risk to YCT genetic integrity.

Table 4. Ranks and descriptions used for assessing genetic risks to designated conservation populations of Yellowstone cutthroat trout in 2006. Hybridizing species includes any introduced species or subspecies that could potentially hybridize with Yellowstone cutthroat trout.

Rank	Genetic Integrity Risk Characterization
1	Introduced potentially hybridizing fish cannot interact with existing YCT population. Barrier provides complete blockage to upstream fish movement or potentially hybridizing fish are not present in same or adjacent drainages.
2	Introduced potentially hybridizing fish are in same stream and/or drainage further than 10 km from YCT population, but not in same stream segment as YCT, or within 10 km of existing barriers that may be at risk of failure.
3	Introduced potentially hybridizing fish are in same stream and/or drainage within 10 km of YCT population and no barriers exist between introduced species and YCT population. However, introduced hybridizing species have not yet been found in same stream segment as YCT population.
4	Introduced potentially hybridizing fish are sympatric with YCT.

Disease Risks

A disease risk assessment was made for each conservation population using a numerical ranking based on level of risk (Table 5). The ranking included five characterizations based on distance from potential sources of disease and the presence of barriers between those sources and the conservation population. Population isolation and security were again viewed as important considerations but they could not be viewed as absolutes given that contamination could be associated with avian or human sources. The catastrophic diseases of concern were those that could cause severe and significant impacts to overall population health. These diseases included but were not limited to whirling disease, furunculosis and infectious pancreatic necrosis virus.

Table 5. Ranks and descriptions used for assessing disease risk to designated conservation populations of YCT in 2006.

Rank	Disease Risk Characterization
1	Significant diseases and the pathogens that cause these diseases have very limited opportunity to interact with existing YCT population. Significant disease and pathogens are not known to exist in the stream or watershed associated with YCT population. Barrier provides complete blockage to upstream fish movement. Stocking of fish from other sources does not occur.
2	Significant diseases and/or pathogens have been introduced and/or identified in the same stream and/or drainage further than 10 km from the YCT population, but not in same stream segment as YCT, or within 10 km of existing barriers that may be at risk of failure. Stocking of fish from others source areas requires fish health screening and pathogen free clearance.
3	Significant diseases and/or pathogens have been introduced and/or have been identified in the same stream and/or drainage within 10 km of the YCT population and no barriers exist between the disease, pathogens and/or diseased fish species and the YCT population. However, diseases and/or pathogens have not yet been found in same stream segment as the YCT population.
4	Significant disease and/or pathogens and disease carrying species are sympatric with YCT in same stream segment but YCT have not tested positive.
5	YCT population is known to be positive for significant disease and pathogens are present. YCT population has a history of impacts from significant diseases. Environmental and/or biological conditions may have intensified disease impact.

Population Health Evaluation

A generalized population health evaluation was completed for each conservation population using an indexed ranking that included consideration of four factors (Appendix C). General population health was indexed by a rating from low to high using a numerical ranking applied to the four variables. The basic approach was consistent with the approach proposed for evaluating extinction risks for salmonids (Rieman et al. 1993) and the approaches applied in the medical profession for evaluation of personal and population health of humans. The basic premise is based on the assumption that expressed conditions associated with certain attributes can be used to estimate general health or overall well being. The first variable (attribute) in the population health evaluation was temporal variability defined as the total stream miles occupied by the conservation population. Total miles were obtained from the habitat segment information in the current distribution geo-database. The general health rationale associated with this variable was linked to the assumption that larger amounts of occupied habitat would be equated to larger drainage basins that would support more stable flow conditions and higher habitat and watershed complexities necessary for protection and maintenance of a diversity of YCT life histories.

Population size of YCT was the second variable considered important to population health. Total numbers of sexually mature YCT (15 cm and larger) were obtained from the fish density information in the current distribution geo-database. For each population, the estimate of total adult fish was obtained by multiplying fish density for each occupied habitat segment by the miles of stream for that segment and then aggregating these segment estimates into a total estimate for the population. The size criterion was believed to reasonably reflect the sexually active component of a YCT population (e.g., grossly approximating an effective population).

This size criterion could be related to multiple age classes of YCT within a population. Multiple age classes may provide an advantage in maintaining population resilience.

The third variable was associated with population production potential for the occupied habitat. The subcomponents for this variable were habitat quality, disease risk and presence of non-native fish, principally non-native salmonids. High quality habitats provide necessary the environment to enhance year class survival and population production that can favorably influence population resilience and persistence. Disease and competition with non-native fish can serve to nullify the benefits of habitat quality. The health score for production potential was obtained by determining the proportion of occupied habitat characterized by the various quality considerations (e.g., excellent, good, fair or poor). The presence of disease and/or non-native species served to lower the health score.

The fourth variable was the degree of population connectivity based on the nature of the habitat networks. It was assumed that YCT and most other cutthroat trout subspecies would continue to exist in relatively small patches of habitat (Dunham et al. 2002). That being the case, population health was believed to be enhanced by more complex habitat networks (e.g., multiple streams), even within relatively small patches of habitat. Stochastic and possibly deterministic influences may be dampened by the complexity of the habitat network. Strong habitat networks (e.g., more than 5 streams) increase the opportunity for movement of individual fish within the population, thereby potentially reducing negative influences resulting from stochastic and deterministic influences. The health determination for within population connectivity (nature of habitat networks) was derived by summing the number of streams associated with a given YCT population.

A composite score of the individual variables was developed into an overall health score for each population by applying weighted coefficients to each health variable and developing a composite score or rating. These coefficients were 0.7 for temporal variability, 1.2 for population size, 1.7 for population production potential, and 0.5 for within population connectivity. The weighted coefficients were initially obtained for the 2001 YCT status assessment (May et al. 2003) through consultation with a co-author³ of the Rieman et al. (1993) report. The same coefficient values have been applied to the population health evaluations for westslope, Colorado River, Bonneville, Rio Grande and Greenback cutthroat trout.

Several other characterizations associated with the conservation population were included in the geo-database. Details on these attributes can be found in Appendix C.

Evaluation of YCT Population Restoration and Expansion Opportunities

Evaluation of potential population and expansion opportunities was based on a review of historically occupied stream segments and lakes that were not currently occupied by conservation populations. The upper and lower bounds for stream segments and lakes not occupied by conservation populations were identified and evaluated. Each assessment team systematically proceeded to identify and evaluate YCT restoration and expansion opportunities using the historical habitat layer within each 4th level HUC as a base that was overlaid with the

³ Personal communication with Danny Lee, co-author of the Rieman et al. 1993 report.

coverage specifically associated with conservation populations. Unoccupied habitats were identified and attributed. Locations of complete barriers, or partial barriers having the potential to be upgraded to complete barriers, were logical break points for the unoccupied habitat segments.

Only historically occupied habitat was evaluated in this exercise. Other suitable habitat (i.e., suitable habitat not identified as historical) should be dealt with in subsequent analyses. The initial step was to identify which historical habitats were no longer suitable for sustaining YCT populations. The associated reasons for the unsuitable determination were linked to physical habitat (e.g., insufficient flows or degraded habitat), temperature conditions or both (Tables 6 and 7). The evaluation of potential restoration and expansion opportunities was applied to the remaining habitat segments.

Table 6. Criteria used to determine habitat inability to support self-sustaining populations of Yellowstone cutthroat trout. (Identify the one that best applies).

Code		Non-native Fish Stocking and/or Presence Status
1	H	The stream or stream segment has habitat that is incapable of supporting a self-sustaining population of YCT (i.e., there are severe habitat deficiencies).
2	T	The stream or stream segment has water temperatures that preclude supporting a self-sustaining population of YCT (i.e., water temperatures that are too high or too low).
3	HT	The stream or stream segment has both habitat and temperature deficiencies.

Table 7. Source of information used to judge habitat capability for restoration or expansion of Yellowstone cutthroat trout. (Identify the one that best applies).

Code	Source of habitat information
1	Judgment, extrapolated information from other streams
2	Judgment with ocular reconnaissance
3	Spot habitat sampling
4	Trend habitat sampling
5	Detailed habitat sampling

Barrier locations were the primarily factor used to identified habitat segments to be considered for restoration or expansion potential. Each habitat segment was evaluated for restoration or expansion potential based on four variables that included fish stocking and/or presence of fish, habitat quality, significance of any associated fishery, and complexity of fish removal (Appendix C). Each variable was rated on a scale of 1 to 4 with 1 being the highest potential and 4 being the lowest potential. The ratings for the four variables were combined into a composite score. For this exercise all variables were weighted equally (Table 8).

Table 8. Summary of factors considered in the assessment of restoration or expansion potential.

Variable	Description	Rank	Criteria
Biological Considerations Associated with YCT Restoration Opportunities	Specifically addresses the biological considerations associated with the presence of other trout in potential restoration segments.	1	No record of fish stocking <u>and</u> the segment is barren of fish
		2	Hybridized YCT are present in the absence of other trout and segment is not part of a conservation population.
		3	YCT may be present and non-native trout are present in low numbers. Segment is not part of conservation population.
		4	YCT maybe present and non-native trout are present in high numbers. Segment is not part of conservation population
Habitat Considerations Associated with YCT Restoration Opportunities	Specifically addresses habitat quality of potential restoration segments.	1	Excellent habitat quality
		2	Good habitat quality
		3	Fair habitat quality
		4	Poor habitat quality
Social and Political Considerations Associated with YCT Restoration Opportunities	Specifically addresses the relative significance of an existing fishery.	1	No fishery present.
		2	Minor fishery (i.e., minimal use)
		3	Moderate fishery
		4	Major fishery (i.e., significant use level)
Relative Complexity Considerations Associated with YCT Restoration Opportunities	Specifically addresses the complexity of non-native trout or hybrid YCT removals (chemical or physical).	1	No fish present
		2	Minor complexity.
		3	Moderate complexity.
		4	Major complexity.

Results and Discussion

Workshops, Assessment Teams, and Use of HUCs as Accounting Units

Two workshops were held to obtain the information for this status assessment. One workshop was held in Idaho Falls, Idaho and the other workshop was held in Billings, Montana. At each workshop, a systematic application of the assessment protocol was undertaken (Appendix C). A total of 32 fisheries professionals provided information used in the 2006 assessment. These biologists represented 5 state agencies, 3 federal agencies and 2 private organizations. In addition to the fisheries professionals, 14 GIS and data management specialists participated in the workshops to assist with data entry and display of status information. At each workshop consistency was maintained by having an individual with knowledge of the protocol and procedure in attendance at both workshops. GIS and database oversight at each workshop also ensured consistency and continuity. Some GIS specialists participated in both workshops. To the

degree possible, the information on YCT was quality control checked and edited at each workshop.

Fisheries professionals associated with the 2006 YCT status assessment had experience levels ranging from several months to several decades. Collectively, these fishery professionals had a total of 480 years of professional fisheries experience, of which 365 years (77%) were directly applicable to YCT conservation and management. The majority of participants had Master of Science degrees (26), 4 had Bachelor of Science degrees, one had a Master of Art degree, and two had PhDs (Appendix B).

A total of 39 4th level HUCs were re-evaluated during the 2006 status assessment. Each hydrologic unit was associated with an eight-digit identification number. Application of a 1:24,000 scale NHD stream layer and comparable lake layer were used to facilitate tracking of pertinent status information. Attribute information for the four parts (e.g., historical, currently occupied habitat, conservation populations and restoration or enhancement potentials) of the status assessment were captured in a geo-database specifically designed for YCT. In total, there were 87,976 GIS records and 33,109 attribute records associated with this status assessment. Not all information in the geo-database will be presented and discussed in this report. It is anticipated that other reports and papers will be developed in the future as the information is updated and used in the coordinated conservation program.

Historical Distribution

As previously described, the historical perspective for this status assessment was based on habitat hypothesized to be occupied by YCT when early European explorers entered western portions of the North American Continent (circa 1800 AD). Anecdotal information contained in journals and diaries of early visitors to this region of the North American continent provided some supportive information for inclusion or exclusion of YCT habitat in the historical database. The information contained in this 2006 assessment serves as a refinement of the historically occupied habitat presented in the 2001 status assessment. The 2001 status assessment utilized a process that required biologists to make specific notations on historical occupancy maps. This information was then transposed onto a 1:100,000-hydrography stream layer. For this status assessment, the 2001 historic the distribution was converted to the 1:24,000-NHD stream coverage. The resulting coverage was used as a template for re-evaluation of historical distribution. The 2006 status assessment also added lakes to the inventory of historically occupied habitats. These changes were added to the geo-database using tools in ArcGIS 9.0.

The base NHD 1:24,000 scale stream coverage contained just over 133,714 miles of stream channel. Included in this mileage were a significant number of ephemeral and intermittent channels that would not have been capable of supporting YCT. Conversion of the base historical distribution, determined in 2001, to the NHD 1:24,000 scale coverage, along with a minor amount of adjustment based on re-evaluation, resulted in the removal of a total of 115,994 miles (87%) of stream channel that were judged as being incapable of historically supporting YCT. Stream miles that were excluded included a significant number of streams with ephemeral or intermittent flows, mislabeled canals and ditches, stream segments above complete fish passage barriers that would have precluded YCT occupancy on or before 1800, and stream segments that were judged to have insufficient habitat necessary to support YCT populations.

For the stream segments above complete passage barriers, the location and type of barrier (e.g., waterfall, velocity, temperature, etc.) were noted. All historical barriers had to be a complete blockage to upstream fish movement and they were identified in the database as having historical significance. At the completion of this systematic review, approximately 17,721 miles of stream habitat were judged as having the potential of being historically (circa 1800) occupied by YCT (Figure 1; Appendix D). All 39 HUCs that were analyzed contained a portion of the total stream miles judged as being historically occupied. The estimated amount of historically occupied habitat in each state was 6,713 miles in Wyoming (38%), 6,471 miles in Idaho (37%), 4,296 miles in Montana (24%), 130 miles (<1%) in Utah and 111 miles (<1%) in Nevada (Table 9; Figure 2).

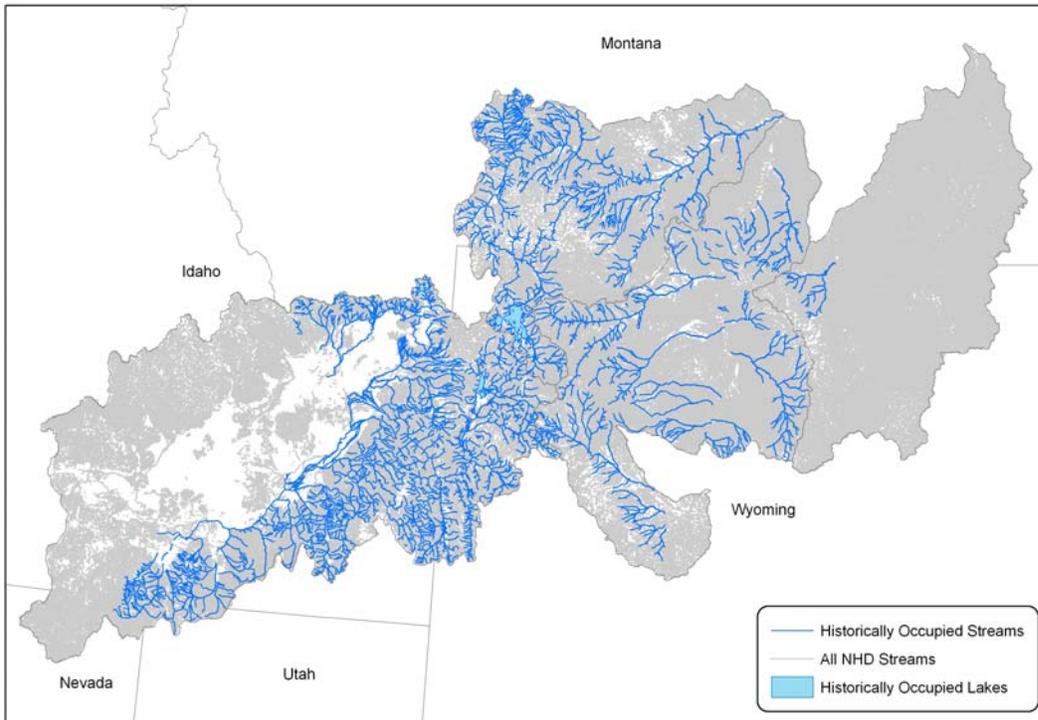


Figure 1. Historically occupied stream and lake habitats (blue) and the base NHD stream layer (gray).

Table 9. Historically occupied stream habitats within the five states with percent of historical habitat in parentheses.

<u>State</u>	<u>Historically Occupied Stream Miles</u>	<u>Percent of Historically Occupied</u>
Wyoming	6,713	(38%)
Idaho	6,471	(37%)
Montana	4,296	(24%)
Nevada	111	(<1%)
Utah	130	(<1%)
Totals	17,721	

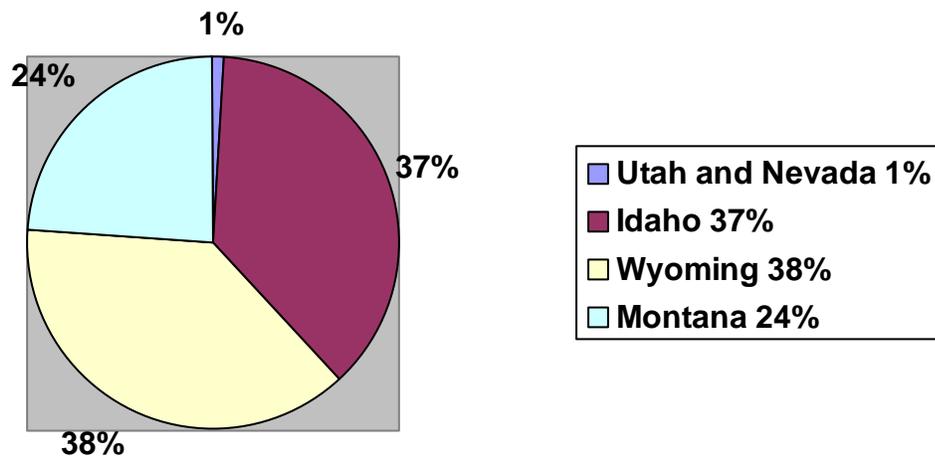


Figure 2. Percent of historically occupied stream miles by state.

A breakdown of historically occupied stream habitat by HUC is presented in Table 10. The largest number of miles was identified in the upper Yellowstone watershed and the fewest number of miles was in the Popo Agie watershed.

Table 10. The amount of historically occupied stream habitat for the 39 4th level HUCs analyzed in 2006.

Name	HUC	Stream Miles	Stream KM
Yellowstone Headwaters	10070001	952.47	1532.89
Upper Yellowstone	10070002	1115.96	1795.94
Shields	10070003	682.12	1097.64
Upper Yellowstone-Lake Basin	10070004	287.99	463.45
Stillwater	10070005	416.22	670.11
Clarks Fork Yellowstone	10070006	524.61	844.72
Upper Yellowstone-Pompey's Pillar	10070007	273.41	440.17
Pryor	10070008	225.89	363.51
Upper Wind	10080001	548.89	883.41
Little Wind	10080002	178.68	287.52
Popo Agie	10080003	129.8	208.94
Upper Bighorn	10080007	629.5	1013.47
Nowood	10080008	555.45	893.84
Greybull	10080009	311.53	501.5
Big Horn Lake	10080010	277.76	447
North Fork Shoshone	10080012	183	294.56
South Fork Shoshone	10080013	319.91	514.96
Shoshone	10080014	172.48	277.58
Lower Bighorn	10080015	422.48	679.69
Little Bighorn	10080016	223.56	359.73
Upper Tongue	10090101	663.22	1067.3
Snake Headwaters	17040101	317.02	510.18
Gros Ventre	17040102	826.09	1329.41
Greys-Hoback	17040103	362.11	582.65
Palisades	17040104	580.37	934.31
Salt	17040105	272.7	439.01
Idaho Falls	17040201	582.88	938.16
Upper Henrys	17040202	290.81	467.84
Lower Henrys	17040203	579.18	932.15
Teton	17040204	393.92	633.73
Willow	17040205	542.64	873.3
American Falls	17040206	632.21	1017.35
Blackfoot	17040207	823.61	1325.55
Portneuf	17040208	277.89	447.07
Lake Walcott	17040209	661.21	1064.4
Raft	17040210	594.74	957.27
Goose	17040211	457.65	736.63
Beaver-Camas	17040214	159.61	256.9
Medicine Lodge	17040215	952.47	1532.89
	Totals	17,721	28,520

The database contained information on a total of 61 lakes that were identified as being historically occupied by YCT. The surface area of these 61 lakes was estimated at 124,716 acres (Table 11). Lakes identified ranged in size from Yellowstone Lake in Yellowstone National Park and Henry's Lake in Idaho, as the largest lakes, to many smaller (e.g., ≤ 10 acres) high elevation lakes. The estimated lake habitat within each state was 118,594 acres in Wyoming and 6,122 acres in Idaho. It should be noted, that information associated with several lakes within Montana that were believed to be historically occupied were inadvertently omitted during data entry. As a result the number of lakes included in the database and the surface area associated with these lakes represents an underestimate of the actual amount of lake environment believed to have been historically occupied by YCT. This error will be corrected during the next update scheduled for 2007.

Table 11. Number of lakes and surface areas estimated to have been historically occupied.

Watershed Name	HUC Identification Number	Total Acres of Historically Occupied Lake Habitat	Number of Lakes
Yellowstone Headwaters	10070001	84442.0	1
Snake Headwaters	17040101	33404.6	30
Gros Ventre	17040102	148.6	13
Greys-Hoback	17040103	598.6	15
Upper Henrys	17040202	6116.9	1
Teton	17040204	5.0	1
Totals		124,715.6	61

Current Distribution

The analysis procedure for determining current distribution of YCT focused on determining the extent of habitat, both stream and lake, that are currently occupied by YCT. To complete this task, biologists were asked to systematically re-evaluate the current distribution map that was converted from the 2001 assessment, and to adjust the current distribution information as needed. The 2006 status database utilized the NHD stream and lake coverage, at the 1:24,000 map scale and these coverage were attributed as individual stream or lake segments. Each lake was identified as a single habitat segment. The focus was to re-evaluate all habitats currently occupied by YCT within the broad perimeter of the historical distribution, and to develop an expanded set of condition characterizations that would be of value to conservation planning and evaluation. Current distribution information included some habitats from within the broad perimeter of historical range, which were not identified as being historically occupied (e.g., habitats above historical barriers that are currently occupied). Use of the NHD coverage allowed for tracking of current distribution characterizations at a very "fine scale" due to the nature of stream segmenting that accompanied the NHD stream layer and the application of the event creation tool, supplied by the NRIS team. In total there were 1,314 stream segments and 205 lake segments identified as being currently occupied by YCT (both spotting patterns combined). Attached to these current distribution segments was an expanded set of attribute characterizations deemed important to YCT conservation.

Summation of currently occupied stream segments resulted in a determination that 7,527 miles of habitat were occupied by YCT (43% of historically occupied stream habitat; Figure 3). YCT currently occupy about 4,048 miles in Wyoming (54% of currently occupied stream habitat; 23% of historical stream habitat in Wyoming), 2,033 miles in Idaho (27% of currently occupied stream habitat; 31% of historical stream habitat in Idaho), 1,339 miles in Montana (18% of currently occupied stream; 31% of historical stream habitat in Montana), about 58 miles in Nevada (0.8% of currently occupied stream habitat; 52% of historical stream habitat in Nevada), and 49 miles in Utah (0.7% of currently occupied habitat, 38% of historical stream habitat in Utah; Table 12; Figure 4).

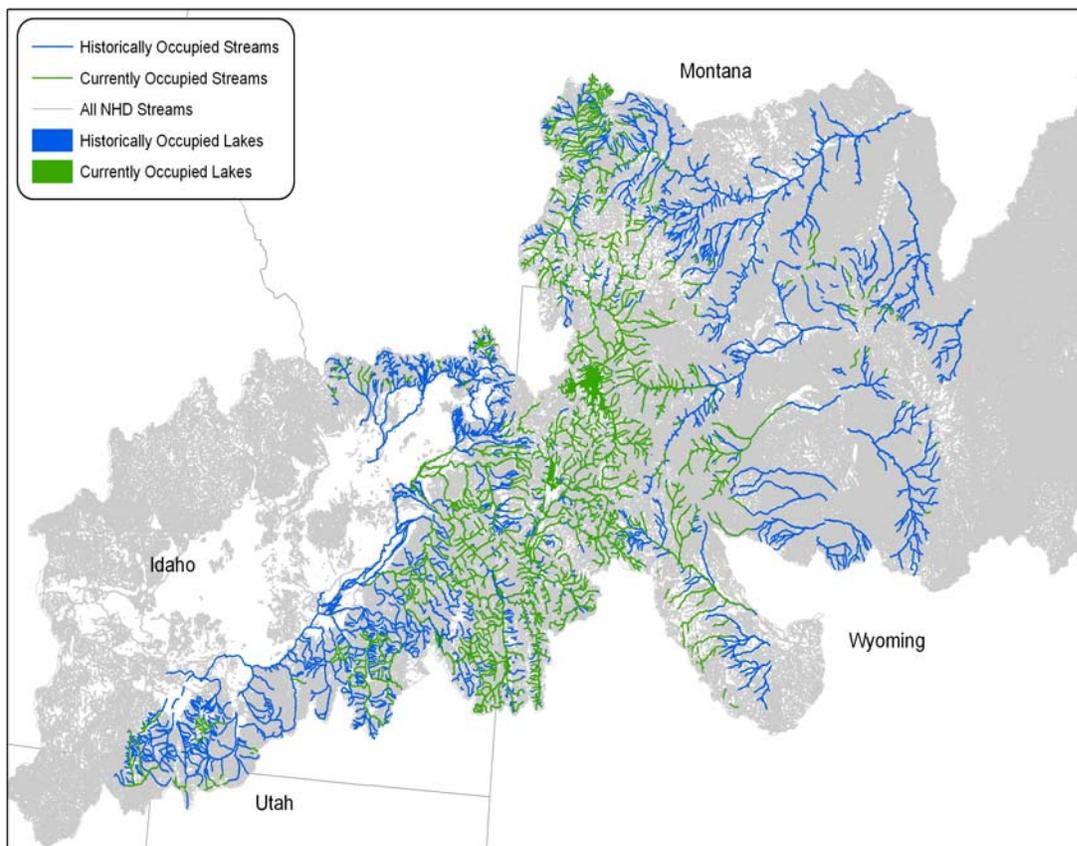


Figure 3. Currently occupied stream segments (green) overlaying the historically designated stream segments (blue) and the base hydrography layer (gray).

This total occupied stream habitat included some streams located within the broad perimeter of historical habitat that were not viewed as being historically occupied. YCT were identified as occupying 205 lakes within the broad historical range boundary. The number represents a 366% increase over the 61 lakes identified as being historically occupied. YCT occupied habitat in 37 of the 39 HUCs that were identified as containing historical habitat.

Table 12. Currently occupied stream habitat within the five states with percent of historical habitat in parentheses.

<u>State</u>	<u>Currently Occupied Stream Miles</u>	<u>Percent of Currently Occupied</u>	<u>Percent of Historically Occupied within State</u>
Wyoming	4,048	53.7%	60.3%
Idaho	2,033	27.0%	30.0%
Montana	1,339	17.8%	31.2%
Nevada	58	0.8%	37.7%
Utah	49	0.7%	52.3%
Totals	7,527		

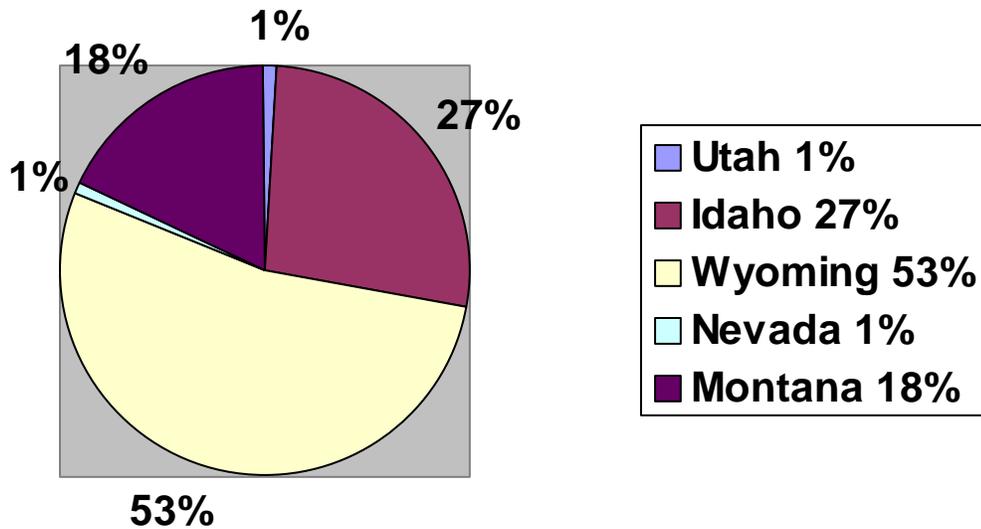


Figure 4. Percent of currently occupied habitat expressed as stream miles, by state.

Fish Passage Barriers

Identification of barriers was a significant part of both the historical and current distribution evaluations. An accurate depiction of the location and characterization of fish passage barriers was determined to be fundamental to conservation planning and implementation for YCT. Specific information associated with each barrier was used to assess whether individual stream segments were likely to be historically occupied by YCT, to assess potential influences from

non-native salmonids and other fish species, to assess potential influences from genetic and disease sources, and to determine the potential of connectivity between populations and subpopulations of YCT. From a historical perspective, long-term geological barriers served to maintain significant portions of some drainages in a fishless condition with regard to YCT (Jordan, D.S. 1891).

Barrier locations were located (as points in ArcGIS) on the NHD layer and specific characterizations associated with each barrier were added to the geo-database. Only barriers of known or perceived significant to YCT were included in the geo-database.

There were a total of 902 barriers identified. The barrier locations were noted as specific points in ArcGIS. Each barrier was attributed with information associated with barrier type, blockage extent and barrier significance. There were 638 complete or total barriers to upstream fish passage. Four hundred and nineteen (419) of these barriers were identified during the determination of historically occupied habitat. For a barrier to be identified as having historical significance, the barrier had to provide complete blockage of upstream fish passage. The remaining 219 total barriers were associated with the current distribution of YCT. In total there were 207 partial barriers identified. These were barriers that were judged to have an influence on fish passage on a seasonal and/or intermittent basis. Of the 426 barriers identified during the determination of currently occupied habitat, 219 were total barriers, 207 were partial barriers and 57 had their blockage extent judged as unknown. With regard to barrier type, the largest proportion of barriers were associated with waterfalls, followed by barriers created by culverts, water diversions, velocity barriers, and man-made dams (Figure 5). The remaining barrier types included insufficient flows, bedrock features, water pollution, and water temperatures. Twenty-five barriers were placed in the unknown category or were placed in the “other” characterization for barrier type with no description. A complete range-wide inventory of all barriers associated with YCT distributions has not been completed, and it is probable that current barrier information represents a conservative assessment of fish passage barriers.

Origin of Current Distributions and Migratory Life Histories

The origin of YCT within the current distribution and the migratory life histories within the habitat segments were part of the additional information collected in 2006. These parameters were added to provide an improved picture of current distribution for YCT. For stream environments occupied by YCT, 6,733 miles (89%) were occupied by fish of aboriginal origin and approximately 686 (9%) miles originated from anthropogenic intervention associated with stocking. YCT in 108 stream miles were of unknown origin (Table 13).

The origin of YCT currently occupying lake segments, as expected, reflected a much higher level of human intervention associated with stocking of YCT (Table 14). Nevada and Utah did not identify any lakes that were either historically or currently occupied by YCT.

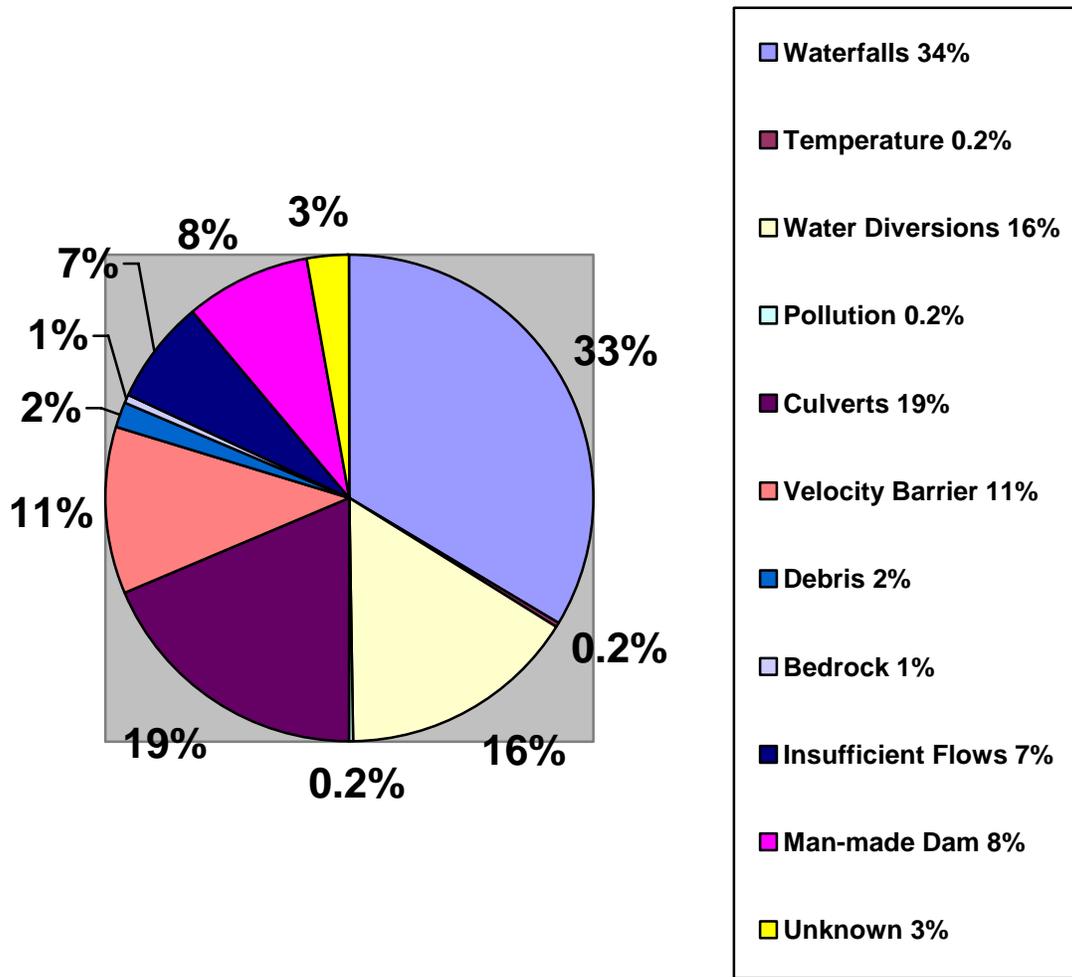


Figure 5. Barrier types identified during the assessment (pollution and water temperature barriers made up less than 1%).

Table 13. Origin of stream dwelling YCT (by state and stream miles).

<u>State</u>	<u>Aboriginal Origin</u> <u>(Miles)</u>	<u>Anthropogenic</u> <u>Origin</u> <u>(Miles)</u>	<u>Unknown Origin</u> <u>(Miles)</u>
Wyoming	3,466	521	61
Idaho	2,024	2	7
Montana	1,136	163	40
Nevada	58	--	--
Utah	49	--	--
Total miles	6,733	686	108

Table 14. Origin of lake dwelling YCT (by state and number of lakes).

<u>State</u>	<u>Aboriginal Origin (Lakes)</u>	<u>Anthropogenic Origin (Lakes)</u>	<u>Unknown Origin (Lakes)</u>
Wyoming	54	114	2
Idaho	6	1	--
Montana	--	26	2
Totals	60	141	4

Migratory life histories associated with current YCT distributions indicated that 1,700 miles (23%) of stream environment contained only non-migratory fish. YCT with a migratory life history occupied approximately 1,199 miles of stream. The largest proportion of stream habitat (4,374 miles) was occupied by fish that demonstrated both migratory and non-migratory life histories (Table 15). The migratory life history in 254 miles of stream was identified as being unknown.

The migratory life history determinations of lake dwelling YCT reflected a significant degree of uncertainty and confusion as to how this characterization should be applied (Table 16). It is highly unlikely that YCT dwelling in lake environments did so without the influence of flowing water to meet the reproductive requirements. Few lakes would have habitat conditions (e.g., within lake springs) capable of providing the flows needed to successfully hatch eggs and develop sac-fry. Unless there is specific documentation that within lake spawning was successful, lake dwelling YCT should be judged to have migratory behavior. A more thorough review of the migratory life history information should be undertaken in subsequent updates to more fully validate the migratory life histories of lake dwelling YCT.

Table 15. Migratory life histories of stream dwelling YCT.

<u>State</u>	<u>Non-Migratory (Miles)</u>	<u>Migratory (Miles)</u>	<u>Non-Migratory and Migratory (Miles)</u>	<u>Unknown Migratory Status (Miles)</u>
Wyoming	629	804	2,458	157
Idaho	582	249	1154	48
Montana	387	146	761	46
Nevada	54	--	1	3
Utah	49	--	--	--
Total Miles	1,701	1199	4,374	254

Table 16. Migratory life history of lake dwelling YCT (by state and number of lakes).

<u>State</u>	<u>Non-Migratory Life History (Lakes)</u>	<u>Migratory Life History (Lakes)</u>	<u>Non-Migratory and Migratory Life Histories (Lakes)</u>	<u>Unknown Migratory Life History (Lakes)</u>
Wyoming	29	6	119	16
Idaho	1	5	1	--
Montana	28	--	--	--
Total lakes	58	11	120	16

Stocking and Presence of Non-Native Species

The record of fish stocking and the presence of non-native fish within the occupied habitat segments were part of the new information collected in 2006. These parameters were added to provide an improved picture of the current distribution of YCT. For the stream environments occupied by YCT, 2,333 miles of occupied stream (31%) had no record of fish stocking, 1,045 miles of stream (14%) had records that indicated that YCT (either large spotted and/or fine spotted forms) had been stocked, and 4,149 miles of occupied stream (55%) had stocking records indicating that various non-native fish (e.g., rainbow, brown, brook trout etc.) had been stocked (Table 17).

Table 17. Records of fish stocking associated with current distributions of YCT (recorded by state and stream miles).

<u>State</u>	<u>No Record of Stocking (Miles)</u>	<u>Record of YCT Stocking (Miles)</u>	<u>Record of Non-Native Stocking (Miles)</u>
Wyoming	1,100	696	2,253
Idaho	866	25	1,142
Montana	330	325	684
Nevada	13	--	45
Utah	24	--	24
Total miles	2,333	1,045	4,149

Records of fish stocking within lakes current occupied by YCT indicated that 71 lakes had no record of fish stocking, 62 had records indicating that YCT (large spot and/or fine spotted forms) had been stocked, and 72 lakes had records that indicated that various non-native fish had been stocked (Table 18).

Table 18. Fish stocking status associated with current distribution of YCT for 2006.

<u>State</u>	<u>No Record of Stocking (Lakes)</u>	<u>Record of YCT Stocking (Lakes)</u>	<u>Record of Non-Native Stocking (Lakes)</u>
Wyoming	60	46	64
Idaho	1	1	5
Montana	10	15	3
Totals	71	62	72

Even more pertinent to YCT conservation was the added information collected in 2006 associated with the presence of non-native fish that were considered to be sympatric with YCT. Within the currently occupied stream habitat there were 3,504 miles (47%) that were identified as having no non-native fish present. A total of 4,024 miles (53%) of occupied stream habitat were identified as having YCT and non-native fish considered to be in a sympatric condition (Table 19; Figure 6).

Table 19. Non-native fish presence with YCT (by state and stream miles) based on 2006 information.

<u>State</u>	<u>No Non-Native Fish Present (Miles)</u>	<u>Non-Native Fish Present (Miles)</u>
Wyoming	2,144	1,905
Idaho	756	1,277
Montana	510	829
Nevada	55	3
Utah	39	10
Total miles	3,504	4,024

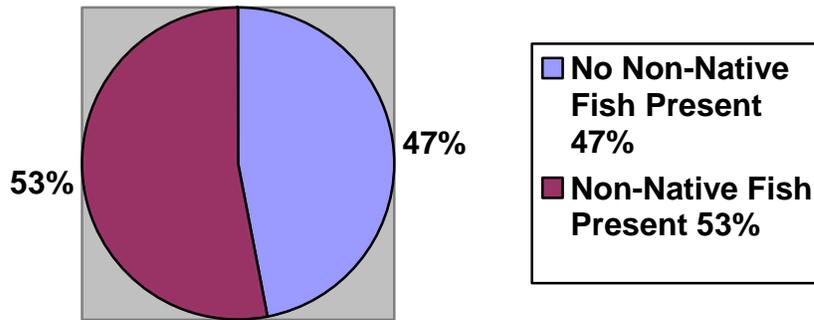


Figure 6. Presence of non-native fish in sympatry with YCT (by percent of occupied stream habitat).

The presence of non-native fish in lake environments occupied by YCT was substantially less (Table 20; Figure 7), compared to stream habitats. It should be noted YCT were not historically present in many of these lakes.

Table 20. Record of non-native fish presence with YCT (by state and number of lakes).

<u>State</u>	<u>No Non-Native Fish Present (Lakes)</u>	<u>Non-Native Fish Present (Lakes)</u>
Wyoming	139	31
Idaho	1	6
Montana	27	1
Total lakes	167	38

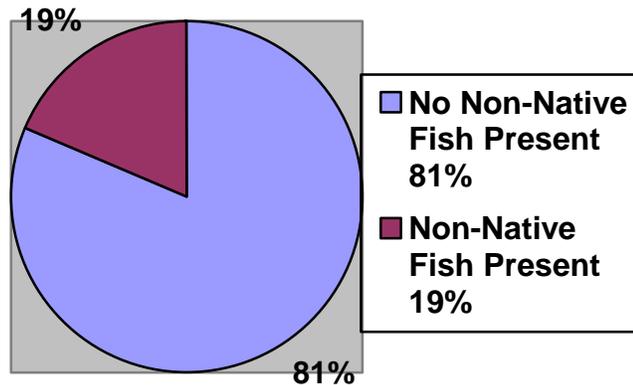


Figure 7. Presence of non-native fish sympatric with YCT (by percent of occupied lakes).

Genetic Status

Genetic testing of YCT across all currently occupied habitats was incomplete. Most genetic testing has not been completed in a structured fashion. Consequently, the available genetics information does not constitute a representative sample taken from the entire YCT population. Instead, there has been a tendency to sample fish from populations that appeared to be typical of the YCT phenotype. Genetic sampling and analysis has been conducted on a sample basis for 4,052 miles of occupied stream habitat (54% of occupied habitats). No evidence of introgression has been found in samples covering about 3,112 miles (80%) of sampled area (Table 21; Figure 8). YCT sampled from 771 miles (20% of sampled miles; 10% of currently occupied stream habitat) reflected varying levels of hybridization. The genetic results reflect a composite of genetic condition over the time span that sampling has been occurring. It is anticipated that site-specific results may change to some extent as sampling continues through time. YCT within 1,854 miles (24% of occupied habitats) were suspected of being genetically unaltered, based on the absence of introduced hybridizing species and/or the lack of records associated with stocking of hybridizing species. YCT sampled from another 1,614 miles of occupied habitat were identified as having the potential of being hybridized due to the presence, and/or past stocking of hybridizing nonnative species or subspecies. One hundred and sixty nine miles were linked to YCT that occupied habitat as a mixed stock of genetically unaltered and altered individuals. For an unexplained reason, 7 miles of stream habitat were tracked as “not applicable” with regard to genetic characterization.

Table 21. Genetic status for Yellowstone cutthroat trout by stream length (miles) within the current range as of 2006.		
Genetic status	Miles	% of occupied
Tested; Unaltered (<1% introgression)	3,112	41%
Tested; <u>>=1% to <=10%</u> introgression	612	8%
Tested; >10% to <u>>=25%</u> introgression	103	1%
Tested, >25% introgression	56	1%
Suspected Unaltered	1,854	25%
Potentially Altered	1,614	21%
Mixed Stock; Altered and Unaltered	169	2%
Not Applicable	7	0%
TOTAL	7,527	100%

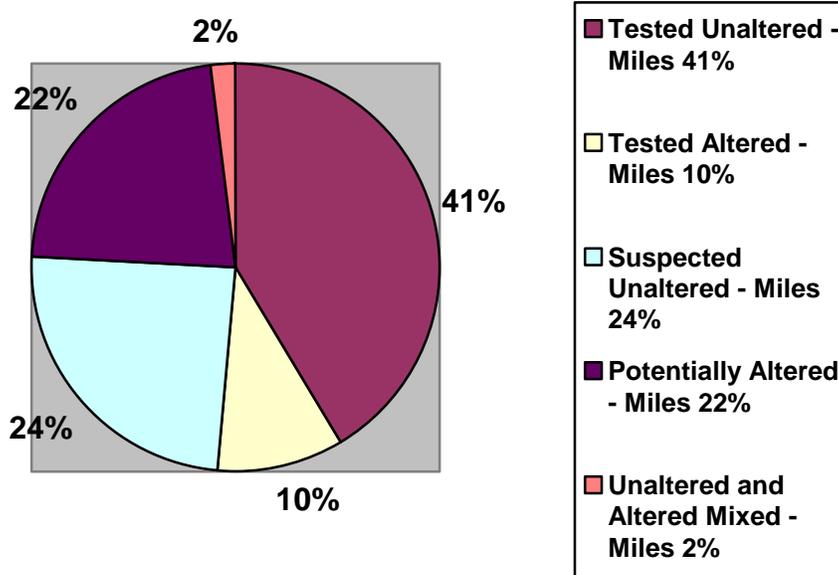


Figure 8. Genetic status of Yellowstone cutthroat trout expressed as percentage of currently occupied habitats (miles) classified within each genetic status category for this assessment completed in 2006.

Genetic results associated with lake sampling reflected the results of a substantially reduced sampling effort. Only 12 of the 205 lakes identified as containing YCT were reported as having genetic data. Nine lakes were tested and found to be genetically unaltered and 3 lakes were tested and found to have some level of non-native trout genes. Most lakes (154) were identified as being untested and suspected of being genetically unaltered due to the fact that YCT that were used to establish a population in many lakes were from genetically unaltered sources. Thirty-

eight lakes were judged to have a high probability of being hybridized based on stocking records and/or the known presence of hybridizing fish that are sympatric with YCT (Table 22; Figure 9).

Table 22. Genetic status for Yellowstone cutthroat trout by number of lakes within the current range as of 2006.		
Genetic status	Number of Lakes Occupied	Percent of Lakes Occupied
Tested; Unaltered (<1% introgression)	9	4%
Tested; ≥1% to ≤ 10% introgression	2	1%
Tested; >10% to ≥ 25%_introgression	0	--
Tested, >25% introgression	1	<1%
Suspected Unaltered	154	77%
Potentially Altered	38	17%
Mixed stock; Altered and Unaltered	1	<1%
TOTAL	205	100.0

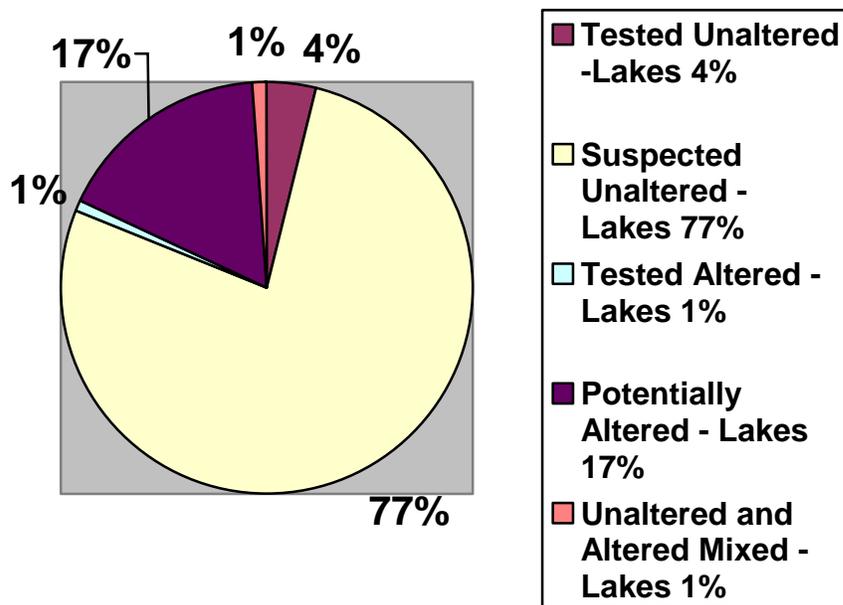


Figure 9. Genetic status of Yellowstone cutthroat trout currently occupying lake habitat (number of lakes).

To provide insight into the likely genetic status of YCT within habitats classified as “Untested - Suspected Unaltered” and “Untested - Potentially Hybridized” we refer the reader to the westslope cutthroat (WCT) status assessment that was completed in February, 2003 (Shepard et al. 2003). For central Idaho where limited genetic testing had been conducted, the WCT assessment team took a closer look at classification results for 10 separate 4th code HUCs where some genetic testing had been conducted, they compared the level of introgression within tested

stream segments to the classifications for stream segments where no genetic testing had been done. Seven of these ten HUCs had the majority of the stream segments classified as “Potentially Hybridized.” Of these seven, genetic testing in five HUCs found no evidence of introgression, while genetic testing in one HUC found 65% of tested stream length had no evidence of introgression and testing in another HUC found evidence of introgression in all tested samples. Conversely, some stream segments in one HUC, that supported WCT that were classified as “Suspected Unaltered”, tested as hybridized, while genetic testing in two other HUCs that were predominated by streams classified as “Suspected Unaltered” found no evidence of introgression. We feel the situation for YCT maybe somewhat similar to that of WCT in that the potential for introgression is highest in stream segments that are connected to waters that support nonnative species or subspecies that could interbreed with YCT.

We caution against drawing specific conclusions about genetic status of YCT for those populations identified as suspected unaltered or potentially hybridized from a genetic perspective. The only definitive way of determining genetic status is through formal genetic testing using a sampling methodology that is both time and location specific.

YCT Abundance

Densities of sexually mature YCT (15 cm and larger) were re-evaluated in 2006 using a more quantified approach than was applied in 2001. The 2001 status assessment called for making broad level qualitative determinations (e.g., abundant, common, rare or unknown) for the abundance of YCT based on population information associated with the occupied habitat segments. In addition, the 2001 assessment employed a second option of determining abundance based on habitat or site potential. As a result, there was uncertainty in how the abundance determinations were made. The 2006 status assessment revised the protocol to reflect a more quantitative approach based on estimated or known numbers of adults per miles for each stream segment. Densities of YCT occupying lake habitats were not included in the database. Instead, YCT that were associated with lake environments were included in the stream densities associated with the stream segments utilized by the lake populations for spawning. Stream segment densities were characterized by density ranges (Table 23). When sampling was sufficient for population estimation, these estimates were included in the database and the estimated density was included in the proper density range. A total of 2,398 miles of occupied habitat (32% of currently occupied habitats) supported YCT identified within the 0- to 50-fish/mile density range. Within the 51- to 150-fish/mile range there were 2,036 miles (27%) of occupied stream habitat. Densities in the 151- to 400-fish/mile range occurred in 1,781 stream miles (15%). Densities in the 401- to 1,000-fish/mile range and the 1001- to 2000-fish/mile range occurred in 626 miles (9%) and 106 miles (1%), respectively. Stream segments associated with 580 miles of stream were reported to have unknown YCT densities.

Table 23. Sexually mature YCT (≥ 15 cm in total length) densities for currently occupied stream habitat (miles). Percentages represent the proportions of each density range.

Density Range (fish/mile)	Occupied Stream Habitat (Miles)	Percent of Occupied Habitat
0 to 50	2,398	32
51 to 150	2,036	27
151 to 400	1,781	24
401 to 1000	626	8
1001 to 2000	106	1
Over 2000	0	--
Unknown	580	8
Totals	7,527	

Habitat Quality

Habitat quality and average bankfull stream widths were two new parameters added to the 2006 status protocol. The total amount of YCT habitat viewed as excellent was approximately 1,080 miles (14% of currently occupied stream habitat). Habitat amounts associated with good, fair and poor conditions were 3,943 (52%), 1,468 (20%), and 380 (5%) miles of stream, respectively. A total of 653 (9%) miles of occupied habitat were reported to have unknown habitat quality (Figure 10). Habitat quality considerations by state are presented in Table 24. Habitat quality was only assessed for stream environments.

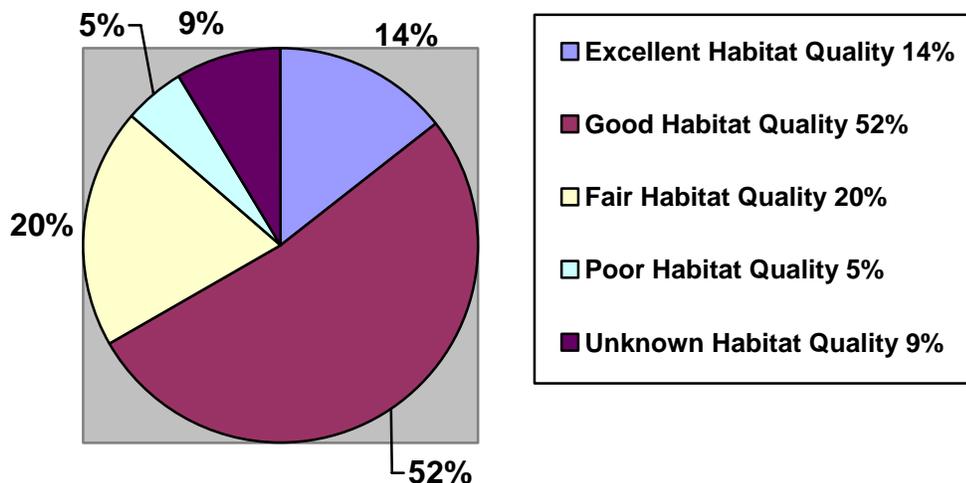


Figure 10. Habitat quality ratings for currently occupied stream habitat.

Table 24. YCT habitat quality for currently occupied habitat (stream miles) in the five states.

Habitat Quality	Wyoming	Idaho	Montana	Nevada	Utah	Totals
Excellent	539	390	151	--	--	1,080
Good	2,592	746	604	--	3	3,946
Fair	717	448	225	48	29	1,468
Poor	101	262	8	--	9	380
Unknown	99	188	351	10	7	653
Total miles						7,527

Stream segment bankfull widths were placed into stream width categories. The majority of occupied stream habitat (2,604 miles) was associated with widths in the 5 to 15 feet category. The next highest amount of stream habitat (1,878 miles) was in the 16 to 25 feet category. Twelve hundred and seventeen miles of habitat were in the 26 to 50 feet category and 907 miles had widths greater than 50 feet. YCT occupied 574 miles of stream habitat that was less than 5 feet in width and other 346 miles of occupied stream habitat was classified as having unknown stream widths (Figure 11).

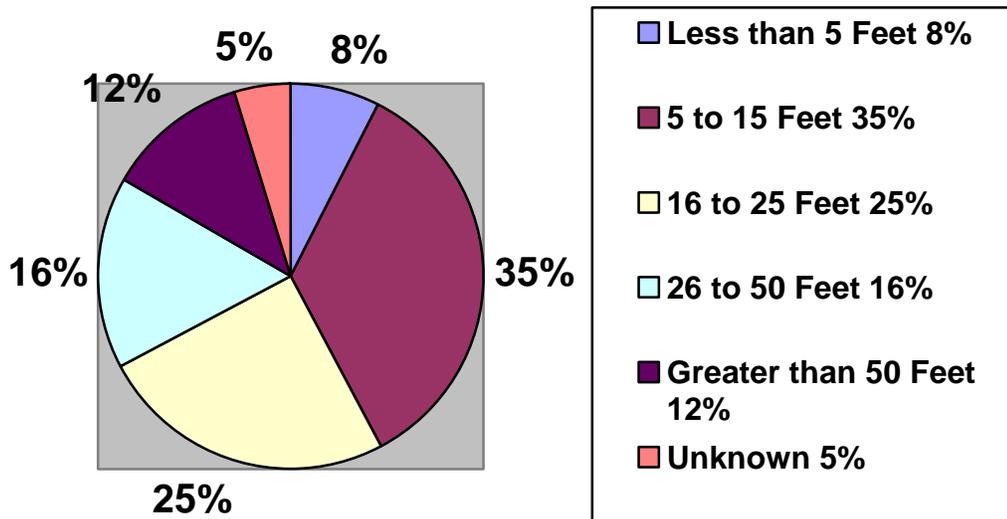


Figure 11. Percentage of occupied stream habitat (miles) by bankfull width category.

Land Ownership Patterns for Current YCT Distribution

Of the 7,527 miles of habitats currently identified as being occupied by YCT (both spotting patterns combined), approximately 4,886 miles (65%) were associated with land administered by specific Federal agencies and Tribal governments. An estimated 962 miles were in designated National Parks (NPS); 3,488 miles were within Forest Service administered lands (excluding miles with the wilderness category); 231 miles were associated with Tribal governments; 176 miles were administered by the Bureau of Land Management; and, 26 miles were administered by the Fish and Wildlife Service. A significant amount of the habitat (1,146 miles) associated with Federal administration was within a category called “wilderness.” This category included areas with special management emphasis that provided additional protection to YCT habitats. A substantial amount of stream habitat was associated with private properties (2,055 miles; 27%) and a lesser amount was linked to state ownership (207 miles; 3%). Three hundred and eight miles of stream habitat were placed in an “other” category (Figure 12). The breakdown of currently occupied YCT stream habitats associated with land ownership and Federal administration is provided in Table 25.

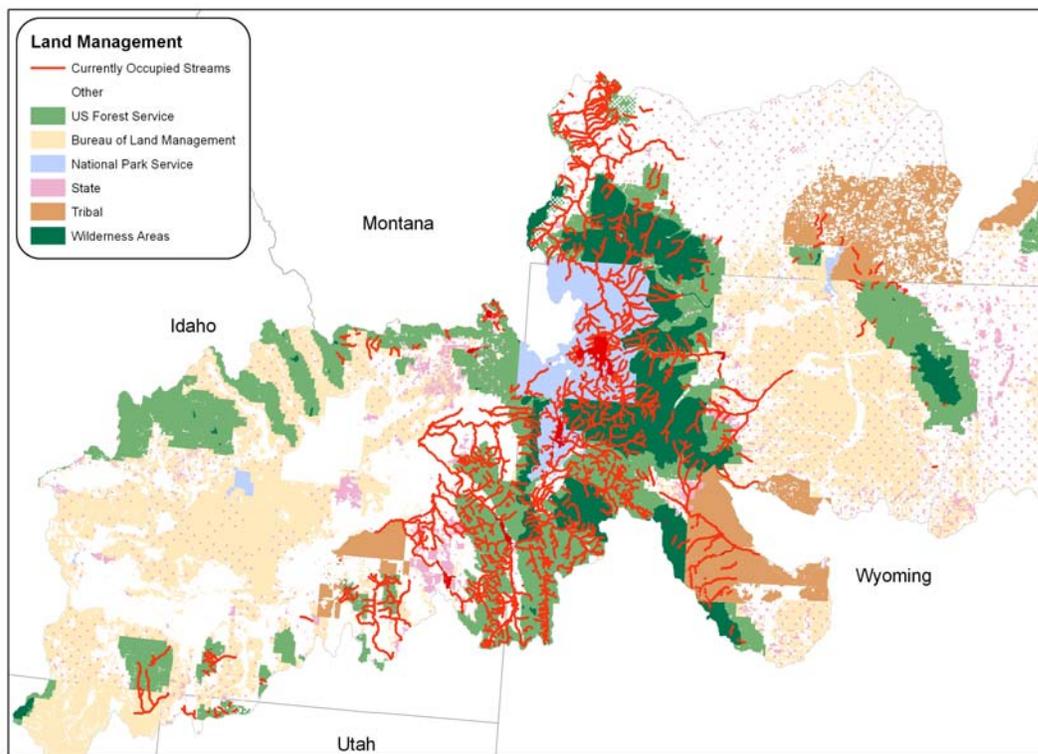


Figure 12. Land ownership patterns for current YCT distribution.

Table 25. Currently occupied YCT habitat (stream miles) by land ownership and administration.

Land Ownership and Administration	Wyoming (Miles)	Idaho (Miles)	Montana (Miles)	Nevada (Miles)	Utah (Miles)	Totals
Forest Service (including "wilderness")	2,124	848	500	--	16	3,488
National Park Service	926	3	34	--	--	962
Bureau of Land Management	38	122	2	10	5	176
Bureau of Indian Affairs	174	17	41	--	--	231
Fish and Wildlife Service	26	--	--	--	--	26
State Lands	78	114	15	--	--	207
Private Lands	538	815	627	48	28	2,056
Other Lands	144	112	122	--	--	378
Total miles	4,049	2,033	1,338	58	49	7,527

Conservation Populations

A total of 382 individual conservation populations of YCT were identified during the 2006 status assessment. The criteria applied during conservation population identification included: aggregation of habitat segments (stream and/or lake) that supported YCT that functioned as a reproductive unit (i.e., genetic exchange within the population occurred in both an upstream and downstream manner); and complete barriers to upstream fish passage could not exist within the habitat network associated with the population. These 382 conservation populations occupied approximately 7,204 miles of stream habitat (96% of currently occupied stream habitats; 41% of historical stream habitat) and 165,717 acres of habitat within 198 lakes (Figure 13).

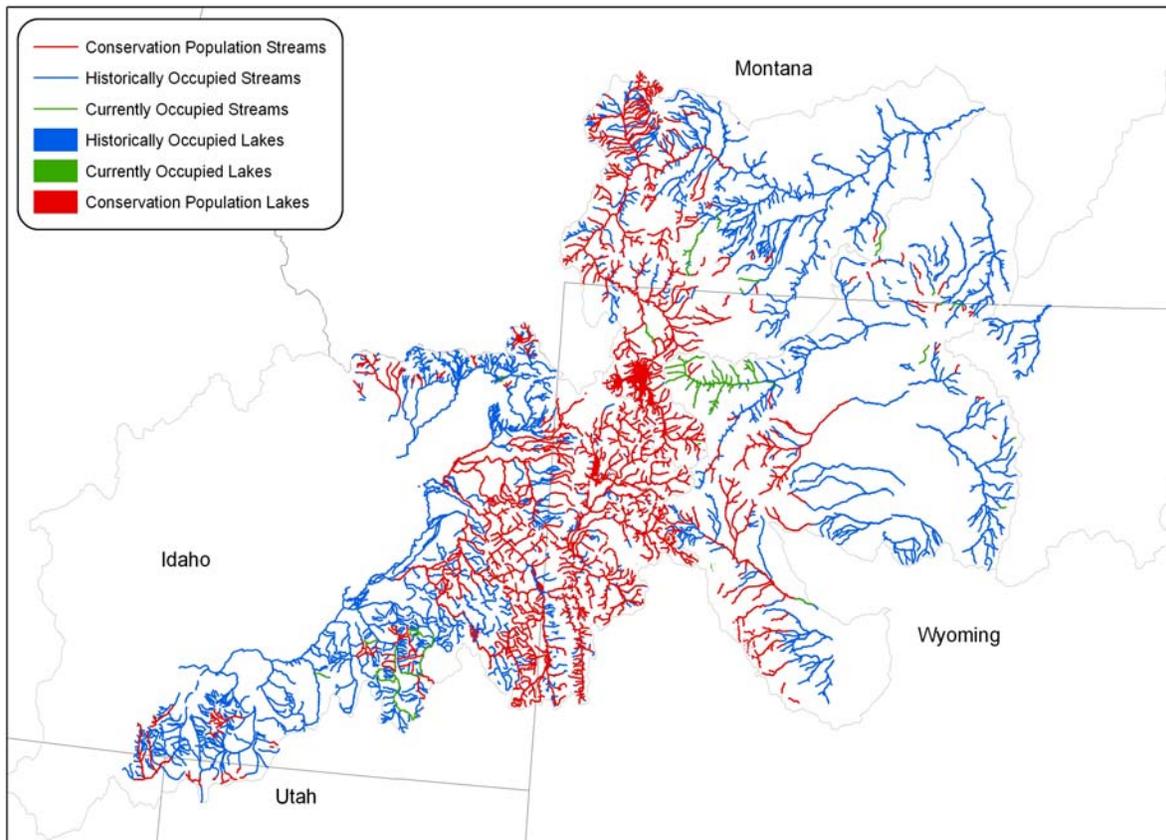


Figure 13. Distribution of YCT conservation populations (red) throughout their range as of 2006. Shown overlaying their current distribution (green) and the historic distribution (blue). The NHD layer is shown in light gray.

Conservation populations were spread throughout the historical range, occupying habitat in all five states and in 37 of the 39 HUCs identified as being historically occupied by YCT. Two hundred and sixty (261) conservation populations were confined only in stream environments, 45 conservation populations occupied both stream and lake habitats and 76 conservation populations were confined to only lake environments. For the group of conservation populations that were identified as occupying only lake environments it was highly likely that some flowing water was associated with each lake and that NHD mapping may have overlooked many small stream courses that were associated with these lakes. In other instances, biologists may have overlooked the status protocol's requirement that YCT be self-sustaining and some lakes may have been inappropriately included as conservation populations. These lake only populations should be re-evaluated during the next status update scheduled for 2007.

Most conservation populations were confined within a single state. Conservation populations were more densely concentrated within the central portion of the historical range (Figure 13).

The amount of habitat occupied by each conservation populations was highly variable. The occupied stream habitat for individual conservation populations varied from 0.2 miles to over 485 miles. The average length of occupied stream for the conservation population was approximately 24 miles. A frequency histogram of mileage groupings by conservation population is presented in Figure 14. The distribution of stream lengths occupied by YCT conservation populations continued to be skewed toward smaller streams. Most conservation populations (63%) in stream environments occupied stream lengths of 10 miles or less.

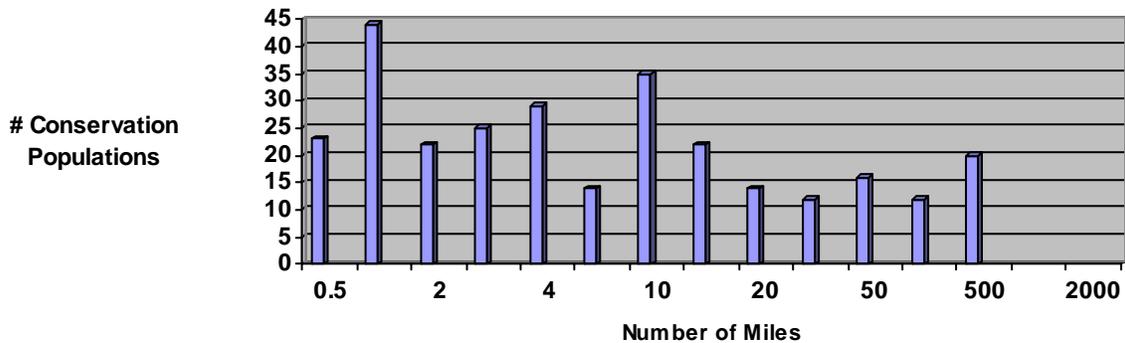


Figure 14. Frequencies of the number of miles (x-axis) occupied by number of conservation populations (y-axis) of Yellowstone cutthroat trout throughout their range. Mileage bins were non-uniformly assigned.

The surface area of the 198 lakes that were associated with the conservation populations ranged from <1 acre to over 84,700 acres. The average surface area of occupied lake habitat was approximately 1,380 acres. Similar to the occupied stream habitat, the size distribution for occupied lakes was skewed toward smaller lakes. The number of lakes associated with the individual conservation populations ranged from 1 to 15 lakes indicating a migratory connection between some lakes.

Conservation Population Qualifier

Each conservation population was assigned a specific conservation population qualifier code. The qualification associated with “core” conservation population code included the requirement that genetic testing had verified that some or all mapping segments were genetically unaltered. Any non-tested mapping segments for “core” populations had to be suspected to be unaltered due to no stocking record of hybridizing fish and/or that hybridizing fish were known not to be sympatric with the population. Additional conservation qualifier codes included known or probable unique life histories, known or probable unique environmental adaptations, known or probable predisposition to manifest a unique physical trait (e.g., large size, distinctive coloration, etc.), and there was an “other” category. The “other” category was used to identify conservation populations that did not specifically fit into one of the other categories. In a few instances, the “other” category was used to track conservation populations that had been established in non-historic habitats within the broad perimeter of the historical range. Another application of the “other” category was for identifying specific habitat units identified as having future

conservation value. The inclusion of part 4 in the 2006 YCT protocol allowed specific identification of restoration or expansion options thereby making the use of the “other” category for protection of future conservation options unnecessary. For all conservation population qualifier categories except the “Core“ category some level of genetic introgression was likely present. The breakdown for 306 conservation populations that were associated with stream habitats and those that included both stream and lake habitats was 138 core conservation populations, 81 conservation population with unique life histories, 3 conservation populations with special environmental adaptation, 2 conservation populations with a predisposition for large size or distinctive coloration and 82 conservation populations in the “other” category (Figures 15 and 16). It is anticipated that the majority of the 76 conservation populations that were confined only to lake habitats will eventually fall within the core conservation category when genetic testing is completed. Most of these lake populations were established through stocking of fish that came from genetically unaltered sources.

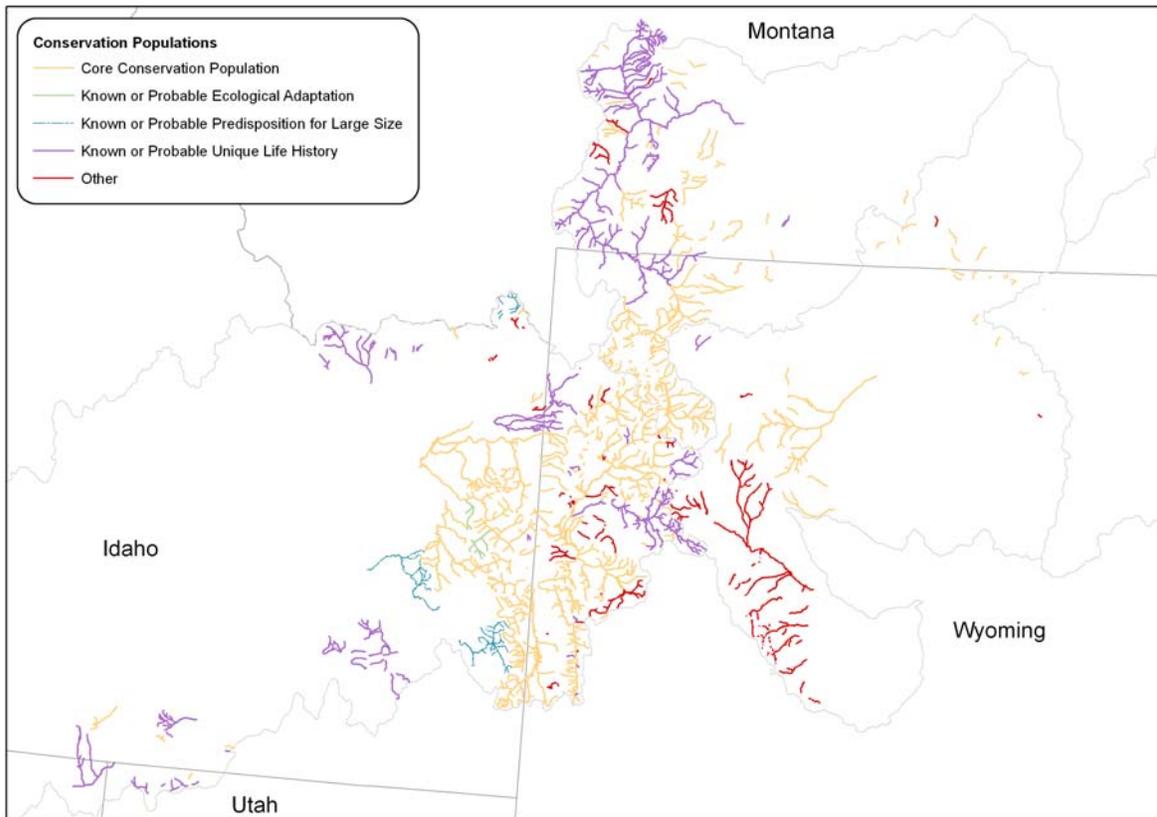


Figure 15. Distribution of conservation populations associated with their population qualifier category.

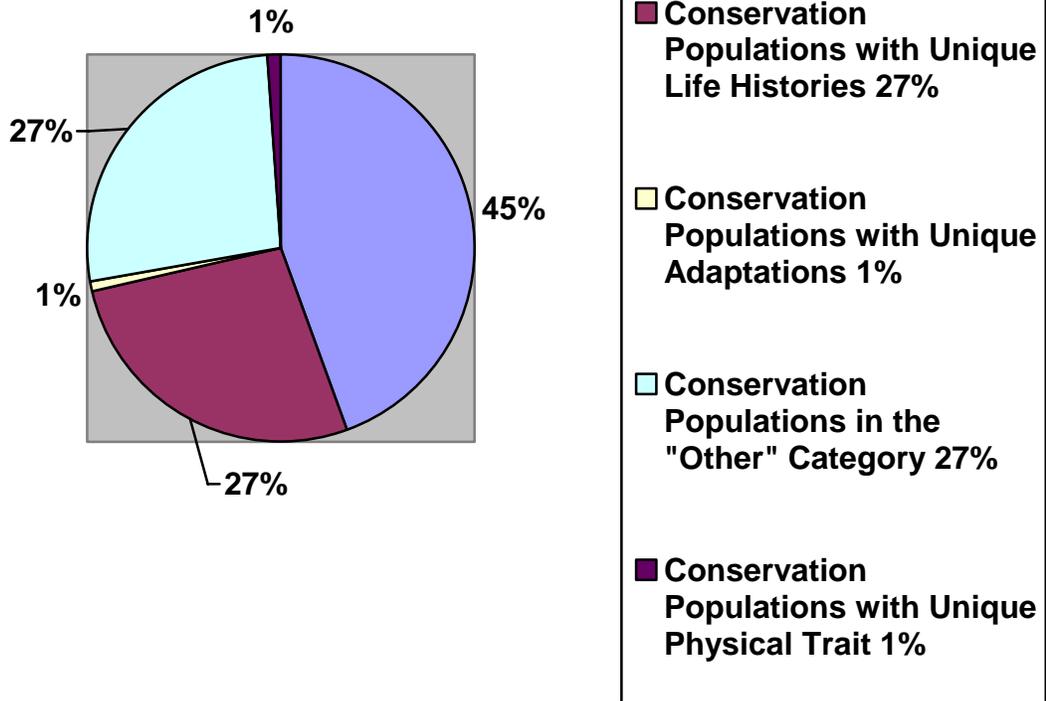


Figure 16. Percentage of conservation populations associated with the population qualifier categories for the stream only and stream and lake conservation populations.

Conservation Population Networks

The approach for identifying population networks in the 2006 status assessment was substantially different than the approach used in the 2001 assessment. In 2001 only two categories were used. Populations that occupied a single stream were viewed as “isolates” and populations that occupied more than one stream were identified as “meta-populations.” The approach applied in 2006 allowed for further partitioning of conservation populations based on stream networks defined by the number of occupied streams. As related to conservation population resilience in the face of potential natural and anthropogenic influences, conservation populations having stronger and more diverse habitat networks were suspected of having resilience and a greater potential for long-term persistence (Rieman et al. 1993).

Most conservation populations (262) were identified as a non-network (e.g., a single stream or lake). Forty-seven conservation populations were identified as very weakly defined networks (e.g., 2 to 3 streams); 36 populations had a moderate network of stream habitat (e.g., 4 to 5 streams); and 37 conservation populations were viewed as having strong networks with more than 5 streams (Table 26). When that amount of occupied habitat is considered, populations existing as moderate and strong networks occupy 79% of stream habitat. A substantial number of inconsistencies were observed during the analysis of the information associated with habitat networks. A careful review of the habitat network information should be included in the database update scheduled for 2007.

Table 26. Information associated with the nature of habitat networks for the conservation populations of YCT.

	Non-Network	Weak Network	Moderate Network	Strong Network	Totals
Conservation Populations	262	47	36	37	382
Stream Miles	912	582	1,347	4,363	7,204
Lake Acres	6,043	828	6,895	151,951	165,717

Genetic and Disease Risks Associated with Conservation Populations

The relative risks of both genetic introgression and disease to the 382 YCT conservation populations were linked to the nature of the habitat network for each population. Genetic risk was based on the relationship between each individual conservation population and the potential for initial or continued genetic introgression. The genetic risk was also based on the presence of complete barriers and distance between the conservation population and contaminating species. In general, moderate to strong habitat networks tended to be associated with increased genetic risk to YCT populations. By contrast, non-networked or weakly defined habitat networks were judged to be at lower risk of genetic contamination (Table 27; Figure 17).

Table 27. Ranked genetic risks to YCT conservation populations related to the number and acres of occupied habitat and the nature of each population’s degree of connectedness (degree of habitat networking).

Type of Habitat Network	Introgression risk ranked by number of populations				Introgression risk ranked by miles				Introgression risk ranked by acres			
	Low	Moderate	High	Very High	Low	Moderate	High	Very High	Low	Moderate	High	Very High
Non-Network	125	44	69	22	381	1,135	221	75	1,763	416	483	3,383
Weak Network	18	10	16	4	127	228	208	26	441	0	128	259
Moderate Network	11	7	14	4	159	473	310	405	467	182	60	6,185
Strong Network	12	5	10	11	827	542	1,416	1,669	46,588	16,881	87,197	1,285
Totals	166	66	109	41	1,495	1,379	2,155	2,175	49,258	17,479	87,869	11,111

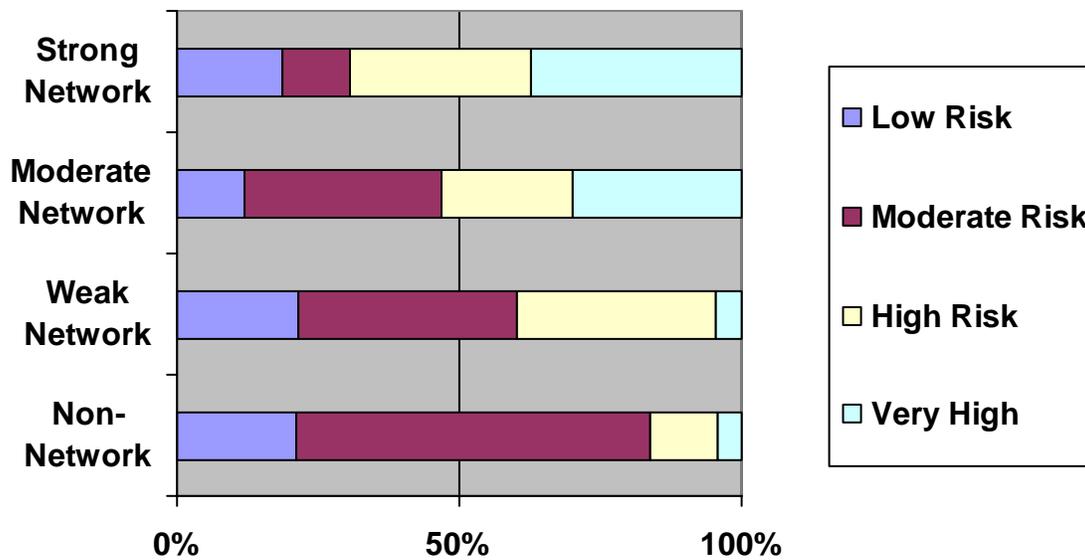
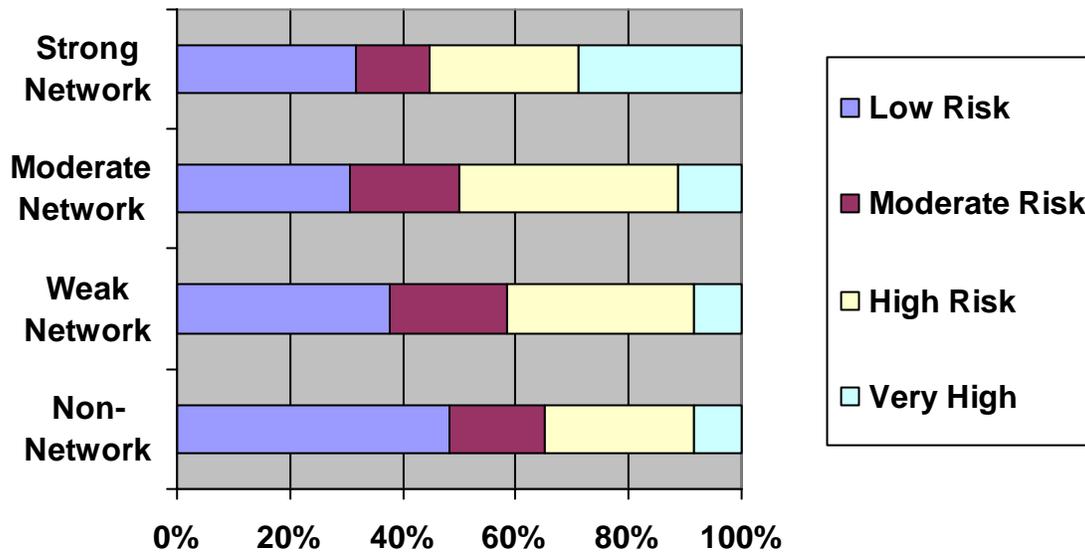


Figure 17. Percentage of YCT conservation populations (by number) for genetic risk and habitat connectivity or networks (top chart) and the percentages of conservation populations (by stream miles) for genetic risk and habitat connectivity (bottom chart).

The relative risks of significant diseases (e.g., whirling disease, furunculosis or infectious pancreatic necrosis) to the 382 YCT conservation populations were also evaluated based on the nature of the habitat network for each population. Disease risk was based on the relationship between each individual conservation population and the potential for initial or continued influence from the major diseases. Presence of complete barriers and separation distance between the conservation population and the sources of disease were factors in the disease risk rating. There was a slightly higher disease risk associated with strong and moderate habitat networks (Figure 18). Non-networked and weakly networked populations were judged to be at a somewhat lower risk from significant diseases (Figure 19; Table 28).

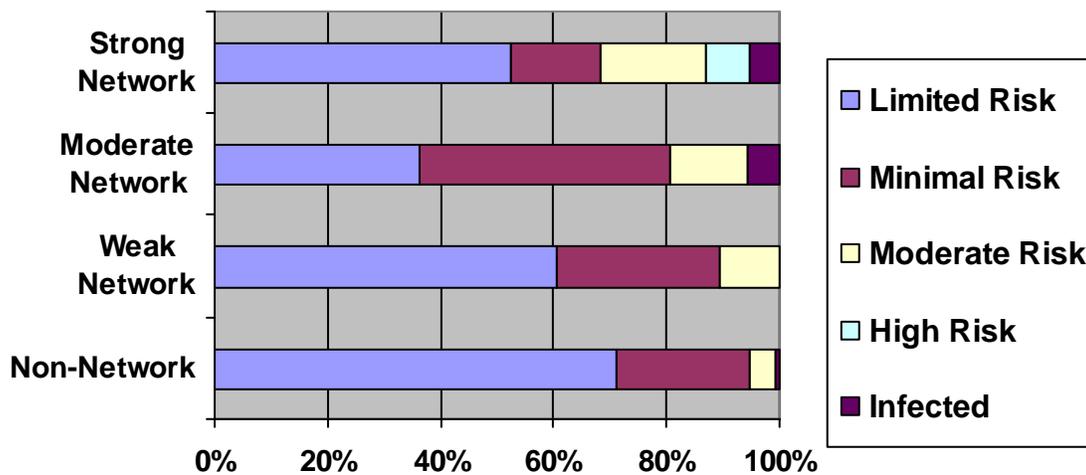


Figure 18. Percentage of YCT conservation populations (by number) for disease risk and habitat connectivity or networks.

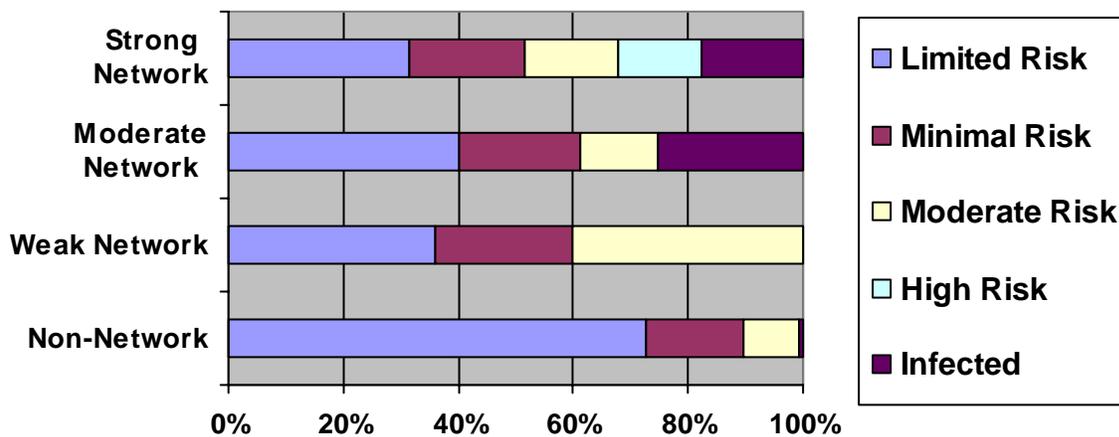


Figure 19. Percentages of conservation populations (by stream miles) for disease risk and habitat connectivity or networks.

Table 28. Ranked disease risks to YCT conservation populations related to the number and acres of occupied habitat and the nature of each population's degree of connectedness (degree of networking).

Type of Habitat Network	Disease Risk Ranked by number of populations					Disease Risk Ranked by miles					Disease Risk Ranked by Acres				
	Limited Risk	Minimal Risk	Moderate Risk	High Risk	Population Infected	Limited Risk	Minimal Risk	Moderate Risk	High Risk	Population Infected	Limited Risk	Minimal Risk	Moderate Risk	High Risk	Population Infected
Non-Network	185	61	12	0	2	591	139	77	0	7	2,060	1,043	2,942	0	0
Weak Network	29	14	5	0	0	213	141	236	0	0	535	293	0	0	0
Moderate Network	13	16	5	0	2	540	283	186	0	338	6,306	585	0	0	5
Strong Network	20	6	7	3	2	1,405	884	732	644	789	31,469	2,527	33,248	0	84,707
Totals	247	97	29	3	6	2,749	1,447	1,231	644	1,133	40,367	4,447	36,190	0	84,712

Conservation Population General Health Evaluation

A generalized population health evaluation based on four indicators hypothesized to be related to population health was completed for 306 conservation populations. Due to the nature of information used in the health evaluation, only those populations that utilized stream habitat were included in the general health evaluation. In other words, general health evaluations were not completed for the 76 YCT conservation populations that occupied lake environments with no stream habitats identified as being present. Components of the health evaluation included: 1) temporal variability associated the amount of occupied stream habitat as an indicator of potential resiliency, 2) population size of sexually mature adults (≥ 15 cm or larger) as a coarse estimator of effective population size, 3) population demographics based on habitat quality, presence of non-native fish and disease, and 4) degree of population connectedness based on the nature of the stream network associated with each population. These indicators of general health were analyzed individually and as a composite based on a weighted formula (Appendix C). It is important to note that individual health indicators and the composite rating for these indicators do not represent absolutes in terms of definitive population health. Rather they are presented as a relative indicator of general health much like a physician's general physical exam or a general health screening.

Temporal variability information indicated that a large number (169) of conservation populations (55%) were associated with a very low health score due to the limited amount of habitat that was occupied (e.g., less than 6 miles in length) by the populations. Eighty-one populations were given a low temporal variability health score, 24 were assigned a moderate health score and 32 were characterized as having a high health score for temporal variability (Figure 20; Table 29). With regard to the number of stream miles included within each temporal variability characterization; 5,180 miles were associated with a rating of high general health, 759 miles were linked to moderate health, 854 miles were associated with low relative health, and 411 miles of occupied habitat reflected a very low general health based on amount of occupied habitat by each population. The average number of stream miles occupied by YCT populations in the high temporal variability category was 161.8 miles. The average number of stream miles occupied by YCT populations in the moderate temporal variability category was 31.6 miles. The average number of miles occupied by populations in the low and the very low temporal variability characterizations were 10.5 miles and 2.4 miles, respectively.

Information associated with population abundance of mature YCT suggested a slightly different result. There were 67 conservation populations that were associated with a high health scores based on adult density exceeding 2,000 individuals (Figure 20; Table 29). The average number of YCT per population for this group was 18,516 adult YCT. Sixty-five populations were judged to have population numbers in the 500- to 2,000-range, which placed them in the moderate population health characterization. Average number of YCT per population in this group was 1,036 adult YCT. There were 110 YCT populations identified as having a low population health score and 64 YCT populations were rated with a very low health score. Average population numbers for the low quality grouping was 209 fish. Within the very low quality category 24 conservation populations had unknown densities and they were automatically included in the very low health category. For the remaining 41 populations the average number of YCT per population was 23 fish. Natural log transformations of the abundance information and the use of a box diagram helped to clarify the nature of the population abundance information (Figure 21).

With regard to stream miles included within each population size category; 5,849 miles (83%) were associated with populations having more than 2,000 sexually mature YCT, 683 miles were linked to populations in the moderate characterization having YCT numbers in the 500 to 2,000 range, 532 miles were associated with low relative population health associated YCT population numbers, and 141 miles were associated with populations having population numbers of less than 50 adults. Included within this group were 60 populations that occupied less than one mile of habitat. The average number of stream miles occupied by YCT populations in each population category was 35 miles for the high health category, 11 miles for the moderate health category, and 5 miles for the low health grouping and approximately 2 miles for the very low health grouping.

None of the 306 YCT populations were judged to have a high population health rating for population production potential based on demographics associated with habitat quality, presence of non-native fish and disease based on the way that these three variables were addressed in the analysis. In the production analysis, presence of non-native fish resulted in down grading to the next lower health rating. Two hundred and twenty eight (228) populations (75%) were judged to have a moderate population health characterization related to factors associated with production potential (Figure 20; Table 29). The remaining 78 populations were judged to have either low production potential (37) or very low production potential (41). The average number of stream miles occupied by YCT populations in each population production category was 5.8 miles for the moderate production category, 15 miles for the low production category and 129.5 miles for the very low production grouping.

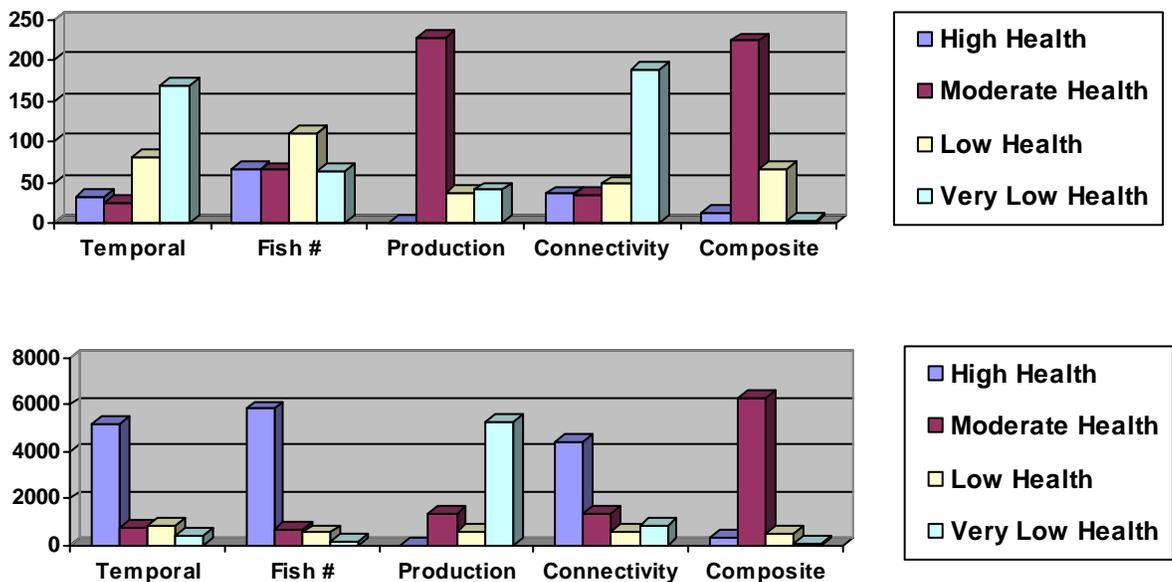


Figure 20. Ranked health scores by number of populations (top graph) and stream miles occupied (bottom graph). Yellowstone cutthroat trout conservation populations are ranked into low to high levels of health.

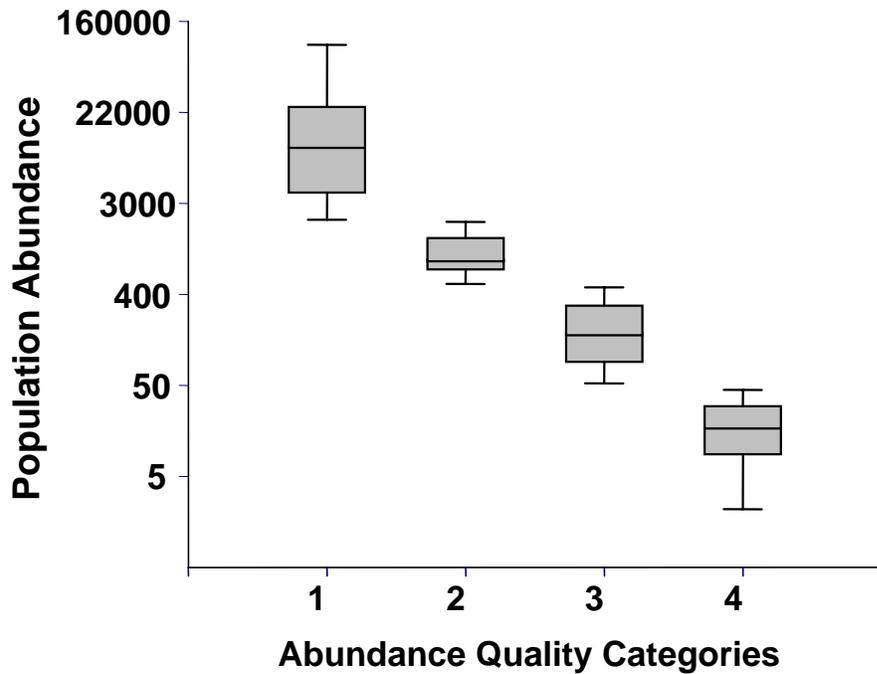


Figure 21. Natural log transformed abundance information by abundance quality categories. Box plots indicated the median value within the box, inter-quartile range by the box itself, and the range of values by horizontal lines at the end of vertical lines.

Table 29. Population health ratings for 306 YCT conservation populations by number of populations and miles of stream occupied.

Health Scores	Health Scores by Number of Populations					Health Scores by Miles Occupied				
	High Health 1	Mod-Health 2	Low Health 3	Very Low Health 4	Total	High Health 1	Mod-Health 2	Low Health 3	Very Low Health 4	Total Miles
Temporal Variability-	32	24	81	169	306	5,180	759	854	411	7,204
Population Size-Mature Adults	177	65	37	27	306	6,807	256	32	110	7,204
Production Potential-	0	228	37	41	306	0	1,334	558	5,312	7,204
Population Networks	36	34	48	188	306	4,454	1,347	590	813	7,204
Composite Score	13	224	66	3	306	462	6,559	172	11	7,204

Composite scores of general population health for the 306 conservation populations (Table 29; Figure 20) allowed for a more balanced or perhaps tempered perspective of general health conditions associated with YCT conservation populations. Only 8 conservation populations (3%) were judged to have a high degree of overall general population health. One hundred and forty one (141) YCT conservation populations (46%) were judged to have overall population health rated as moderate quality. Of the remaining populations, 148 (48%) were judged to have low general health and 9 (3%) had a very low level of general health. The average number of stream miles occupied by YCT populations in each composite health category was 332 miles for the high general health grouping. The moderate composite health category had 6,341 miles. The low composite health category had 484 miles, and the very low composite health category had 47 miles of occupied stream habitat.

Another comparison of general population health can be obtained by reviewing the relationships among temporal variability, population size and population production potential against the nature of the habitat networks associated with the YCT populations (Figure 22). Assessment of population habitat networks indicated that a substantial majority of populations (188) existed as non-networked entities (e.g., single streams). Weakly networked populations were second in abundance (48); followed by 34 moderately networked populations and 36 strongly networked populations. The average number of stream miles occupied by YCT populations in each connectivity category was 123.7 miles per population in the strongly networked category, 39.6 miles in the moderate network category, 12.3 miles per population for the low network category and 4.3 miles per population in the very low network grouping.

Of the 188 populations identified as “non-networks” and the majority (124) were rated as having a moderate composite health quality rating (Figure 22). Sixty populations had a low composite health quality rating. The other four populations were equally split between the high and very low composite health ratings. The health factor of most concern for these “non-networked” populations was temporal variability due to most populations (144) occupying less than 6 miles of habitat. The health factor associated with population size was more evenly distributed across the population abundance characterizations (e.g., high quality - 9 populations, moderate quality – 42 populations; low quality – 80 populations; and very low – 57 populations). The very low quality grouping included 24 populations without fish density information. Population production potentials for these non-networked populations were rated as either high (171) or moderate (17). Many of these non-networked populations (83) were identified as core conservation populations. The majority of non-networked populations (175) were judged to be at limited risk of disease and 136 were judged to be at low to moderate risk from influences to the genetic integrity of the populations.

Forty-eight conservation populations that were evaluated for general population health were identified as having weak habitat networks (e.g., 2 to 3 streams in the habitat network). The majority (43) were judged to have a moderate level of population health (Figure 22). Four populations were given a low composite health score and 1 received a very low health score.

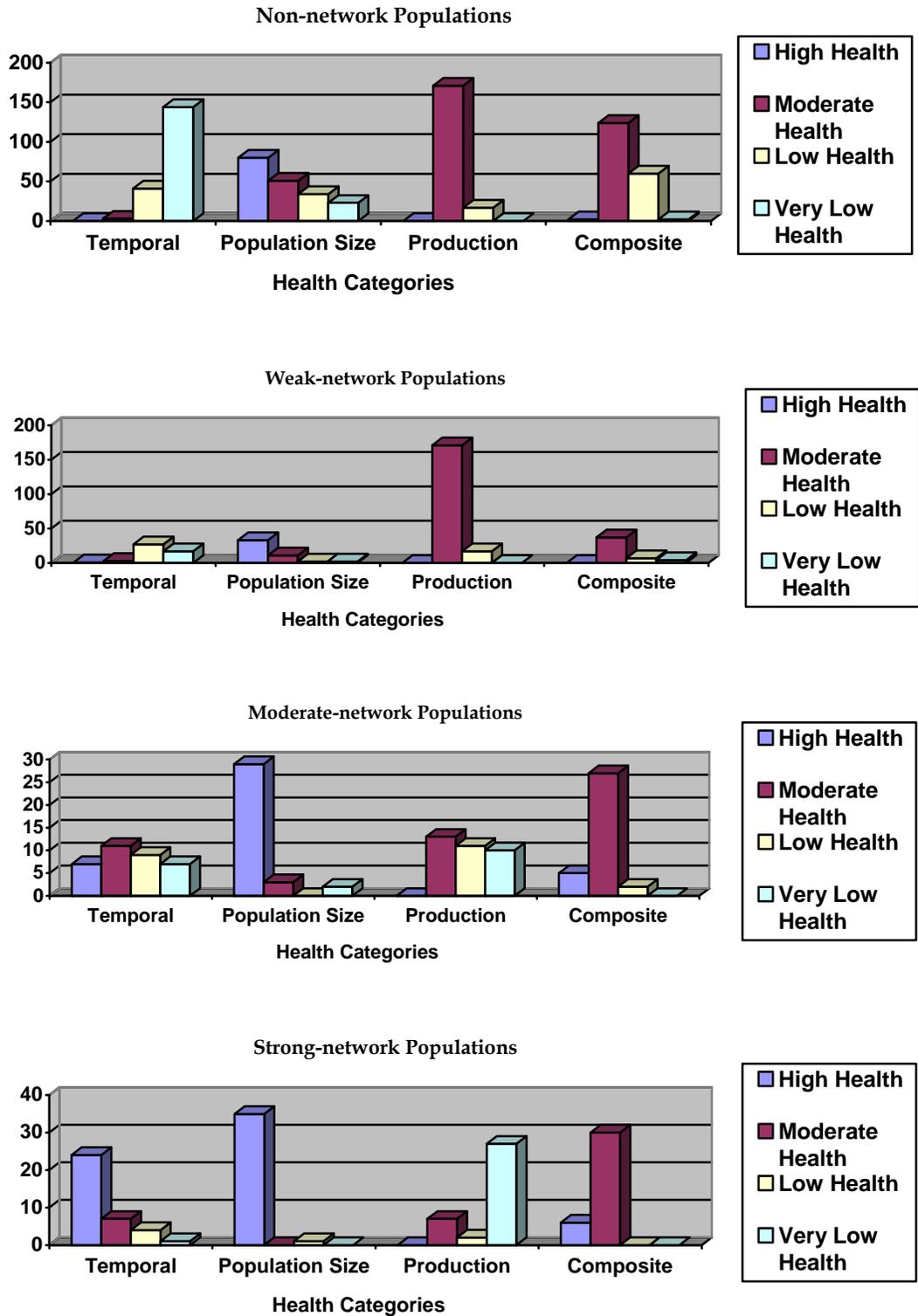


Figure 22. Ranked health scores by number of populations for each population health characterization and the nature of population habitat networks.

The health factor of most concern for these “weak networked” populations was temporal variability. Twenty-seven of these populations occupied between 6 to 19 miles of habitat and another 17 populations occupied less than six miles of habitat. Health factors associated with population size and production potential for the majority of populations were viewed as lesser population health concerns. The majority of weakly networked populations (43) were judged to be at limited to minimal risk from disease. Genetic integrity for this group of conservation populations included 28 populations (58%) considered to have low to moderate risks to genetic integrity and 20 populations (42%) with high to very high risk to genetic integrity.

General health composite scores for 34 moderately networked populations (i.e., 4 to 5 streams in the habitat network) were: 3 populations with a high health characterization, 26 populations with a moderate health rating, and 5 populations with a low health characterization (Figure 22). Health factors of most concern for these “moderately networked” populations were temporal variability and production potential. The health factor associated with population size was judged to be in the high quality category. The majority of moderately networked populations (27) were judged to be at limited to minimal risk from disease. Genetic integrity for this group of conservation populations had a slightly higher level of uncertainty with regard to genetic integrity. Nearly 50% of moderately networked populations were judged to be at high to very high risk to genetic integrity.

General health composite scores for 36 strongly networked populations (i.e., more than 5 streams in the habitat network) were: 4 populations with a high health characterization, 31 populations with a moderate health characterization, and 1 population with a very low quality score (Figure 22). The health factor of most associated these “strongly networked” populations was temporal variability. The health factors associated with population size were judged to be predominately in the high health quality category. The majority of strongly networked populations (24) were judged to be at limited to minimal risk from disease. Genetic integrity for this group of conservation populations had a higher level of uncertainty with regard to genetic integrity. Nearly 58% of strongly networked populations were judged to be at high to very high risk of introgression with non-native trout.

As a reminder, it is important that individual health indicators and the composite ratings for these relative health ratings do not represent absolutes in terms of definitive population health. They do, however, provide a general or relative view of population health based on the four variables considered individually or in combination.

Conservation Actions and Land Use Influences

Restoration, conservation, and management activities that had been implemented to conserve conservation populations were identified for the 382 YCT populations (Table 30). The majority of populations (57%) had one or more conservation actions (e.g., activities or projects) implemented to improve conditions. A significant number (153) of conservation populations (40%) had no specific conservation actions implemented to improve conditions. During this status assessment there was no attempt to define levels of significance of the conservation actions, either on a specific YCT population or with regard to the broad conservation effort.

Relative significance will have to be addressed in subsequent assessments that will be conducted within the coordinated conservation effort.

Land uses and human influences associated with each YCT conservation population were also tracked (Table 31). The most pervasive land uses were non-angling recreation (i.e., recreational trails), livestock grazing, angling and roads. Land uses that were less frequently identified included channel de-watering, timber harvest and mining. For a significant number of conservation populations (95), the types of land uses were identified as unknown. There was no attempt to define levels of significance of the various human influences, either on a specific YCT population basis or with regard to the broad conservation effort. Relative significance will have to be addressed in subsequent assessments yet to be conducted by the coordinated conservation effort.

Table 30. Number and percentage of YCT conservation populations associated with the various conservation actions taken to improve conditions.

Conservation Action	Count	Percent of Total YCT Populations
None	153	40
Special angling regulations	139	36
Land-use mitigation direction and requirements (e.g., Forest Plan direction, regulation, permit req., coordination stipulations, etc)	103	27
Population covered by special protective mgt. emphasis (e.g., Nat'l Park, wilderness, special mgt. area, conservation easement, etc.)	65	17
Culvert replacement	49	12
Riparian restoration	36	9
Bank stabilization	28	7
Channel restoration	26	7
Population restoration/expansion	24	6
Riparian fencing	20	5
Chemical removal of competing/hybridizing species	16	4
Public outreach efforts at site (Interpretative site)	15	4
In-stream cover habitat	11	3
Spawning habitat enhancement	11	3
Barrier removal	10	3
Water lease/In-stream flow enhancement	10	3
Woody debris placement	9	2
Diversion modification	8	2
Physical removal of competing/hybridizing species	8	2
Pool development	8	2
Population supplementation (e.g., to implement genetic swamping or to reduce potential of genetic drift, etc.)	8	2
Other (List in comments)	8	2

Table 31. Number and percentage of YCT conservation populations that had human land-use activities associated with them.

Land Use Activity	Count	Percent of Total YCT Populations
Recreation (non-angling)	228	60
Range (Livestock grazing)	210	55
Angling	208	54
Roads	161	42
De-watering	88	23
Timber harvest	68	18
Mining	35	9
Fish stocking (e.g., non-native fish)	18	5
Hydroelectric, water storage and/or flood control	13	3
Other (list in comments)	8	2
None	7	2
Unknown	95	25

YCT Restoration and Expansion Evaluation

The initial status assessment completed in 2001 did not include an assessment of potential opportunities for restoration or expansion of YCT populations. This assessment (2006) did include a specific component that addressed restoration and expansion opportunities. The restoration and expansion evaluation was only applied to those stream segments, not currently occupied by conservation populations of YCT, that were initially identified as being part of the historically occupied range. In addition, a second criterion was applied to the currently unoccupied habitat that addressed the habitat’s current ability to support “cold water biota” and more specifically YCT. Lake environments and stream habitats outside of the identified historical range were not evaluated. These opportunities may be reviewed within the coordinated effort at a later date.

Of the 17,721 miles of historical habitat, approximately 10,517 miles (61%) were identified as not being occupied by YCT conservation populations (Figure 23). In order to objectively evaluate the restoration or expansion potential within these unoccupied habitats it was deemed important to determine how much of this historical stream habitat (6,746 miles) was currently capable of supporting YCT. Those stream miles judged as being incapable (3,771 miles) were eliminated from further consideration due to significant environmental changes. The working groups reviewed the unoccupied historical stream segments for each watershed (Figure 24).

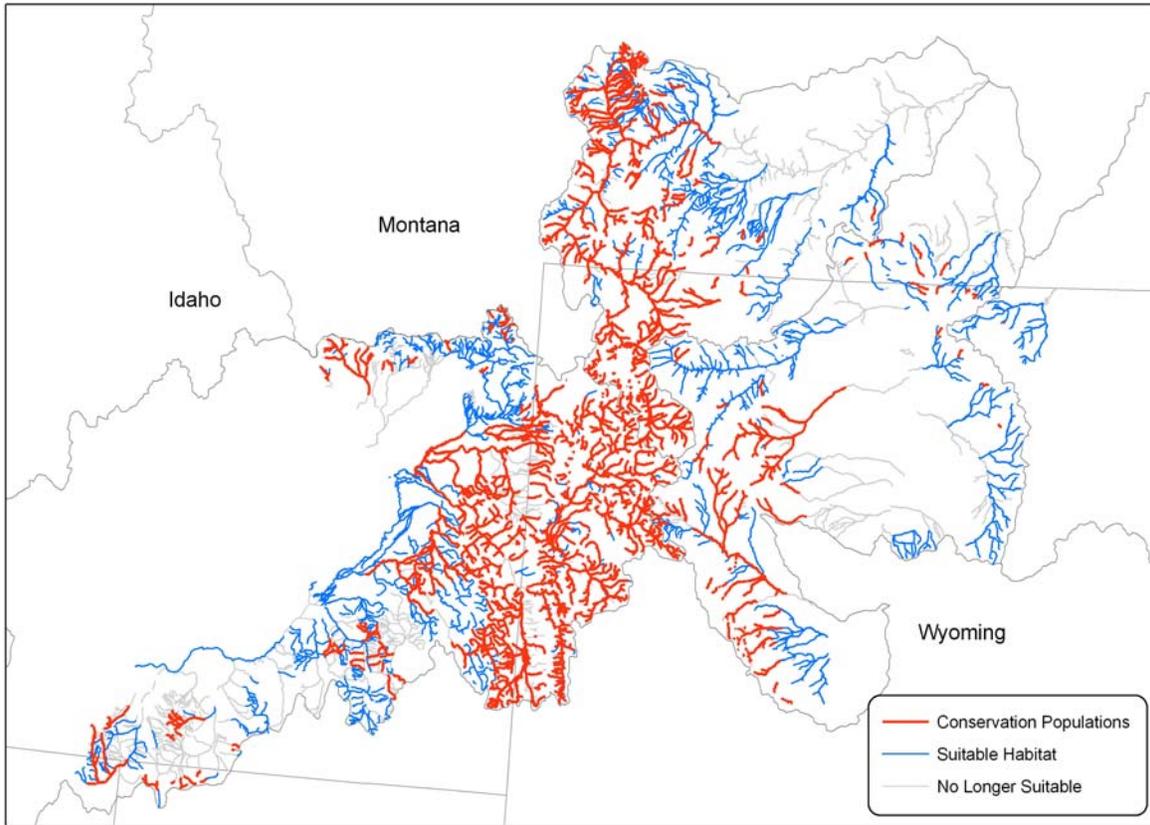


Figure 23. Map displaying historic habitat currently occupied by conservation populations (red), currently suitable habitat (blue) and currently unsuitable habitat (gray) for YCT restoration and expansion.

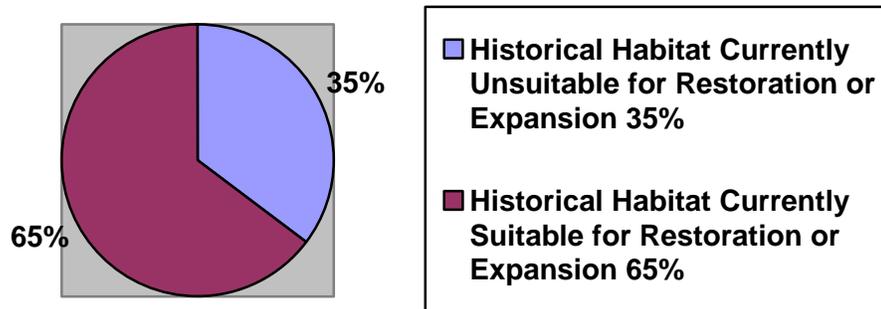


Figure 24. Proportions of historical YCT habitat considered as suitable for restoration or expansion.

In actuality, the geo-database contained restoration and expansion information for an additional 223 miles of stream habitat. The exact source of this overage is unknown, but it is likely that there was a misunderstanding in the application of the protocol and some stream segments outside of the historical stream coverage (e.g., stream habitats above a historical barrier) were inadvertently included in the restoration and expansion analysis. In total, 6,969 stream miles were judged to be suitable and carried through the restoration or expansion evaluation. They were rated in relation to their potential for restoration or expansion of YCT conservation populations (Table 32) based on current capability to support YCT.

There were four general attributes deemed of particular importance to the potential success of restoration or expansion in these suitable habitats. The first attribute related to past stocking and/or presence of non-native fish, especially other trout species that would compete or hybridize with YCT. The second attribute addressed the relative quality of the habitat. The third attribute considered the significance of existing fisheries within the suitable habitat segments. And last, an attribute associated with the relative complexity of fish removal within the stream segments was included in the evaluation. These attributes were assessed individually and in combination. There was also consideration given to the presence of barriers that could provide security from competing and/or hybridizing species of fish.

Table 32. Potential restoration and expansion opportunity assessment base information by watershed (miles).

Watershed Name	Watershed Number	Restoration or Expansion Base Layer	Habitat Judged as Unsuitable	Habitat Judged as Suitable
Yellowstone Headwaters	10070001	69.9	0.0	69.9
Upper Yellowstone	10070002	587.0	0.0	587.0
Shields	10070003	222.4	32.2	190.2
Upper Yellowstone-Lake Basin	10070004	288.5	288.5	0.0
Stillwater	10070005	523.1	66.4	456.8
Clarks Fork Yellowstone	10070006	523.6	166.2	357.4
Upper Yellowstone-Pompey's Pillar	10070007	277.9	277.9	0.0
Pryor	10070008	211.4	0.0	211.4
Upper Wind	10080001	209.9	4.6	205.3
Little Wind	10080002	161.7	0.0	161.7
Popo Agie	10080003	126.5	0.0	126.5
Upper Bighorn	10080007	586.5	429.1	157.4
Nowood	10080008	551.6	168.9	382.7
Greybull	10080009	83.2	75.2	8.1
Big Horn Lake	10080010	263.7	43.1	220.6
North Fork Shoshone	10080012	261.3	4.7	256.6
South Fork Shoshone	10080013	137.6	7.7	129.9
Shoshone	10080014	345.5	146.5	199.0
Lower Bighorn	10080015	167.5	156.5	11.0
Little Bighorn	10080016	424.7	194.2	230.5
Upper Tongue	10090101	268.8	24.5	244.3
Snake Headwaters	17040101	37.2	0.0	37.2
Gros Ventre	17040102	4.7	0.0	4.7
Greys-Hoback	17040103	74.9	0.0	74.9
Palisades	17040104	12.0	0.0	12.0
Idaho Falls	17040201	248.6	0.0	248.6
Upper Henrys	17040202	518.9	0.0	518.9
Lower Henrys	17040203	135.8	42.4	93.4
Teton	17040204	185.6	185.6	0.0
Willow	17040205	192.1	0.0	192.1
American Falls	17040206	484.6	78.2	406.4
Blackfoot	17040207	331.9	0.0	331.9
Portneuf	17040208	489.8	184.2	305.6
Lake Walcott	17040209	280.1	191.9	88.2
Raft	17040210	493.2	372.0	121.3
Goose	17040211	480.6	308.6	172.0
Beaver-Camas	17040214	434.8	287.1	147.7
Medicine Lodge	17040215	43.6	35.0	8.6

Past Stocking and/or Presence of Non-native Trout

With regard to presence of non-native trout, of the 6,969 stream miles identified as being suitable for conservation population restoration or expansion, 310 miles (4%) had no record of non-native fish stocking and were judged to be barren of fish. Another 3,332 miles (49%) of stream habitat had records indicating that non-native trout were present in high numbers. Another 1,843 miles (26%) had non-native trout in low numbers and in the remaining 1,484 miles (21%) were unknown as to whether non-native trout were present (Figure 25).

Table 33. Information relative to non-native stocking and/or presence for habitat (miles) being considered for conservation population restoration or expansion.

Record of Stocking and Presence or Non-Native Trout	Miles of Suitable Historical Habitat
No record of stocking--segment is barren	310 (4%)
Record of stocking and/or presence of only YCT – not included in conservation population	0
Record of stocking and segment has non-native trout in low numbers	1,843 (26%)
Record of stocking and segment has non-native trout in high numbers	3,332 (49%)
Unknown presence of non-native trout	1,484 (21%)
Total	6,969

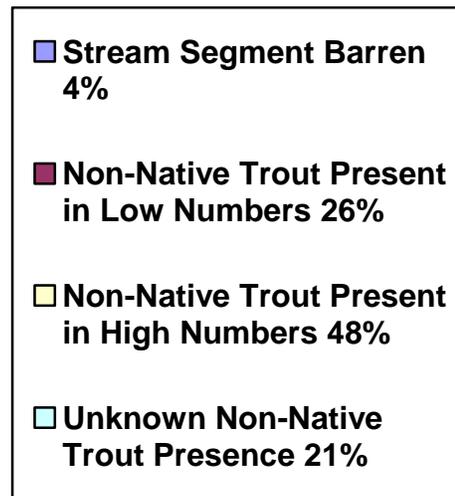
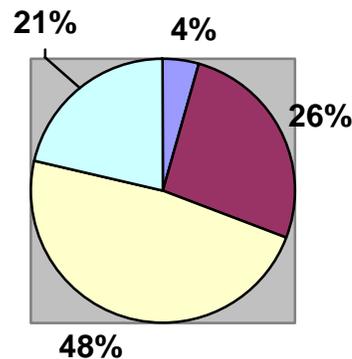


Figure 25. YCT restoration or expansion opportunity based on presence of non-native trout.

Habitat Quality Associated with Restoration and Expansion of YCT

Of the 6,969 stream miles of habitat considered suitable for population restoration or expansion, 125 miles (2%) had habitat quality rated as excellent. Another 2,733 miles (39%) had habitat quality rated as good. Twenty two hundred and seventy seven miles (33%) had habitat rated as fair. Another 503 miles (7%) had habitat quality rated as poor, and 1,332 miles (19%) of suitable habitat had unknown quality (Table 34; Figure 26).

Table 34. Information relative to habitat quality of suitable habitat (miles) being considered for conservation population restoration or expansion.

Habitat Quality	Miles of Suitable Historical Habitat
Excellent	125 (2%)
Good	2,733 (39%)
Fair	2,277 (33%)
Poor	503 (7%)
Unknown	1,333 (19%)
Total	6,969

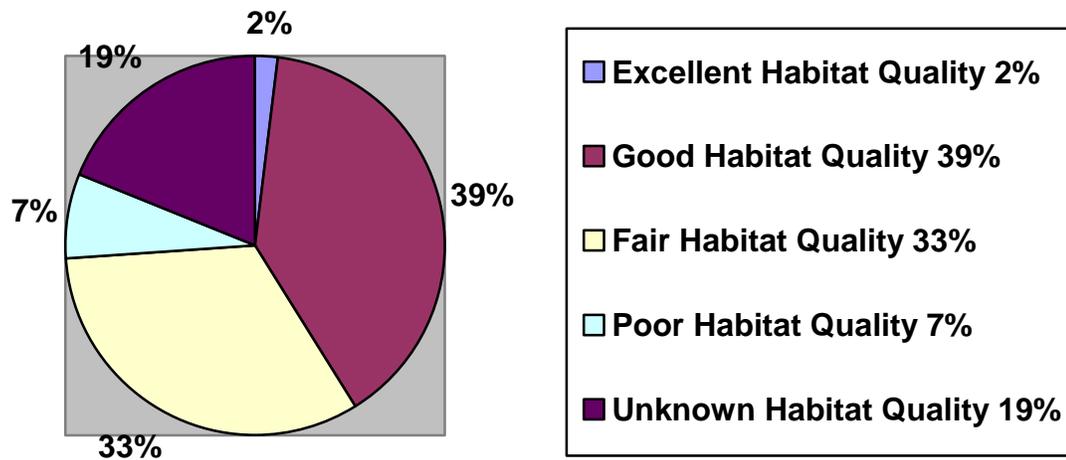


Figure 26. Habitat suitability for YCT restoration or expansion based on presence of non-native trout.

Recreational Fisheries Associated with Restoration and Expansion of YCT

Of the 6,969 stream miles of habitat considered suitable for population restoration or expansion, 152 miles (2%) had habitat with no fishery present. Another 2,634 miles (39%) had fisheries of minor significance. Sixteen hundred and sixteen miles (23%) had habitat rated as having a fishery of moderate significance. Another 1,143 miles (16%) had habitat rated as having a major fishery and for 1,424 miles (20%) the fishery significance was unknown (Table 35; Figure 27).

Table 35. Information for significance of fisheries associated with stream habitat (miles) being considered for YCT conservation population restoration or expansion.

Significance of Fisheries	Miles of Suitable Historical Habitat
No fisheries present	152 (2%)
Minor	2,634 (39%)
Moderate	1,616 (23%)
Major	1,143 (16%)
Unknown	1,424 (20%)
Total	6,969

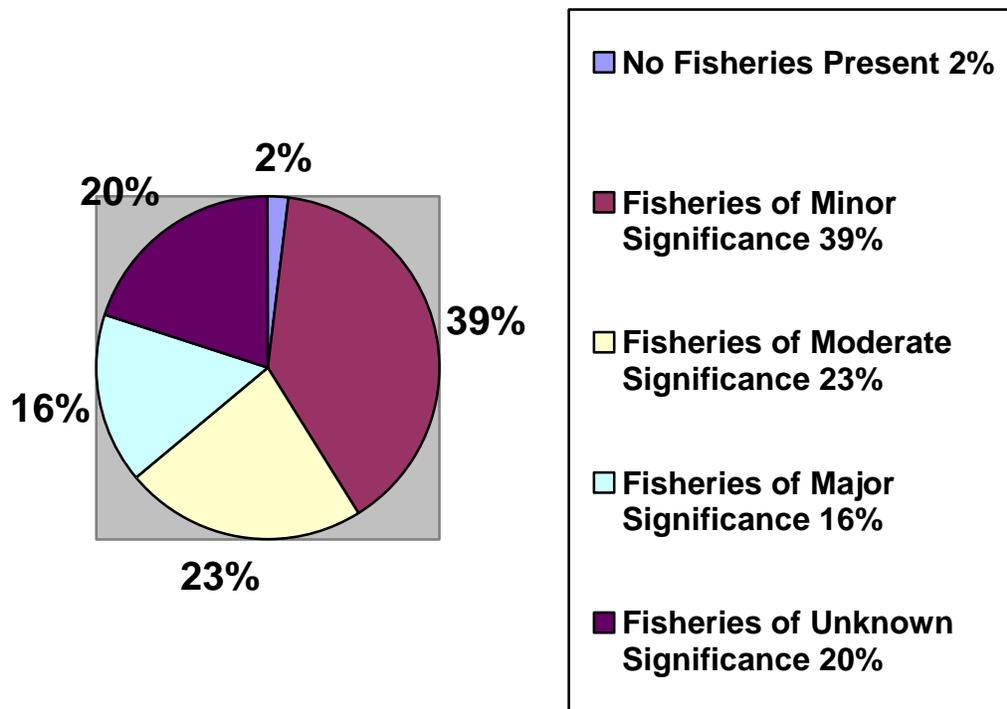


Figure 27. Habitat suitability for YCT restoration or expansion based on significance of existing fisheries.

Considerations Associated with the Complexity of Removal of Non-Native Fish

Of the 6,969 stream miles of judged suitable for restoration or expansion, 179 miles (3%) were judged to have no fish present and removal would not be needed. Another 122 miles (2%) were judged to have a minor level of complexity in relation to fish removal. Eleven hundred and twenty nine miles (16%) were rated as having a moderate level of complexity related to the removal of unwanted fish. Another 3,978 miles (57%) were rated as having a major complexity related to fish removals, and for 1,562 miles (22%) the complexity related to fish removals was identified as being unknown (Table 36; Figure 28).

Table 36. Information relative to the complexity of fish removals that is associated with habitat (miles) being considered for YCT conservation population restoration or expansion.	
Complexity of Fish Removal	Miles of Suitable Historical Habitat
No fish present	179 (3%)
Minor	122 (2%)
Moderate	1,129 (16%)
Major	3,978 (57%)
Unknown	1,561 (22%)
Total	6,969

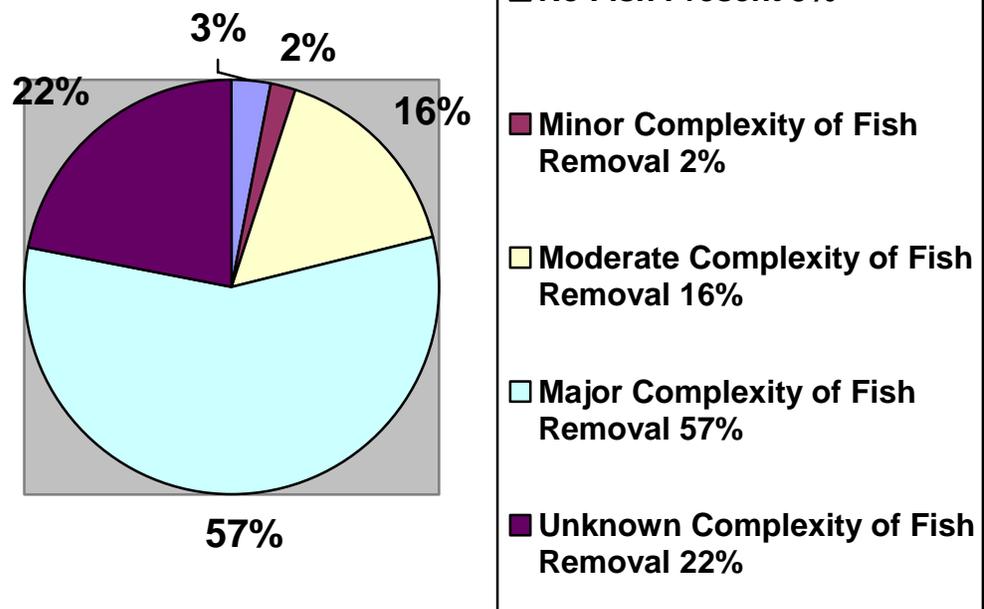


Figure 28. Potential for YCT conservation population restoration or expansion based on the complexity of existing fish removal.

Combined Rating of Restoration and Expansion Rankings for YCT

An effort was made to combine the results of the four variables into a composite rating. To facilitate development of an overall view of restoration or expansion potential, the ratings for the four variables were weighted equally and then summed to give a final score. In situations where one or more of the individual variables were considered as unknown these suitable miles were automatically included in the unknown category. Of the 6,969 miles of habitat judged as suitable to be considered for YCT restoration or expansion, only 83 miles (1%) were judged to have a high combined score related to YCT restoration or expansion. Another 167 miles (2%) were judged to have only an intermediate potential for expansion or restoration. Thirty seven hundred and eight miles (53%) were rated as having a low potential for restoration or expansion. Thirteen hundred and sixty nine miles (20%) were rated as having very low potential for YCT restoration or expansion, and 1,642 miles were identified as having unknown potential for restoration or expansion (Table 37; Figure 29).

Table 37. Composite rating of restoration or expansion potential for YCT conservation populations.	
YCT Restoration or Expansion Combined Rating	Miles of Suitable Historical Habitat
High overall potential	83 (1%)
Intermediate potential	167 (2%)
Low potential	3,708 (53%)
Very low potential	1,369 (20%)
Unknown	1,642 (24%)
Total miles	6,969

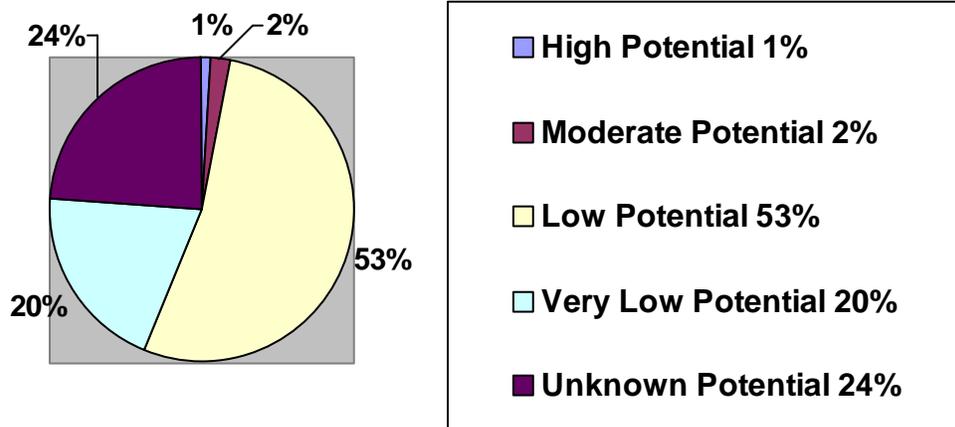


Figure 29. YCT conservation population restoration or expansion based on the composite rating of the four variables evaluated.

Comparisons of Fine-Spotted and Large Spotted Forms of YCT

Consistent with the 2001 status assessment, we hypothesize that both large and fine-spotted YCT historically occupied stream and lake environments within the historical range described in this report. In some instances both forms were likely present in sympatry. We further hypothesize that fine spotted YCT historically occupied only those HUCs (i.e., Snake Headwaters, Gros Ventre, Greys-Hoback, Salt and Palisades) in the uppermost portion of the Snake River Basin. There was no effort to project the amount of historical habitat occupied by YCT based on spotting pattern. This assessment continued to partition information on the basis of spotting pattern.

Information collected for current distributions of YCT based on spotting patterns within the 7,527 miles of occupied habitat, indicated that 4,620 miles (61%) were occupied only by the large spotted form, 1,132 miles (15%) were occupied only by the fine spotted form, and 1,775 miles (24%) were occupied by both large and fine spotted YCT in a sympatric relationship (Table 38; Figure 30). Wyoming had the greatest amount of habitat (2,318 miles) occupied by fine spotted YCT. Idaho had mostly large spotted YCT (1,445 miles) and a lesser number of miles (583) occupied by both large and fine spotted YCT. Idaho reported only 5 miles of stream habitat occupied by only fine spotted YCT. Habitats in Montana, Nevada and Utah supported only large spotted YCT. Of the 205 lakes currently occupied by YCT, 86 contained only the large spotted form of YCT, 91 were identified as supporting only the fine spotted form, and 28 contained both large and fine spotted YCT. The associated acreages were 125,313 acres for the large spotted YCT, 33,775 acres for the fine spotted YCT, and 21,123 acres for YCT with both spotting patterns occupying the same habitat (Table 39). Initial analysis of the spotting pattern information for lakes appeared to have inconsistencies and likely reflects errors that occurred during data entry (e.g., lakes within the Yellowstone Headwaters HUC were identified as supporting both large and fine spotted YCT). This report will present the information as it now exists in the database, but it is anticipated that changes will occur as the database is corrected in the scheduled update planned for 2007.

Table 38. Occupied stream habitat associated with the various spotting patterns of YCT

Spotting Pattern	Occupied Stream Habitat (Miles)					
	Wyoming	Idaho	Montana	Nevada	Utah	Totals
Both large and fine spot	1,192	583	--	--	--	1,775
Fine spot only	1,126	5	--	--	--	1,132
Large spot only	1,730	1,445	1,339	58	49	4,620
Totals	4,049	2,033	1,339	58	49	7,527

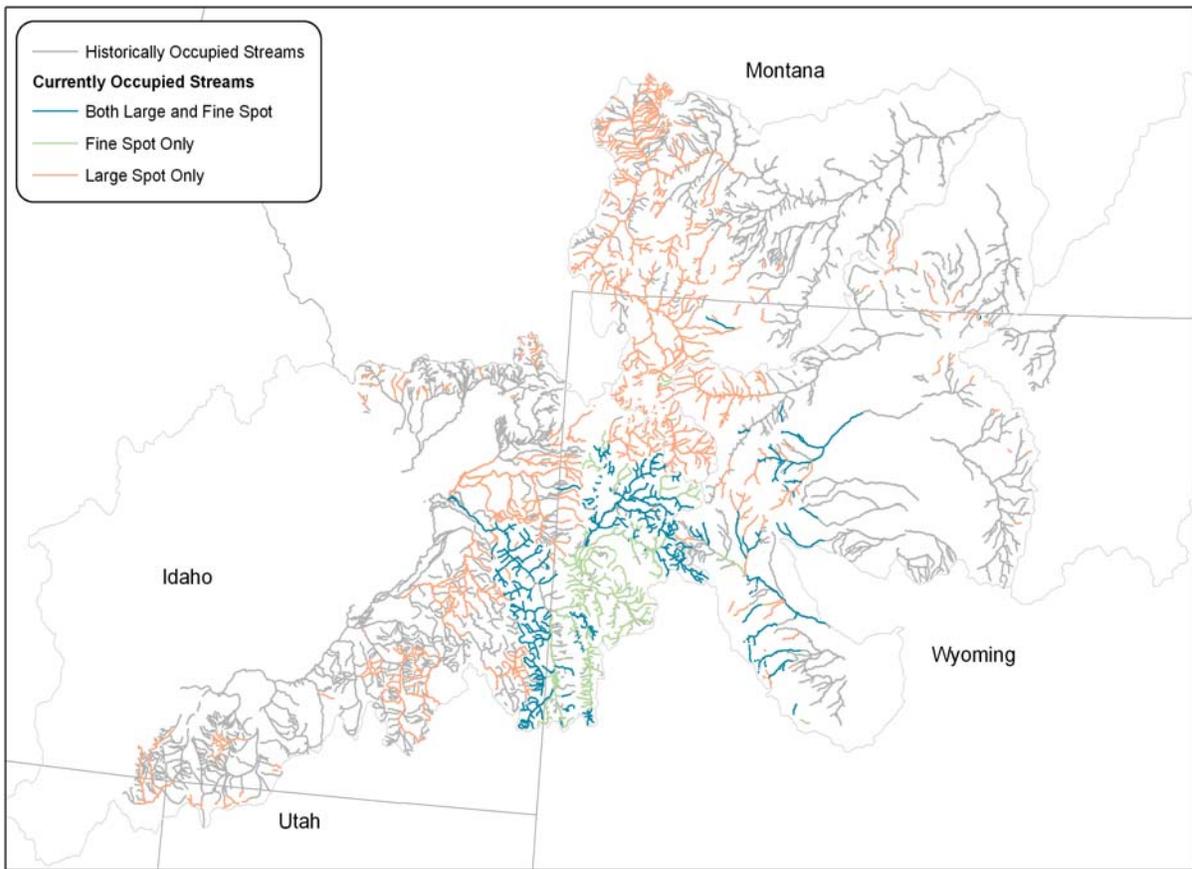


Figure 30. Current distribution of YCT based on the three spotting pattern categories.

Table 39. Occupied lake habitat associated with the various spotting patterns of YCT.

Spotting Pattern	Occupied Lake Habitat (# of lakes)			Occupied Lake Habitat (Acres)		
	Wyoming	Idaho	Montana	Wyoming	Idaho	Montana
Large Spot Only	53	5	28	94,282	30,332	698
Fine Spot Only	91	--	--	33,775	--	--
Both Large and Fine Spot	26	2	--	5,236	15,887	--
Totals	170	7	28	133,293	46,220	698

Twenty-one HUCs contained habitat occupied by the large spotted YCT. Six watersheds had some habitat occupied only by large spotted YCT, but other habitats were occupied with both large and fine spotted YCT that were sympatric. Two watersheds contained habitat that supported only large and fine spotted YCT that were sympatric. Two watersheds had some habitat that supported only fine spotted YCT and other habitats that support both large and fine spotted YCT that were sympatric. One watershed supported both large and fine spotted YCT in separate habitats, and 5 watersheds had separate habitats that support all combinations associated with spotting pattern (Table 40). Eight watersheds contained lakes supporting only large spotted YCT. Four watersheds contained lakes having all three spotting pattern combinations. Three watersheds contained lake supporting only fine spotted YCT, and 1 watershed contained lakes supporting both spotting patterns that were sympatric (Table 41). Expansion of the fine spotted form of YCT into so many watersheds is largely related to the use of these fish in contemporary fishery management, especially in Wyoming. Also, some lakes in Montana were inadvertently omitted from the geo-database. These lakes would have been occupied by large spotted YCT.

Table 40. Watersheds and associated stream miles occupied by the various spotting patterns of YCT.

Watershed Name	HUC Code	Spotting Pattern	Miles
Yellowstone Headwaters	10070001	Fine Spot Only	17.2
Upper Wind	10080001	Fine Spot Only	24.3
Little Wind	10080002	Fine Spot Only	0.3
Popo Agie	10080003	Fine Spot Only	4.4
Snake Headwaters	17040101	Fine Spot Only	122.5
Gros Ventre	17040102	Fine Spot Only	132.8
Greys-Hoback	17040103	Fine Spot Only	663.6
Salt	17040105	Fine Spot Only	166.7
		Total	1,132.0
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	15.5
Upper Wind	10080001	Both Large and Fine Spot	198.0
Little Wind	10080002	Both Large and Fine Spot	47.0
Popo Agie	10080003	Both Large and Fine Spot	5.7
Upper Bighorn	10080007	Both Large and Fine Spot	44.2
Greybull	10080009	Both Large and Fine Spot	142.1
South Fork Shoshone	10080013	Both Large and Fine Spot	14.1
Little Bighorn	10080016	Both Large and Fine Spot	1.3
Snake Headwaters	17040101	Both Large and Fine Spot	420.6
Gros Ventre	17040102	Both Large and Fine Spot	171.4
Greys-Hoback	17040103	Both Large and Fine Spot	72.0
Palisades	17040104	Both Large and Fine Spot	287.7
Salt	17040105	Both Large and Fine Spot	317.2
Idaho Falls	17040201	Both Large and Fine Spot	27.4
Teton	17040204	Both Large and Fine Spot	11.4
		Total	1,775.0

Table 40. Continued.

Yellowstone Headwaters	10070001	Large Spot Only	914.5
Upper Yellowstone	10070002	Large Spot Only	560.2
Shields	10070003	Large Spot Only	452.7
Stillwater	10070005	Large Spot Only	103.4
Clarks Fork Yellowstone	10070006	Large Spot Only	81.0
Pryor	10070008	Large Spot Only	26.8
Upper Wind	10080001	Large Spot Only	123.0
Little Wind	10080002	Large Spot Only	23.3
Nowood	10080008	Large Spot Only	11.2
Greybull	10080009	Large Spot Only	89.1
Big Horn Lake	10080010	Large Spot Only	64.5
North Fork Shoshone	10080012	Large Spot Only	253.3
South Fork Shoshone	10080013	Large Spot Only	23.6
Shoshone	10080014	Large Spot Only	4.1
Lower Bighorn	10080015	Large Spot Only	7.0
Little Bighorn	10080016	Large Spot Only	20.0
Upper Tongue	10090101	Large Spot Only	0.6
Snake Headwaters	17040101	Large Spot Only	153.5
Gros Ventre	17040102	Large Spot Only	2.2
Greys-Hoback	17040103	Large Spot Only	3.3
Palisades	17040104	Large Spot Only	32.8
Upper Henrys	17040202	Large Spot Only	71.5
Lower Henrys	17040203	Large Spot Only	156.0
Teton	17040204	Large Spot Only	387.7
Willow	17040205	Large Spot Only	195.9
American Falls	17040206	Large Spot Only	17.9
Blackfoot	17040207	Large Spot Only	271.3
Portneuf	17040208	Large Spot Only	264.3
Lake Walcott	17040209	Large Spot Only	7.8
Raft	17040210	Large Spot Only	102.3
Goose	17040211	Large Spot Only	119.2
Beaver-Camas	17040214	Large Spot Only	18.1
Medicine Lodge	17040215	Large Spot Only	58.1
		Total	4,620.0

Table 41. Watersheds and the number of lakes occupied by the various spotting pattern combinations.				
Watershed Name	Watershed Number	Large Spot Only	Fine Spot Only	Both Spotting Patterns
Yellowstone Headwaters	10070001	4		
Stillwater	10070005	24		
Clarks Fork Yellowstone	10070006	4		
Upper Wind	10080001	26	21	11
Little Wind	10080002	9	26	8
Popo Agie	10080003		3	
Nowood	10080008	1		
North Fork Shoshone	10080012	2		
Snake Headwaters	17040101	10	15	5
Gros Ventre	17040102		16	
Greys-Hoback	17040103	1	8	2
Palisades	17040104			2
Salt	17040105		2	
Upper Henry's	17040202	3		
Teton	17040204	1		
Blackfoot	17040207	1		
Totals		86	91	28

Genetic Comparisons by Spotting Pattern

Genetic information for streams occupied by only large spotted YCT (Figure 31) indicated that genetically unaltered fish occurred in 1,390 miles (30%), large spotted YCT with less than 10% introgression occurred in 492 miles (11%), large spotted fish with introgression in the range from >10 and ≤25% occupied 84 miles (2%), and those large spotted YCT with more than 25% introgression occupied 56 miles (1%). There were 136 miles of habitat occupied only by large spotted YCT where both genetically unaltered and altered fish occurred in a sympatric condition. Genetic testing has not been completed for a substantial amount of occupied habitat and for these areas the biologists were asked to project the genetic condition based on the history of stocking and/or the presence or absence of genetically contaminating fish. For untested stream segments containing only large spotted YCT, 1,236 miles (27%) were judged as suspected unaltered, and 1,219 (26%) were viewed as being potentially altered (Table 42).

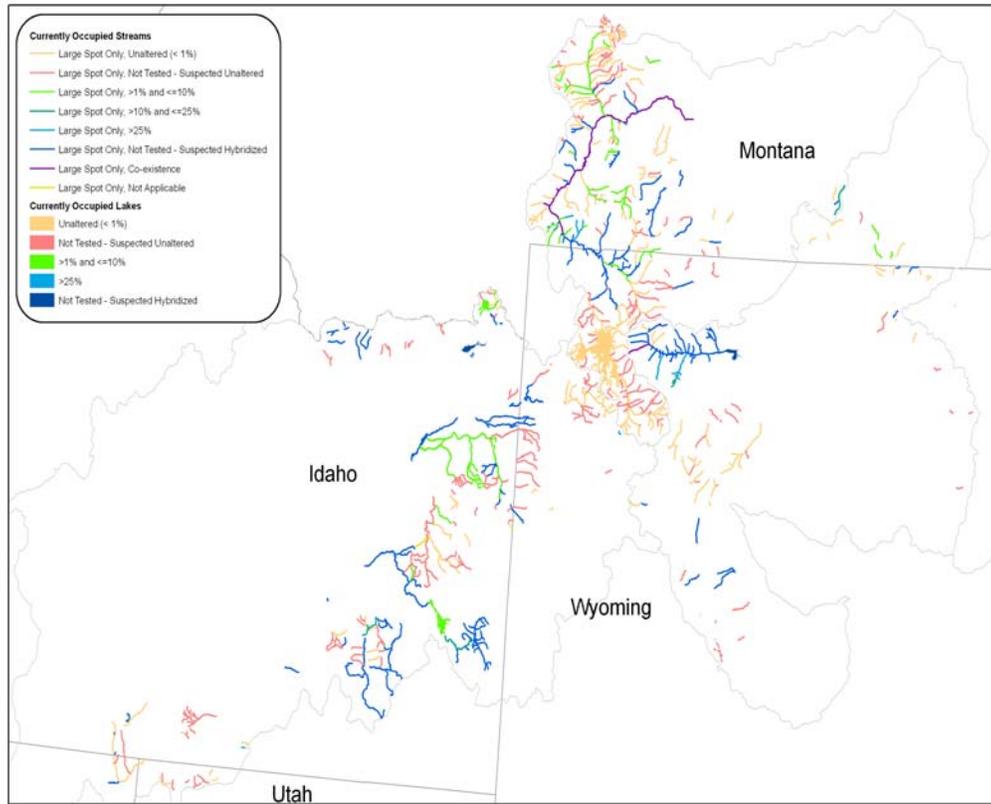


Figure 31. Genetic information associated with stream habitat occupied only by large spotted YCT.

For those stream habitats (1,132 miles) occupied only by fine spotted YCT (Figure 32), 905 miles (80%) were tested and found to be genetically unaltered, and another 100 miles (9%) were suspected of being unaltered based on stocking history and/or absence of genetically contaminating (Table 42). Thirty-six miles (3%) were found to have low levels of introgression and 57 miles (5%) had fish that were potentially altered genetically. The remaining 34 miles (3%) of stream habitat occupied by fine spotted YCT were judged to support both unaltered and altered that were sympatric.

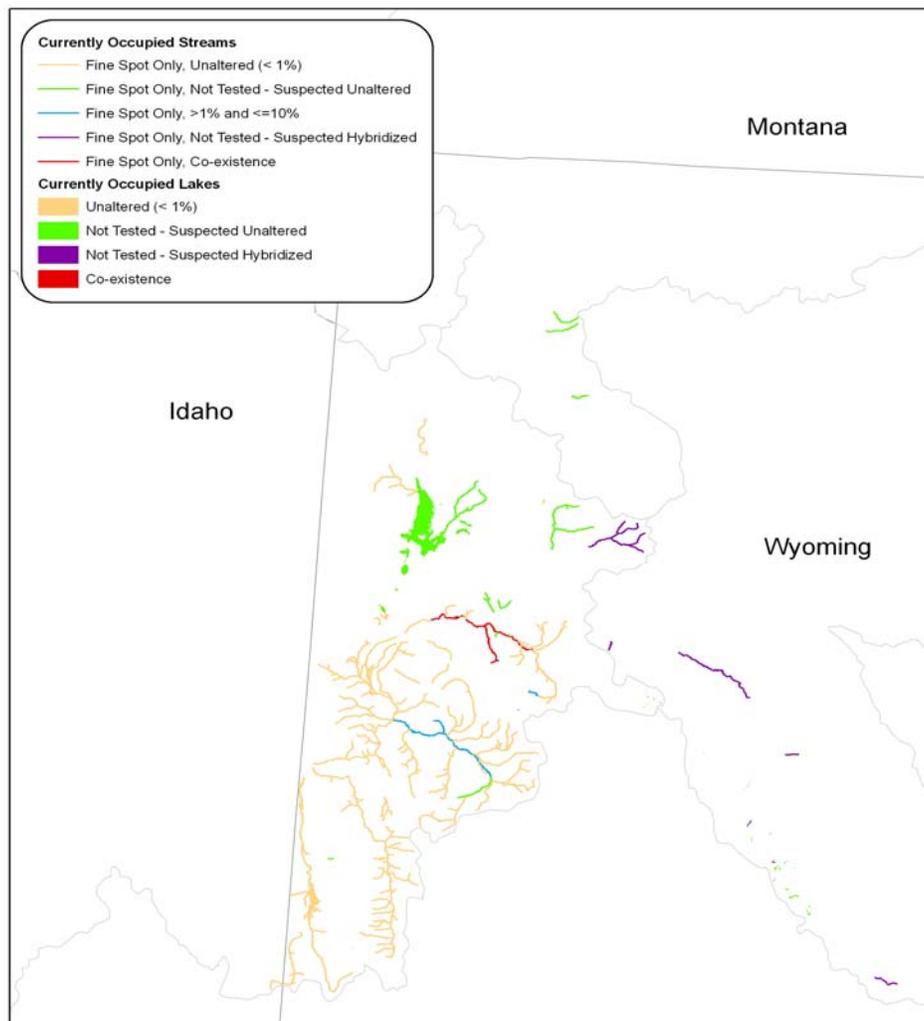


Figure 32. Genetic information associated with stream habitat occupied only by fine spotted YCT.

The remaining spotting pattern category had both large and fine spotted YCT in a sympatric condition. The genetic information collected for this grouping identified 817 miles (46%) as being genetically unaltered, 517 miles (29%) were untested but suspected of being unaltered, 84 miles (5%) were tested and found to be slightly hybridized, and another 19 miles (1%) were in the hybridized category of >10 and ≤25%. Three hundred and thirty eight miles (19%) were not tested but judged as being potentially hybridized (Figure 33).

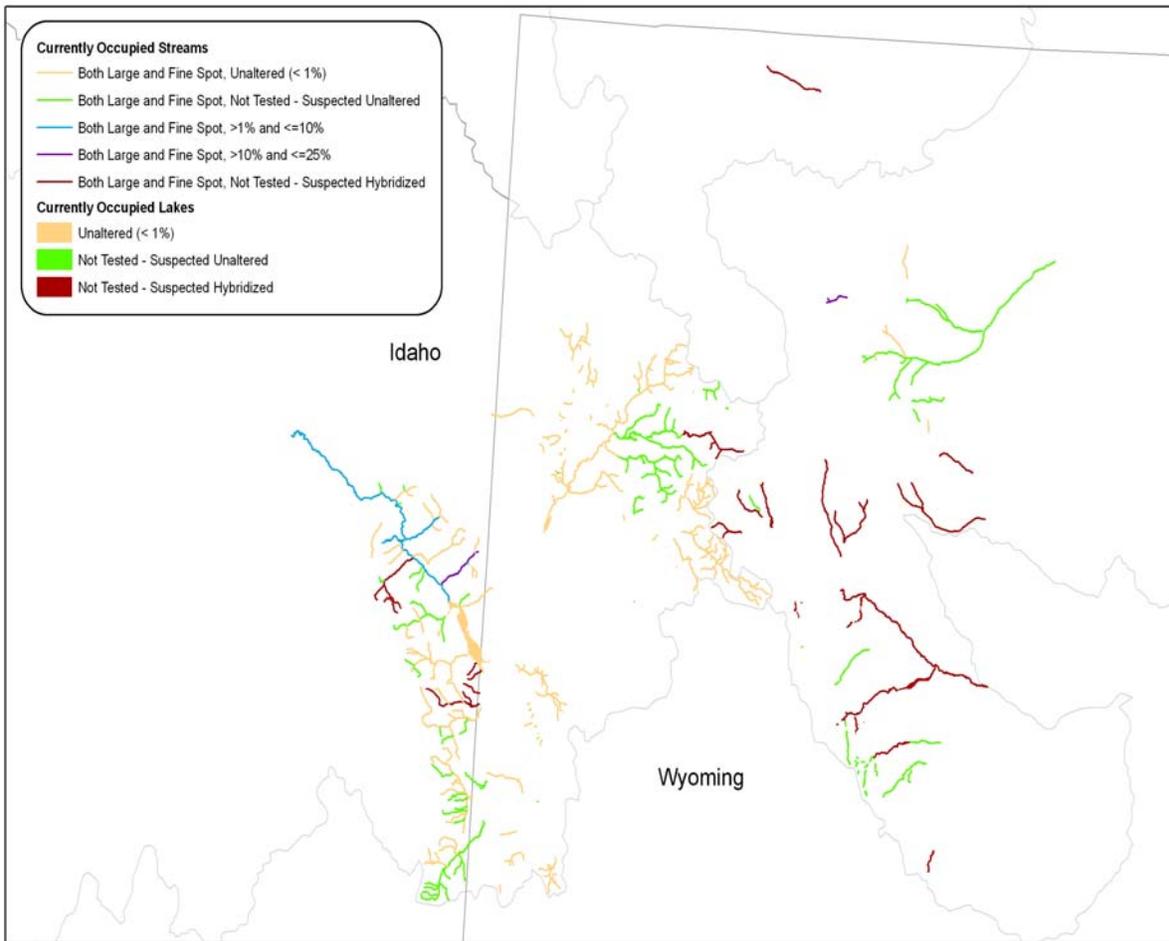


Figure 33. Genetic information associated with stream habitat occupied only by both large and fine spotted YCT in a sympatric condition.

Table 42. Genetic results by spotting pattern and genetic category for currently occupied habitat. Values are miles of occupied stream habitat.

Genetic Category	Spotting Pattern Category (Miles of Occupied Stream Habitat)			Total
	Large Spot Only	Fine Spot Only	Large and Fine Spot	
Unaltered	1,390	905	817	3,112
>1% and ≤10%	492	36	84	612
>10 and ≤25%	84	--	19	103
>25%	56	--	--	56
Not tested – suspected unaltered	1,236	100	517	1,854
Not tested -- potentially altered	1,219	57	338	1,614
Altered and unaltered co-exist	136	34	--	169
Totals	4,620	1,132	1,775	7,527

Conservation Population Comparisons by Spotting Pattern

Of the 382 conservation populations, 210 (55%) were comprised of the large-spotted form, 79 (21%) were comprised of the fine-spotted form and 93 (24%) represented a mixture of both spotting patterns (Table 43). Large-spotted YCT conservation populations were identified as being broadly distributed throughout the current range of YCT (Figure 30). Large-spotted YCT existing, as conservation populations, without the presence of the fine-spotted form occurred in 3,349 miles of stream (47% of habitat occupied by conservation populations). The fine-spotted form existing, as conservation populations, without the presence of the large-spotted form occurred in 576 miles of stream (8%). Conservation populations represented by both spotting patterns occurred in 3,279 miles of stream (46%). Conservation populations with only fine-spotted YCT were primarily located within headwaters of the Snake River. A lesser number of fine-spotted YCT conservation populations were identified in drainages in Wyoming that were outside of the Snake River basin (Figure 30). The fine-spotted form of YCT has been widely used within recreational fishery management program for Wyoming; therefore, they have been introduced into many watersheds outside of their historical area.

Table 43. Summary of conservation populations based on spotting patterns within the various populations. Values are miles of streams.

Spotting Pattern	Number of Populations	Miles of Stream Occupied
Large spotted YCT only	210	3,349
Fine spotted YCT only	79	576
Both large and fine spotted YCT	93	3,279
Totals	382	7,204

Conclusions, Comparisons, and Recommendations

The 2006 status assessment was intended to provide a second appraisal of the status of YCT from a variety of perspectives and at various scales or levels. The perspectives included a historical point of view, a current distribution perspective based on habitat occupancy of phenotypically correct (i.e., they look like) YCT, an effort to delineate discrete populations of YCT identified for their conservation value, and a perspective related to the potential for restoration or expansion of YCT conservation populations. The various scales or levels, in ascending order, from which information can be derived included: 1) the habitat feature level (e.g., a specific barrier); 2) the habitat segment scale level; 3) the stream or lake level; 4) the watershed level; 5) the geographical management unit (GMU) level; 6) the administrative unit level (e.g., state and/or agency boundaries); and 7) the range-wide level.

YCT are considered game fish by all state, federal and tribal agencies that have management authority for this subspecies of cutthroat trout. Consequently, all YCT have sport fish value and have been managed as such by the various states, national parks and Tribal authorities in which they occur, regardless of their conservation status or other considerations associated with this status assessment. Most YCT were also managed as “conservation populations” with additional management emphasis being placed on conservation or preservation as a primary management focus and recreational public use (i.e., sport fishing) as a secondary emphasis. Conservation objectives included maintenance of genetic integrity, concern for resilience and viability at both subspecies and population levels, and protection and enhancement of specific aquatic environments and associated watersheds linked to the conservation populations. Conservation objectives also included investment in public outreach and conservation education. Since 2000, YCT have been managed under a range-wide conservation agreement as a partnership of state and federal agencies. Prior to 2000, YCT conservation was provided by the various partners on an individual basis. Many western states having management and conservation authority for cutthroat trout participated in the development of a position paper on genetic management and conservation (Utah Division of Wildlife Resources 2000) of cutthroat trout. A hierarchical classification for conserving cutthroat trout genetics included: 1) a core component of genetically unaltered populations or individuals; 2) designation of conservation populations that may be either genetically unaltered or slightly hybridized but have other attributes worthy of conservation (e.g., unique life histories or environmental adaptations); and 3) populations that

are managed primarily for their recreational fishery value. Core populations were recognized as having important genetic value, and they would serve as donor sources for developing either captive or wild broods or for re-founding additional populations through replication of existing YCT populations. Management of conservation populations has emphasized conservation actions that include maintenance of genetic integrity, population expansion, of both core and conservation populations, restoration of core populations, protection and enhancement of habitats and watersheds and elimination of non-native fish.

Status Comparisons

The exact evolutionary (phylogenetic) origins and zoogeographical processes taken during the speciation process for the various cutthroat trout subspecies continue to generate much speculation and debate (Behnke 1992, Smith et al. 2002 and others). More recent advances in genetic testing methodologies have offered new insight into the pre-historical cutthroat trout story. Recent status updates (1996, 2001 and 2006) did not attempt to address the pre-historical picture of YCT. Rather, the focus has been on a more recent historical point of reference that could more reliably be validated and explained. Additionally, this contemporary perspective provided for a better opportunity of understanding anthropogenic influences that have had substantial impacts on current YCT conditions over the last 200 years.

Historical habitats of YCT delineated in the 1996 status assessment (May 1996), the 2001 status assessment (May et al. 2003), and the estimated historical habitat in this status assessment, differ substantially from earlier assessments. A notable difference was associated with the reference period of historical occupancy. The work of Behnke (1979; 1992) provided a pre-historical perspective of YCT distribution that has been cited in most assessments (Hadley 1984; Varley and Gresswell 1988; Thurow et al. 1988; Gresswell 1995; Kruse et al. 2000; Meyer et al. 2003). The range-wide YCT status assessment completed in 1996 (May 1996) initiated discussion of the historical range of YCT from a more immediate perspective using European exploration of the inland portion of west (circa 1800) as the historical benchmark. Kruse et al. (2000) completed an intensive status assessment of YCT in specific drainages of the Bighorn River and anchored his historical perspective to this more recent time period.

Another substantial difference among the status updates of 1996, 2001 and 2006 and many previous assessments was associated with the base representation of occupied habitat across the historical range. Behnke (1979, 1988 and 1992) used narratives and generalized maps to describe the outer most boundaries of YCT historical range. These publications made reference to field notes and observations, but did not attempt to provide quantification, in terms of miles of stream or acres of lake, for the historically occupied habitat. Hadley (1984) provided a very limited qualitative reference to historical occupancy in the Yellowstone River Basin in Montana. Varley and Gresswell (1988) cited Behnke's publications relative to the broad boundary of the historic range and then provided some quantitative detail. They estimated that the historic range of YCT was comprised of 44,500 ha (107,550 acres) of lake habitat and 24,000 km (15,000 miles) of stream environment. Varley and Gresswell (1988) did not, however, provide an explanation on how they arrived at these estimates. A status assessment for inland YCT completed in 1996 (May 1996), included an attempt to quantify historical range based on an exercise that utilized area biologists and others having specific local knowledge to identify the extent of historical distribution on land status maps using 1800 as the reference time period. The approach used in

the 1996 assessment was in contrast to most early status evaluations that generally implied that all or most streams within the broad boundary were occupied by YCT. The 1996 report referenced several historical publications, journal entries and personal contacts with “elder” residents of the historical range to provide further validation of the historical distribution.

Behnke’s distribution maps (Behnke 1992) encompassed many 4th level watersheds (e.g., the lower Tongue River, lower Rosebud Watershed within the Tongue River Basin, Badwater, Muskrat, and Lower Bighorn watersheds in the Bighorn River Basin, and several watersheds on the north side of the mainstem Yellowstone River). Inclusion of these areas resulted in an over estimate of the amount of habitat that would have been historically occupied. The approach applied in the 1996 and 2001 assessments, and validated in this 2006 status assessment excluded the above watersheds based on information provided by historical accounts, and a focused review by individuals knowledgeable about aquatic and watershed conditions in these specific geographical areas.

The extent of historically occupied stream habitat in the 2001 status assessment (May et al. 2003) estimated that YCT occupied 17,407 miles of habitat. The 2001 status assessment did not project historical occupancy for lake environments. The 2006 status assessment refined that estimate of historically occupied stream habitat and increased it to 17,721 miles. The 2006 status assessment also identified 61 lakes, covering 124,715 surface acres, as being historically occupied. A further comparison can also be made with the 1996 YCT assessment (Table 44). In the 1996 assessment, YCT were estimated to occupy 16,686 miles of riverine habitat (May 1996).

Table 44. Comparison of the miles of streams and number of lakes of estimated historical habitat for YCT, by assessment year.

State	1996	2001	2006
Streams			
Wyoming	10,969	6,886	6,713
Idaho	3,587	6,267	6,471
Montana	1,920	4,040	4,296
Utah	210 combined	103	130
Nevada		97	111
Total miles	16,686	17,393	17,721
Lakes⁴			
Wyoming	113	--	59
Idaho	3	--	2
Montana	2	--	--
Utah	0	--	0
Nevada	0	--	0
Total lakes	118	--	61

⁴ The 2001 status assessment for YCT did not include a specific effort to identify lake environments occupied by YCT. In retrospect, this oversight should not have happened.

There were 118 lake environments identified as being historically occupied in the 1996 status assessment (Table 44). The vast majority of these lakes were in Wyoming. The 2001 status assessment did not specifically address lake environments in either the historical or current distribution reviews. Rather, the stream course segments that bisected the lakes were attributed as being occupied by lacustrine-adfluvial YCT if they were believed to be present.

The differences in stream mileages for the two assessments were likely linked to differences in map scales for the efforts. In 2001, the map scale was 1:100,000 as compared to a 1:24,000 scale used in the 2006 status assessment. Another difference was the nature of hydrography coverage between the 2001 assessment and the 2006 assessment. In 2001, the stream coverage contained nearly 32,220 miles of digitized stream course. Excluded from that coverage were ephemeral and intermittent streams and most ditches and canals. From that total, the estimated amount of historical stream habitat (17,393 miles) was derived through a process of elimination based on the influence of passage barriers (e.g., falls and temperature) that would have controlled upstream fish passage and a determination of the capability of habitats (e.g., linked minimal flows, excessive gradients, intermittent or ephemeral flows, etc.) to support and maintain YCT. Some stream reaches were excluded because of historical references and anecdotal observations indicating that the stream was barren of fish (May 1996). Other habitats were included on the basis of historical journal entries, scientific reports, anecdotal information on presence, evidence of basin transfers and presence of trout when no barriers were present. By comparison, the 2006 assessment utilized a NHD stream coverage that contained over 199,000 digitized miles of stream course. This coverage included ephemeral and intermittent channels and many ditches and canals. From this new coverage, the projected amount of historical stream habitat (17,721 miles) was derived using similar considerations applied in 2001.

While the total amount of historically occupied stream habitat was relatively similar for the three recent status updates, there were substantial differences in mileages projected for the various states. The differences between these estimates at the state level could be explained in two ways. First, there was a substantial amount of refinement in the assessment protocol that occurred between the status assessment reported in 1996 and the status assessment completed in 2006. Secondly, the 1996 status assessment maps at a very broad scale (1:200,000) for delineating historical habitat. Comparison of historical information obtained in the three recent status updates with the estimate of approximately 15,000 miles provided by Varley and Gresswell (1988) reflected a comparable estimation of historically occupied habitat. Since Varley and Gresswell (1988) did not provide a rationale of how they derived the number of historically occupied stream miles, we did not attempt to complete a detailed comparison with the 2006 information. The number of lakes and the associated surface area for historically occupied lakes varied to a greater extent. In 1996 there were 118 lakes identified as being historically occupied but no estimates of surface acreages were provided. No explicit projection of historical use of lakes was associated with the 2001 status assessment. The 2006 status assessment included an estimate of lake environments occupied by YCT. Sixty-one lakes (125,716 surface acres) were projected to be historically occupied. Varley and Gresswell (1988) estimated the historical lake acreage to be approximately 44,500 hectares (approximately 107,500 surface acres). Similar to the estimated stream mileage, Varley and Gresswell (1988) did not provide a rationale on how they derived their lake estimates.

The 2006 status assessment estimated that YCT (e.g., phenotypically correct YCT) currently occupied 7,527 miles of habitat (42% of historically occupied habitat) within the historical range (Figure 3). Of these miles, YCT occupied 4,048 miles (54%) in Wyoming, 2,033 miles (27%) in Idaho, 1,339 miles (18%) in Montana and Nevada and Utah having 58 and 49 miles, respectively (Table 45). Comparison of current distribution information from the 1996, 2001 and 2006 assessments provided comparable results associated with the amount of occupied habitat (Table 45). It is probable that differences for the individual states reflected the influence of different map scales associated with the stream layers, and better information associated with the more recent status updates. The reason for the significantly large difference in currently occupied habitat within Montana was because during the 1996 assessment only those YCT that had been genetically tested were counted in that assessment (May 1996). The estimated number of currently occupied lakes in 2006 was 205 lakes; this was a 366% increase over the 61 lakes identified as being historically occupied. Varley and Gresswell (1988) estimated that YCT, in their pure form, currently occupied 38,500 ha of lake habitat (~80,900 acres) and 2,400 km (~1,500 miles) of stream habitat. A reason for this estimate being significantly lower could be linked to the identification of habitats supporting only “pure” YCT. Varley and Gresswell (1988) did not provide a discussion of how purity was determined to support their estimate of current distribution.

Table 45. Comparison of current YCT distribution estimates from three recent status assessments. Values are expressed as miles.

State	1996	2001	2006
Wyoming	4,624	3,861	4,048
Idaho	1,622 ⁵	2,174	2,033
Montana	625	1,417	1,339
Nevada	--	44	58
Utah	--	42	49
Total miles	6,817	7,538	7,527

Use of the NHD stream and lake layers at the 1:24,000 scale, application of a revised protocol and database, and the availability of substantial amounts of new information increased the ability of the 2006 status assessment to provide the necessary information upon which to base conservation decisions. The 2006 protocol added new characterizations for each occupied habitat segment that included the origin of YCT, migratory life histories, stocking records, genetic status, fish density, habitat quality and quantity, and information on non-native fish presence. The 2006 protocol also tracked the source of information, ranging from professional judgment to detailed sampling and analysis, for each of these characterizations. Characterizations were applied to both stream and lake segments. Use of the NHD format and the “event creation” tool will allow future updates to be even more precise.

With regard to genetic status, there was a substantial increase in the total number of genetic samples taken and the amount of habitat that was associated with these samples. In 2001, genetic sampling was reported from 1,776 miles of habitat (Table 46). This level of sampling was estimated to be 25% of the 7,538 miles identified as currently occupied. By contrast, the 2006

⁵ The 1,622 stream miles in Idaho include the stream miles for Utah and Nevada that occur in Goose Creek and Raft River.

status assessment identified that genetic samples had been taken from 3,883 miles of occupied habitat. This level of sampling was estimated to be 42% of the 7,527 miles of occupied habitat.

Table 46. Comparison of genetic results and determinations reported in the 2001 and 2006 status updates.

Genetic Testing	2001	2006
Tested - unaltered	1,301	3,112
Tested – altered	475	771
Sub-total of miles tested	(1,776)	(3,883)
Untested – suspected unaltered	3,019	1,854
Untested – potentially altered	2,630	1,614

Genetic tests can detect introgression between YCT and potentially hybridizing species or subspecies by detecting alleles unique (“diagnostic alleles”) to the hybridizing species or subspecies within YCT populations. The number, and thus the proportion, of “diagnostic alleles” within YCT populations were used to estimate the level of introgression in the YCT population. A consequence associated with this approach is that proving a stock of YCT to be genetically pure is essentially impossible: all individuals in the population would have to be tested. Therefore, sample size must be considered when evaluating the reliability of any genetic test. Generally, sample sizes should be large enough to determine, with a pre-determined level of statistical reliability (95% has often been used), that a 1% or less level of introgression would be detected. Both the number of fish sampled and the number of alleles that are “diagnostic” between species or subspecies determine the sample size needed for a pre-determined level of statistical reliability. Thus, when genetic testing finds no evidence of introgression, sample size is very important for assessing how valid the result may be. For the 2006 status assessment, we reported the most current results of all genetic testing, regardless of sample size. The geo-database contains information on sample sizes and sampling dates for all genetic testing and this information can be used if more detailed genetic analysis is desired. In this report, we did not address changes in genetic status that might have been observed over time for a given habitat segment.

YCT abundance for currently occupied habitat was the only other characterization addressed in the 2001 status assessment that could be compared to the information in the 2006 status assessment. Due to the qualitative approach applied in 2001 it was necessary to develop a “cross walk” between the status updates. To accomplish this the qualitative characterizations of rare, common and abundant in the 2001 assessment were matched with one or more of the quantitative density ranges in the 2006 assessment (Table 47).

Table 47. Comparison of abundance or density estimates from the 2001 and 2006 status assessments.			
Density Category Conversion		Density Comparison	
2001	2006	2001	2006
Rare	0 to 50 fish/mile	1,506	2,398
Common	51 to 150 fish/mile	3,302	2,036
Abundant ⁶	151 to 2000 fish/mile	2,282	2,513
Unknown	Unknown	439	580

The change from the very qualitative approach in 2001 to the more quantitative approach in 2006 represented a significant improvement in the status protocol. The change reduced subjectivity and decreased the amount of time required by the assessment teams to arrive at an abundance determination. Having a quantitative characterization will facilitate comparison with future status updates.

For the new information associated with origin, migratory behaviors, fish stocking, habitat quality and non-native fish presence that was collected in 2006, much of this information was used to complete the evaluations associated with conservation population health and well-being. Specific comparison of the new characterization information with the 2001 status assessment could not be completed due to the lack of this information in the 2001 assessment. It is anticipated that such comparisons will become valuable as future assessments are completed.

With regard to conservation populations, there continued to be two types of conservation strategies represented within the YCT populations identified in 2001 and those re-evaluated and identified in 2006. One strategy was associated with conserving genetic integrity and reducing the influence of non-native species through isolation of YCT populations (Kruse et al. 2001). The other strategy was associated with maintenance of connectivity within YCT populations by providing relatively large areas of continuous habitat that would allow YCT to express a range of life history behaviors, particularly migratory behaviors. As was detailed in the results, the inherent risks and influences on relative population health from the two conservation strategies were different.

For those YCT conservation populations where genetic integrity and isolation from competing species were emphasized by the population characterizations, negative health influences linked to lower population size, reduced temporal variability expressed as the amount of occupied stream habitat, and reduced within population connection were generally more pronounced. The assumptions associated with these negative influences was that YCT populations benefit from a larger number of fish that occupy relatively large amounts of habitat with well defined habitat networks that allow for connection among sub-components of the population. Some authors have indicated that populations need to be supported by an effective population of at least 500 reproducing adults based on the 50/500 “rule” (Franklin 1980; Soulé 1980); thus, many small populations of cutthroat trout are believed to be at a high risk of local extinctions (Kruse et al. 2001; Hilderbrand and Kershner 2000). Harig and Fausch (2001) found that cutthroat trout

⁶ The conversion of the 2001 abundance category required merging three density ranges from the 2006 status update.

translocations were reproductively successful, more than 50% of the time, when the drainage area was at least 14.7 km² (5.6 mi.²). This likely translates to inhabited stream lengths of at least 2 to 3 miles. Translocations were predicted to be successful 90% of the time when drainage areas were greater than 33 km². Stream lengths associated with these larger watersheds would likely be within the 5 to 7 mile range. Hilderbrand and Kershner (2000) estimated that cutthroat trout needed at least 5.7 miles (9.3 km) of habitat at moderately high densities to persist under the “500 rule.” Rieman and Dunham (2000) provided data that indicated small, isolated populations of WCT might not be as prone to extinction as other vertebrates, and even other salmonids, based on their evaluation of the persistence of isolated headwater populations of westslope cutthroat trout in the Coeur d’Alene Basin of Idaho. Fausch et al. (2006) provided a thorough review of the challenges associated with salmonid populations isolated above passage barriers in small habitat patches. Information obtained in the 2006 status assessment indicated that 67 YCT conservation populations had population sizes that exceeded 2,000 adult fish. Most of these populations (57) had habitats that exceeding 10 miles of stream. Ten of these populations occupied habitats with less than 10 miles.

For YCT conservation populations identified in 2006 that occupied larger and more complex and connected habitat units, the negative health characterizations associated with temporal variability and population size were generally lower. Population production potentials tended to be lower for this group principally because these populations had a higher occurrence of non-native fish co-existing with the YCT populations. Population abundance for a substantial number of these populations exceeded 2000 mature adults. Many populations had abundances exceeding 4,000 adults. Risk to genetic integrity for populations occupying larger habitat units was higher than for the smaller non-networked or weakly networked populations. Risks associated with catastrophic diseases for the majority of YCT populations were viewed as being limited or low regardless of which conservation strategy was manifested.

General Conclusions

This assessment clearly re-affirmed that YCT currently occupy and are distributed across significant portions of their historical range. YCT currently occupy a higher proportion of habitat near the core of their historical range. Several studies, both theoretical and empirical, have suggested a decline in the proportion of sites occupied and in population densities from the center to the fringe of a species range for many vertebrate species (e.g., Brown 1984; Caughley et al. 1988; Lawton 1993). Meyer et al. (2003) observed that most YCT populations in southeastern Idaho had neither declined in abundance nor distribution over the last two decades.

Efforts to determine the genetic status of YCT increased by 64% between 2001 and 2006 based on the number of stream miles associated with genetic sampling. Genetic results demonstrated that a significant number of YCT continue to persist as genetically unaltered fish. Conservation populations were identified as occupying 96% of the habitat currently occupied by YCT. Three hundred and eighty three conservation populations were identified. Seventy-six of these populations occupied only lake environments. Of the remaining 306 conservation populations, 45 populations occupied habitats consisting of a combination of stream and lake environments and 261 occupied habitat limited to stream environments. A high percentage of the conservation populations were identified as “core” conservation entities reflecting an unaltered genetic condition.

A component of the current YCT conservation effort that was not specifically addressed in this status assessment was associated with the effectiveness of the coordinated conservation effort initiated among states and agencies. In 2000, five states (Montana, Idaho, Wyoming, Nevada and Utah) along with the USDA Forest Service, and the National Park Service entered into a Memorandum of Understanding (MOU) for the conservation and management of YCT. Parties to the MOU identified a common conservation goal and seven objectives that would collectively and individually guide future conservation efforts. The goal included the intent to ensure persistence of YCT within the historic range, and to preserve genetic integrity, and to provide adequate numbers and populations to provide for protection and maintenance of intrinsic and recreational values of YCT. The objectives included: efforts to identify all existing populations, securing and enhancing conservation populations, restoration of populations, public outreach, data sharing, improved coordination, and a stated intent of implement actions and activities necessary to meet the stated goal and objectives. At present, Montana has developed a state level conservation plan for all cutthroat trout that is consistent with the MOU. Wyoming likewise has a state level plan in place. Idaho is in the process of finalizing a similar plan. Currently, Idaho, Utah and Nevada provide for YCT conservation as part of their resident trout management plans. The Forest Service and other Federal governmental agencies (e.g., FWS, NPS and BLM) are implementing conservation actions on an annual basis consistent with their authorities and programs. Tribes with management responsibility for YCT are implementing their own management and conservation actions. Completion of this status assessment was viewed as a priority coordination action necessary to provide both a qualitative and quantitative basis for future conservation action. Through the coordinated conservation effort state, federal and tribal managers have employed recreational fishery management sufficient to regulate sport fisheries on YCT populations to ensure that both harvest and incidental hooking mortality do not cause these populations to decline due to angler use. Agency fish managers should continue their efforts to reduce the potential for genetic introgression resulting from sport fish stocking practices, and aggressively manage to reduce threats from nonnative species that may hybridize and/or compete with YCT. Land management agencies need to manage for aquatic habitats at a high habitat quality level to ensure that remaining YCT populations flourish. In particular, we recommend that existing roadless areas, parks, and wilderness areas continue to be managed so that aquatic habitats are maintained at or near their habitat potential. Since so much of the remaining habitat occupied by YCT is located within federally managed lands, good stewardship of these lands is critical for conserving YCT.

There is little doubt that YCT distribution and numbers have been reduced during the last 200 years. Most reductions probably occurred in the late 1800's and early 1900's due to severe habitat changes, introduction of non-native fish species, and overharvest. It is also clear that many current YCT populations face challenges associated with resiliency and persistence based on small population size, limited habitat, competition with non-native fish and loss of genetic integrity due to hybridization and limited gene flow. To some the future of YCT may appear dim; to others there is hope and optimism. The recent coordinated conservation efforts that are associated with the interagency YCT conservation work group provide a basis for this hope and optimism. As the conservation effort matures and develops, challenges currently facing the YCT populations will continue to be addressed and progress associated with ensuring persistence and viability will be achieved. Human intervention will be necessary to bring about the changes

required to reduce or eliminate the challenges facing YCT. Will YCT be reinstated to their historical condition? Not likely. Will YCT continue to persist? Yes. But in a changed condition that will require vigilance and continual conservation action.

Recommendations

1. We recommend that the geo-database be updated on an annual basis for at least the next 10 years. Adjustments to that frequency, if deemed warranted by consensus of all members of the conservation work group, can be determined after that time period. Each geo-database update should be archived for future reference.
2. The next database update should focus on correction of data entry errors and inconsistencies in the information (e.g., lake information, habitat network information, conservation population determination, etc.) as a primary focus. Addition of new information should be a secondary objective.
3. We support the use of geographical management units (GMU) to partition the YCT conservation effort into manageable units. And we recommend the creation of specific GMU implementation teams, each with a designated team leader, to facilitate information collection and database updates.
4. We also recommend that GMU teams be used to plan, implement and evaluate conservation efforts on an annual basis.
5. We recommend the formulation of a GIS/database working group to insure consistency and provide oversight necessary to maintain the quality of the database. This group would also serve as “clearing house” for changes to the status protocol and should provide training for GIS/database specialists.
6. We recommend that each GMU team have as a member, an assigned GIS/database specialist to facilitate geo-database updates and develop data queries to be used in conservation planning and evaluations.
7. Each database update should be archived and maintained as a separate entity to allow for tracking of changes in the information over time.

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References

- Behnke, R. J. 1979. Monograph of the native trouts of the genus *Salmo* of western North America. Final report under contract to BLM, FWS, and USDA Forest Service, Region 2, Lakewood, Colorado.
- Behnke, R. J. 1988. Phylogeny and classification of cutthroat trout. In: Status and Management of Interior Stocks of Cutthroat Trout. American Fisheries Society Symposium 4:1-7.
- Behnke, R. J. 1992. Native trout of Western North America. American Fisheries Society, Monograph 6, Bethesda, Maryland.
- Behnke, R. J. 2002. Trout and salmon of North America. The Free Press. 359 pp.
- Brown, J. H. 1984. On the relationship between abundance and distribution of species. American Naturalist 124:255-279.
- Campton, D. E. and L. R. Kaeding. 2005. Westslope cutthroat trout, hybridization, and the U.S. Endangered Species Act. Conservation Biology. 19(20): 1323-1325.
- Caughley, G.D., G. R. Barker, and B. Brown. 1988. The edge of the range. Journal of Animal Ecology 57:771-785.
- Dunham, J.B., B.E. Rieman, and J. T. Peterson. 2002. Patch-based models of species occurrence: lessons from salmonid fishes in streams. In: Predicting species occurrences: issues of scale and accuracy. Scott, J. M., P. J. Heglund, M. Morrison, M. Raphael, J. Haufler, and B. Wall (Editors). Inland Press. Covelo, CA. pp 327-334.
- Fausch, K. D., B. E. Rieman, M. K. Young and J. B. Dunham. 2006. Strategies for conserving native salmonid populations at risk from nonnative fish invasions: Tradeoffs in using barriers to upstream movement. USDA Forest Service. Rocky Mountain Research Station. General Technical Report RMRS-GTR-174. 44 pp.
- Franklin, I. A. 1980. Evolutionary changes in small populations. Pages 135-150 in M. Soulé, and B. A. Wilcox, editors. Conservation biology: an evolutionary-ecological perspective. Sinauer Associates, Sunderland, Massachusetts.
- Gresswell, R. E. 1995. Yellowstone cutthroat trout. In: Conservation Assessment for Inland Cutthroat Trout. M.K. Young Technical Editor. USDA Forest Service RM-GTR-256. p. 36-54.
- Hadley, K. 1984. Status report on the Yellowstone cutthroat trout (*Salmo clarkii bouvieri*) in Montana. Montana Fish, Wildlife & Parks Report. 74 pp.
- Harig, A. L., and K. D. Fausch. 2001. Minimum habitat requirements for establishing translocated cutthroat trout populations. Ecological Applications 12:535-551.

- Hilderbrand, R. H., and J. L. Kershner. 2000. Conserving inland cutthroat trout in small streams: how much stream is enough? *North American Journal of Fisheries Management* 20:513-520.
- Hirsch, C. L., S. E. Albeke, and T. P. Nesler. 2006. Range-wide status of Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*): 2005. Colorado River cutthroat trout Conservation Team Report. Colorado Division of Wildlife, Fort Collins, Colorado.
- Hydrologic Units Maps of the Conterminous United States. 2002. United States Geological Survey, Reston, VA. <http://water.usgs.gov/GIS/metadata/usgswrd/huc250k.html>
- Jordan, D. S. 1891. A reconnaissance of the streams and lakes in the Yellowstone National Park, Wyoming, in the interest of the United States Fish Commission. *Bulletin U. S. Fish Commission*. Vol. 41-63.
- Kruse, C. G., W. A. Hubert, and F. J. Rahel. 2000. Status of Yellowstone cutthroat trout in Wyoming waters. *North American Journal of Fisheries Management* 20:693-705.
- Kruse, C. G., W. A. Hubert, and F. J. Rahel. 2001. An assessment of headwater isolation as a conservation strategy for cutthroat trout in the Absaroka Mountains of Wyoming. *Northwest Science* 75:1-11.
- Lawton, J. H. 1993. Range, population abundance and conservation. *Trends in Ecology and Evolution* 8:409-413.
- Leary, R. F., W. R. Gould, and G. K. Sage. 1996. Success of basibranchial teeth in indicating pure populations of rainbow trout and failure to indicate pure populations of westslope cutthroat trout. *North American Journal of Fisheries Management* 16: 210-213.
- May, B. E. 1996. Yellowstone cutthroat trout (*Oncorhynchus clarkii utah*). In: Conservation Assessment for Inland Cutthroat Trout. D. D. Duff Technical Editor. USDA Forest Service, Intermountain Region Report. pp. 11-34.
- May, B. E., and S. E. Albeke. 2005. Range-wide status of Bonneville cutthroat trout (*Oncorhynchus clarkii utah*): 2004. Utah Department of Wildlife Resources, Salt Lake City, UT Printed Agency Report. 139 p. Available at: <http://www.wildlife.utah.gov/pdf/cuttpos.pdf>. Accessed 17 April 2006.
- May, B. E., W. Urie, and B. Shepard. 2003. Range-Wide Status of Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*): 2001. USDA Forest Service, Gallatin National Forest, Bozeman, Montana. 201 p. Available at: <http://www.wildlife.utah.gov/pdf/cuttpos.pdf>.
- Montana Fish, Wildlife & Parks. 2000. Cooperative conservation agreement for Yellowstone cutthroat trout within Montana. FWP. Helena, Montana. 57 pp.

- Montana Fish, Wildlife & Parks. 2001. Range-wide conservation Agreement and memorandum of agreement for Yellowstone cutthroat trout. 6 pp.
- Meyer, K. A., D. J. Schill, F. S. Elle, and W. C. Schrader. 2003. A long-term comparison of Yellowstone cutthroat trout abundance and size structure in their historical range in Idaho. *North American Journal of Fisheries Management* 23:149-162.
- Rieman, B. E., and J. B. Dunham. 2000. Metapopulation and salmonids: a synthesis of life history patterns and empirical observations. *Ecology of Freshwater Fish* 9:51-64.
- Rieman, B., D. Lee, J. McIntyre, K. Overton, and R. Thurow. 1993. Consideration of extinction risks for salmonids. FHR Currents, Fish Habitat Relationships, Technical Bulletin 14 December. USDA Forest Service, Boise, Idaho.
- Shepard, B. B., B. E. May, and W. Urie. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) in the United States. Montana Fish, Wildlife & Parks. Printed Agency Report. 94 pp.
- Smith, G. R., T. E. Dowling, D. W. Gobalet, T. Lugaski, D. K. Shiozawa, and R. P. Evans. 2002. Biogeography and timing of evolutionary events among Great Basin fishes. In: *Great Basin Aquatic History*. Editors: Robert Hershler, David B. Madsen and Donald R. Currey. *Smithsonian Contributions to the Earth Sciences*. 33:175-234.
- Soulé, M. E. 1980. Thresholds for survival: maintaining fitness and evolutionary potential. Pages 151-169 in M. E. Soulé, and B. A. Wilcox, editors. *Conservation biology: an evolutionary-ecological perspective*. Sinauer, Sunderland, MA.
- Thurow, R. F., C. E. Corsi and V. K. Moore. 1988. Status, ecology, and management of Yellowstone cutthroat trout in the upper Snake River Drainage, Idaho. In: *Status and Management of Interior Stocks of Cutthroat trout*. American Fisheries Society Symposium 4:25-36.
- USFWS. 2003. Endangered and threatened wildlife and plants: Reconsidered finding for an amended petition to list the westslope cutthroat trout as threatened throughout its range. *Federal Register* vol. 68 (#152): 46989-47009.
- USFWS. 2006. Endangered and threatened wildlife and plants: 12-month finding for a petition to list the Yellowstone cutthroat trout as threatened. *Federal Register* vol. 71: 8818-8831.
- Utah Division of Wildlife Resources. 2000. Cutthroat trout management: a position paper, genetic considerations associated with cutthroat trout management. Publication Number 00-26. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- Varley, J. D. and R. E. Gresswell. 1988. Ecology, status, and management of Yellowstone cutthroat trout. In: *Status and Management of Interior Stocks of Cutthroat Trout*. American Fisheries Society Symposium 4:13-24.

Appendix A

The Genesis and Evolution of the Status Assessment Protocol for Cutthroat Trout: A Methods Review

Bruce E. May and Bradley B. Shepard

2007

Introduction

Dr. Robert J. Behnke began drawing attention to the plight of native trout of Western North America beginning with his Masters thesis (1960) that addressed the taxonomy of the cutthroat trout of the Great Basin and culminating with his monograph on native trout of Western North America (Behnke 1992) and his book entitled “Trout and salmon of North America” (Behnke 2002). His work detailed much of what is currently understood regarding the phylogeny, zoogeography, and status of native western trout. Behnke credited the work of earlier naturalists, such as Girard, Jordan, Evermann, Gilbert, Suckley, Cope, Yarrow, and others, who provided detailed notes regarding the biota, including trout, of the western landscape in the mid to late 1800’s. These individuals also collected type specimens of trout, including cutthroat trout, from across western North America. In 1988, the American Fisheries Society sponsored a symposium “Status and management of interior stocks of cutthroat trout” (Gresswell 1988). This symposium yielded 19 papers prepared by 30 authors and co-authors. Papers presented at the symposium addressed the status of many subspecies of cutthroat trout from a number of perspectives. In addition, there have been many other attempts to describe the status of site-specific populations or groupings of cutthroat trout within the context of state boundaries (Hanzel 1959; Hadley 1984; Haskins 1993; Scully 1993; Alves 1998) or from smaller geographical units (Nelson 1993; Whelan 1993; Duffield 1990; Shepard et al. 1997).

Passage of the Endangered Species Act (ESA), as amended in 1973, was an event of pivotal importance that led to status reviews for many species of native fish. Under this Act, Congress set in motion a wave of interest in the status of many native fish, including all subspecies of cutthroat trout. Under the auspices of the ESA, petitions for listing could be filed and, if upheld, these petitions triggered the completion of status reviews. Petitions have been filed for nine subspecies of cutthroat trout (e.g., Coastal, Colorado River, Bonneville, Greenback, Lahontan, Paiute, Rio Grande, westslope and Yellowstone cutthroat trout). ESA status reviews have been completed for Bonneville (USFWS 2004), Rio Grande (USFWS 2002), westslope (USFWS 1999), and Yellowstone cutthroat trout (USFWS 2006). Status reviews for Greenback, Lahontan and Paiute cutthroat trout were completed at the time of listing in the 1970’s.

Several universal challenges have been associated with the completion of most status reviews and assessments. The first challenge has been dealing with the scope of each status review. Most status reviews have been conducted for a relatively broad spatial scale (e.g. entire range of a cutthroat trout subspecies), where reviewers generally had to rely on a limited amount of site-specific information that was expanded to predict distributions and abundance in other areas with lesser amounts of information. Another challenge was associated with determining a time frame

to define the historical condition. Behnke's (1992) monograph on western native trout included a composite distribution map for all native trout at the end of the 19th century. Behnke (1992) also included more detailed historical range maps for most of the species and subspecies. Each of these maps depicted the historical distributions from a very broad perspective that did not, in most cases, take into consideration vacant habitat that likely existed within the broad boundaries. A third challenge was the variable level of detail and lack of consistency for status information. For most subspecies of cutthroat trout, status information was derived from a number of sources. These sources often utilized different methodologies and approaches to collect, summarize, and display information. Consequently, it was usually difficult to evaluate the comparability and compatibility of the information.

More recently, unified efforts have been undertaken to describe the status of several cutthroat trout subspecies utilizing a procedure originally developed in 1993 that has been refined during the subsequent 13 years. This unified status procedure relies on a team approach for compiling information and assessing status. To ensure that information was consistently and comparably applied, a detailed protocol was developed. In this report we summarize the sequence of events and processes that led to the procedure now being applied to evaluate the range-wide status for several subspecies of cutthroat trout. We wish to acknowledge the many fishery professionals involved in developing these protocols through an adaptive process that involved diverse professionals meeting in teams and reaching consensus on both the protocols and in applying these protocols to evaluate the status of individual subspecies. The current status protocol has been modified and strengthened to not only provide reliable status information, but as a valuable tool that is being used by many private and governmental entities for conserving cutthroat trout.

The Beginning – Generation 1

In 1993, the USDA-Forest Service initiated an effort to develop "Habitat Conservation Assessments" (HCA) for five subspecies of cutthroat trout (i.e., Bonneville, Colorado River, Rio Grande, Westslope, and Yellowstone cutthroat trout; Young 1995; Duff 1996). These assessments targeted cutthroat trout occupying habitat on Forest Service administered land. The effort was intended to compile all existing information on life histories, abundance and distribution, habitat relationships and trends, biotic interactions, reasons for concern, and management considerations. This effort was divided into two tasks. First, the Rocky Mountain Research Station was charged with compiling all published information on these subspecies. Secondly, the Forest Service's Intermountain Region was charged with compiling all unpublished information on these subspecies. Specific individuals were selected to lead each task for each cutthroat trout subspecies. A standard set of instructions, definitions, and information forms was used. Information was compiled by sub-basin at a scale of 3rd to 5th level Hydrologic units (HUC). Each task leader was asked to complete the appropriate information forms for each subspecies using whatever information they had available. Some of these individuals relied primarily on their own information and experience, while others used as many sources of information as possible. There was no consistent effort to compile all available information during this assessment. Information collected outside Forest Service boundaries was usually ignored and different individuals exerted different levels of effort to compile the information.

Despite some limitations, the basic approach used for the HCA's appeared to address some of the shortcomings of earlier status assessments. First, there were a standard set of instructions, definitions and information forms to be used to assess each cutthroat trout subspecies. The instructions, definitions and information forms increased the potential for comparability and continuity. Secondly, the historical perspective was anchored to a specific point of time (i.e., "the last 100 years"). This allowed for reviewers to anchor the historical perspective to a time period for which there existed some documented field observations. There were, however, certain challenges associated with the HCA process that continued to plague development of realistic status appraisals. These challenges included: 1) the difficulty of tracking down all unpublished information; 2) problems associated with extrapolating information collected from one area to other areas where no information was available without the benefit of local information or experience; and, 3) the historical time frame was too short because significant changes in cutthroat status were known to have occurred before 1890. For most cutthroat trout subspecies, the 100-year time frame omitted significant amounts of time when anthropogenic influences that were responsible for reductions in cutthroat trout distribution and abundance had occurred.

The HCA status protocol was further modified to resolve most of the stated challenges when it was applied to the Yellowstone cutthroat trout subspecies. First, the assessment area included the entire historical range of Yellowstone cutthroat trout, including areas outside Forest Service administered lands. The historical range was then subdivided into smaller geographical areas and meetings or workshops were convened so fish professionals with knowledge and information within each area could get together to collaboratively complete the information sheets. All individuals who had either information or knowledge regarding Yellowstone cutthroat trout within each specific geographical area were invited to attend a workshop and present their information and points of view. Secondly, in situations where judgment calls or extrapolations of information were required, these calls were made by a consensus of individuals having first-hand knowledge for a given geographical area. Thirdly, the historical time frame was set to be the year 1800, ensuring that post-European expansion anthropogenic impacts were considered.

Additionally, reference maps of a consistent scale (1:100,000 for Montana and Idaho, and 1:24,000 for Wyoming) were used for identifying both historical and current distributions of Yellowstone cutthroat trout. Thus, stream lengths determined to be historically and currently occupied were estimated using a standardized procedure. Information was compiled on land administrative status, historical and current occupancy, and the condition of available habitat and factors influencing habitat condition. Each geographic team evaluated the relative risks and stability of Yellowstone cutthroat populations in their areas based on the compiled data and their judgment. This information was summarized in a final report (May 1996).

Initial Application of GIS and geodatabase technology -- Generation 2

After completing the Yellowstone HCA in 1996, the process used in the HCA was evaluated by many of the fisheries professionals who participated. The impetus for this evaluation was driven, in part, by a recent petition to list Yellowstone cutthroat trout under ESA and the recognition that a more formal status review was needed. During this time period the state of Montana had initiated a formal coordinated conservation effort for Yellowstone cutthroat trout. In addition, Montana had a statewide fish resource database and a geographic information system (GIS) that state biologists and GIS specialists were using to store fisheries information. As a result of these events, we decided to update the HCA status assessment for Yellowstone cutthroat trout using a modified protocol that took advantage of GIS capabilities within the Forest Service and state of Montana and an existing Montana fish resource database. This modified protocol used an electronic Microsoft Access relational database linked to GIS layers for inputting and displaying fish distribution, abundance, and genetic information.

To validate the potential of a geo-referenced information base for assessing the status of Yellowstone cutthroat trout, a working group of fisheries professionals from within Montana convened during July 1998 and updated the Yellowstone cutthroat status using the revised assessment protocol. This assessment utilized the GIS capabilities of the Gallatin National Forest that linked a Montana Rivers Information System (MRIS) hydrography layer to an Access database. A latitude/longitude identifier (LLID) was used as a key field to link the database to the GIS layer. Historical and current distributions were physically identified and annotated on 5th level HUC maps and then transferred to the GIS hydrography layer. Attribute information associated with the historical and current distributions were entered on data forms and then transferred into an Access database. The focus of this assessment effort was on Yellowstone cutthroat trout that had been genetically tested.

Populations of Yellowstone cutthroat trout were identified for each individual stream they inhabited. Each stream's population was then evaluated to assess its relative risk of extinction based on deterministic, stochastic and genetic risks. Genetic risks were ranked from low to very high based on the presence of fish migration barriers and the proximity of the population to hybridizing fish. Deterministic and stochastic risks were also ranked from low to very high based on four factors (i.e., temporal variability based on potential recruitment and year class strength and watershed and habitat complexity; population size; growth and survival characteristics linked to habitat quality; and isolation) identified in a paper dealing with extinction risks for salmonids (Rieman et al. 1993). Application of the concepts contained in the Rieman et al. (1993) publication were felt to be applicable in determining the relative risk for each Yellowstone cutthroat trout population. The risk evaluation allowed for comparisons within each risk factor, or as a composite score for the four factors. Consultation with Danny Lee, a co-author of the Rieman et al. paper, produced a set of weighting coefficients that were applied to each risk factor to compute the composite score. In addition, an effort was taken to evaluate the influence of land uses on each population using a qualitative process based on the judgment of individuals within the working group.

This GIS-based assessment for Yellowstone cutthroat trout in Montana illustrated that a geo-referenced status procedure improved the effectiveness and efficiency of compiling status

information. The assessment group concluded that GIS capabilities coupled with the use of an electronic database in a workshop setting provided a means for: 1) faster data input; 2) better and quicker display of information for editing; 3) more consistent information across broad geographic areas; and 4) faster and more accurate summaries of the information. The group recommended that this procedure be used for future status updates for Yellowstone cutthroat trout, and possibly other cutthroat trout subspecies as well⁷.

Range-wide Application of the GIS and geodatabase Approach (Yellowstone and westslope cutthroat trout) – Generation 3

During the time period between 1997 and 1999, several coordination meetings were held to discuss formation of a range-wide conservation effort for Yellowstone cutthroat trout. These discussions resulted in the completion of a range-wide Yellowstone cutthroat trout conservation memorandum of agreement that was signed by all five states historically occupied by Yellowstone cutthroat trout, the Forest Service and the National Park Service (Montana Fish, Wildlife & Parks 2000). Coordination between the signatories of the agreement was considered to be the focal point of the agreement. It should be noted that similar range-wide interagency agreements were also being prepared for Colorado River cutthroat, Bonneville cutthroat, Rio Grande cutthroat, and westslope cutthroat trout during this time period.

During a Yellowstone cutthroat trout range-wide coordination meeting in August 2000 there was interest by all parties in completing a range-wide status update to complement the status assessment reported in 1996. The interagency coordination group reviewed the geo-referenced status effort for Yellowstone cutthroat trout in Montana completed in 1998 and agreed to apply a similar approach to a range-wide status update. A subgroup was organized to finalize the protocol and logistics for the effort. The final protocol included three parts: 1) re-validation of the historical distribution; 2) an update of current distribution information and identification of conservation populations; and 3) an evaluation of risks to genetic integrity and population persistence for those populations identified as conservation populations. This range-wide status assessment was conducted at three formal workshops where biologists and database specialists entered information into a geo-referenced database.

The protocol development subgroup decided to utilize standardized 4th level HUC paper maps that showed 1:100,000 scale hydrography and paper information forms to facilitate quality control for the effort. At each workshop, biologists identified stream sections occupied historically and currently by Yellowstone cutthroat trout. The biologists also located all known fish migration barriers on these maps and completed data forms specifically designed to track barrier attributes.

Next, biologists identified populations of Yellowstone cutthroat trout, using primarily genetic integrity and life history expression criteria, through a consensus process (Utah Division of Wildlife Resources 2000). After identifying conservation populations, groups of biologists collectively rated genetic and population risks for each conservation population through a consensus process. These risk rankings were entered onto appropriate forms for each

⁷ May, B. E. 1996. Yellowstone cutthroat trout: current status and conservation recommendations within the State of Montana. An Executive Summary. 10 pp.

conservation population by the biologists. After all forms were completed for each Yellowstone cutthroat trout population within a HUC, these forms and the map were forwarded on to the database specialists for entry into the geo-referenced database. After data entry, biologists could check updated GIS maps on a computer screen to confirm that historical and current distributions were correctly entered and appropriate conservation populations were correctly identified and displayed.

Important improvements to the assessment protocol included: 1) addition of barriers to the GIS map along with specific information for each barrier; 2) addition of an information quality score and source index that allowed for tracking information reliability; 3) a method for tracking genetic information and the source of that information; 4) a qualitative characterization of fish abundance for each occupied habitat segment; 5) identification of conservation populations based on specific genetic and life history criteria; 6) the ability to link several individual stream populations into single conservation populations based on the ability of cutthroat trout to move and interact as a unit (i.e., movement had to be able to occur uniformly within the group of fish); and 7) adjusting population risk evaluations to reflect changes in conservation views associated with population resilience and viability (Hilderbrand and Kershner 2000; Harig and Fausch 2001; Soulé 1980). Aspects of the updated protocol that still generated concerns and challenges included: 1) inability to identify conservation/restoration activities for a particular population or stream segment, and 2) inability to identify land-uses and their potential impacts to cutthroat trout at the stream segment scale. Identification of conservation/restoration activities at the stream segment level was difficult because there was confusion regarding whether to identify conservation actions based on a specific location or to a broader area that could potentially be influenced by the conservation action. The protocol allowed for entering land-use impacts as either “known” or “possible” impacts and it was often not clear why a particular impact was entered either way. Similar to conservation actions there was confusion regarding land uses and how to judge influences (e.g. specific stream segment versus a number of segments). A status update report for Yellowstone cutthroat trout information collected in 2001 was completed in 2003 (May et al. 2003).

A range-wide status update for westslope cutthroat trout was needed in 2002. In 1999, a status review for westslope cutthroat was completed by the Fish and Wildlife Service (FWS 1999). The ESA listing finding associated with this status review was subsequently challenged in court. As a result, the FWS was directed by the Court to re-visit the status review and listing decision. Based on the FWS’s review and acceptance of the protocol used to complete the status update for Yellowstone cutthroat trout in 2001, the FWS supported completion of a similar effort for westslope in 2002.

For the 2002 westslope cutthroat trout status update, several aspects of the Yellowstone cutthroat trout 2001 status protocol were adjusted to address specific changes needed to more accurately evaluate the status of westslope cutthroat trout. Changes were also made to address the confusion associated with attributing the habitat segments with conservation action and land-use information. Changes to the 2001 protocol included: 1) adjusting the genetic information table to account for co-existence of westslope and native red-band rainbow trout; 2) evaluating abundance information based on habitat potential; and, 3) changing the scale at which information associated with conservation actions and land-use influences conservation

populations to the population level rather than the stream segment level. A status update report for westslope cutthroat trout was completed in 2003 (Shepard et al. 2003) and a publication based on this assessment was completed in 2004 (Shepard et al. 2004).

The status update procedure continued to utilize the consensus approach where biologists generated the status information at workshops and used paper maps and attribute forms to initially record the status information. Database specialists were provided packets of information of each 4th level HUC prepared by the biologist and they completed data entry into the geo-referenced database. Latitude and longitude identifiers (LLID) continued to be used to link the database to the GIS layer

Moving GIS and Geo-database Capabilities to a Higher Level – Generation 4

In 2004, the Colorado River and Bonneville cutthroat trout interagency conservation working groups decided to complete status updates for these subspecies with the protocol that was refined for Yellowstone and westslope cutthroat trout (i.e., addressing the three components associated with historical distribution, current distribution and identification of conservation populations). These two efforts included one significant change from previous protocols. Rather than use a 1:100,000 LLID-based hydrography layer, the National Hydrography Dataset (NHD) was used (see <http://nhd.usgs.gov/> for more information on NHD). The 1:24,000 scale NHD was used for most waters within each analysis area. The USDA Forest Service's Natural Resource Information System (NRIS) provided an ArcGIS event creation tool to geo-reference cutthroat population segments. The tool utilized a "point-and-click" user interface to reference these population segments against the NHD networks by creating route events. These status updates used GIS tools and personal geo-databases compatible with ArcGIS format. In addition, these efforts also tracked cutthroat use of lake environments.

Another very important change to the GIS and personal geo-database component of these status updates was incorporating the ability to enter data directly into the database during the update process and providing "real time" updates for both the databases and maps that could be immediately checked and edited by the biologists. The effectiveness and efficiency of the status updates were improved by eliminating the use of paper maps and forms. Quality control was substantially improved by having the data entry specialists as a member of each analysis team. Only streams, primarily perennial, and lakes identified on the NHD data set had information entered into the database.

The protocol was also expanded to include additional attribute information. The additional information included information on: 1) presence of non-native fish species; 2) an evaluation of habitat quality for supporting the species or subspecies of interest; 3) incorporating stocking records at the stream or stream segment level; and 4) describing life history behaviors for each population. The status protocol was also expanded to evaluate the restoration or expansion potentials within the context of the historically occupied habitat. Risks to conservation populations were inverted to compute relative population health and these general health evaluations were derived from information contained in the current distribution database to reduce potential subjectivity. The biologists were no longer asked to make a separate determination related to population health and risk factors.

The most significant benefits that accrued from these GIS and database changes were associated with timesavings and the improvement in the quality of the information. Due to the improvement in efficiency, updates to the geo-databases are now occurring on an annual basis for both the Colorado River and the Bonneville cutthroat trout. Status update reports were completed for the Bonneville cutthroat trout in 2005 (May and Albeke 2005) and for the Colorado River cutthroat trout in 2006 (Hirsch et al. 2006).

Continued Protocol Refinement and Evaluation– Generation 5

In 2006, the cutthroat trout status protocol of 2004 was used to update status information of Yellowstone cutthroat trout. The protocol was also used in 2006 to generate status information for Rio Grande and Greenback cutthroat trout. Application of the protocol was only slightly modified for the 2006 Yellowstone cutthroat status update to accommodate differences in spotting patterns for two distinct groups of Yellowstone cutthroat trout (e.g. fine spotted and large spotted forms). In addition, the origin of the cutthroat was also identified in the 2006 effort to verify if the population was of aboriginal or introduced origin. The personal geo-database was improved to allow for more efficient extraction of information and generation of reports.

A 2006 status update report for Yellowstone cutthroat is being prepared (May and Albeke In preparation). Status updates for Rio Grande and Greenback cutthroat trout using the protocol described in this report are currently in progress. Components of the protocol will also likely to be used in an ESA status review currently being completed for Lahontan cutthroat trout.

Conclusions

Conservation of cutthroat trout is dependent upon having reliable information on the distribution and genetic status of current populations and identifying those populations that warrant conservation efforts. The status assessment protocol we described above has enhanced our ability to compile existing information in a consistent, timely, and efficient manner. Use of GIS technologies and geo-referenced databases have strengthened conservation programs by keeping them focused on conserving mutually agreed-upon conservation populations. An added benefit is that locations of these conservation populations and the relative conservation priorities for these populations can be easily displayed using maps. These databases and the associated GIS information have allowed fish managers to better prioritize and coordinate conservation efforts among many diverse interest groups and agencies. The participation by individuals from many different private, tribal, and governmental entities in these status updates have fostered better collaboration and cooperation among these entities and has resulted in many more collaborative conservation efforts.

The status protocol outlined in this methods review has been applied to westslope, Yellowstone, Colorado River, Bonneville, Rio Grande and Greenback cutthroat trout with the specific intent of providing consistent empirical information upon which judgments related to subspecies status can be made. An evaluation of status based on theoretically based models was not a focus of the protocol. Rather the status update procedure was designed to provide a consistent way of

developing status information a consistent and comparable manner across the entire range of a given cutthroat trout subspecies.

The status update protocol was primarily designed to provide information upon which conservation programs could be planned and evaluated. A secondary benefit of this status protocol has been generating quality, comparable information that can be used in ESA status reviews. A simple comparison of the status review procedures used to generate information for an ESA status review and finding for westslope cutthroat trout (USFWS 1999) to the status update procedures described in this report reflects a significant improvement in efficiency and effectiveness. Use of westslope cutthroat trout status information obtained using the status update procedure (Shepard et al. 2004) was viewed as constituting “best available science” because the information was derived by using a consistent approach that was applied in a comparable manner across the entire westslope cutthroat range.⁸ A status review for Yellowstone cutthroat trout (USFWS 2006) also relied substantially upon status information derived from application of the status update procedure (May et al. 2003).

It is anticipated that future refinements to the status protocol will be made as conservation efforts for cutthroat trout continue and as conservation theory evolves through time. As discussed, the current protocol represents an adaptive approach based on a foundation structured around consistency and comparability. Future refinements must be sensitive to the need for maintaining a base level of comparability.

⁸ Lynn Kaeding, Personal communication. 2007.

References

- Alves, J. 1998. Status of Rio Grande cutthroat trout in Colorado. Colorado Division of Wildlife Report. 10 pp.
- Behnke, R. J. 1960. Taxonomy of the cutthroat trout of the Great Basin with notes on the rainbow series. Master's Thesis. University of California, Berkeley.
- Behnke, R. J. 1992. Native trout of Western North America. American Fisheries Society, Monograph 6, Bethesda, Maryland.
- Behnke, R. J. 2002. Trout and salmon of North America. The Free Press. 359 pp.
- Duff, D. A. 1996. Conservation assessment for inland cutthroat trout: distribution, status, and habitat management implications. U.S.D.A. Forest Service, Intermountain Region, Ogden, Utah.
- Duffield, D. 1990. Management plan and status report: Native cutthroat trout of the Dixie National Forest. Dixie National Forest. Cedar City, UT 19pp.
- Gresswell, R. E. 1988. Status and management of interior stocks of cutthroat trout. Yellowstone cutthroat trout. American Fisheries Society Symposium 4.
- Hadley, K. 1984. Status report on the Yellowstone cutthroat trout (*Salmo clarki bouvieri*) in Montana. Montana Fish, Wildlife & Parks Report. 74 pp.
- Hanzel, D. A. 1959. The distribution of cutthroat trout (*Salmo clarki*) in Montana. Proceedings Montana Academy of Science. 19:32-71.
- Harig, A. L., and K. D. Fausch. 2001. Minimum habitat requirements for establishing translocated cutthroat trout populations. Ecological Applications 12:535-551.
- Haskins, R. L. 1993. Current status of Bonneville cutthroat trout in Nevada. Nevada Department of Wildlife. Reno. NV.
- Hilderbrand, R. H., and J. L. Kershner. 2000. Conserving inland cutthroat trout in small streams: how much stream is enough? North American Journal of Fisheries Management 20:513-520.
- Hirsch, C. L., S. E. Albeke, and T. P. Nesler. 2006. Range-wide status of Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*): 2005. Colorado River cutthroat trout Conservation Team Report. Colorado Division of Wildlife, Fort Collins, Colorado.

- May, B. E. 1996. Yellowstone cutthroat trout (*Oncorhynchus clarki utah*). In: Conservation Assessment for Inland Cutthroat Trout. D. D. Duff Technical Editor. USDA Forest Service, Intermountain Region Report. pp. 11-34.
- May, B. E., W. Urie, and B. Shepard. 2003. Range-Wide Status of Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*): 2001. USDA Forest Service, Gallatin National Forest, Bozeman, Montana. 201 p. Available at: <http://www.wildlife.utah.gov/pdf/cuttpos.pdf>.
- May, B. E., and S. E. Albeke. 2005. Range-wide status of Bonneville cutthroat trout (*Oncorhynchus clarki utah*): 2004. Utah Department of Wildlife Resources, Salt Lake City, UT Printed Agency Report. 139 p. Available at: <http://www.wildlife.utah.gov/pdf/cuttpos.pdf>. Accessed 17 April 2006.
- Montana Fish, Wildlife & Parks. 2000. Cooperative conservation agreement for Yellowstone cutthroat trout within Montana. MFWP. Helena, Montana. 57 pp.
- Nelson, K. 1993. Status of the Yellowstone cutthroat trout in the Bridger-Teton National Forest, Wyoming. USDA-Forest Service. Administrative Report.
- Rieman, B., D. Lee, J. McIntyre, K. Overton, and R. Thurow. 1993. Consideration of extinction risks for salmonids. FHR Currents, Fish Habitat Relationships, Technical Bulletin 14 December. USDA Forest Service, Boise, Idaho.
- Scully, R. J. 1993. Bonneville cutthroat trout in Idaho: 1993 status. Idaho Department of Fish and Game. Administrative Report. Boise.
- Shepard, B. B., B. Sanborn, L. Ulmer and D. C. Lee. 1997. Status and risk of extinction for westslope cutthroat trout in the Upper Missouri River Basin, Montana. North American Journal of Fisheries Management 17:1158-1172.
- Shepard, B. B., B. E. May, and W. Urie. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the United States. Printed Agency Report. 94 pp.
- Shepard, B. B., B. E. May, and W. Urie. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) in the United States. Montana Fish, Wildlife & Parks. Printed Agency Report. 94 pp.
- Soulé, M. E. 1980. Thresholds for survival: maintaining fitness and evolutionary potential. Pages 151-169 in M. E. Soulé, and B. A. Wilcox, editors. Conservation biology: an evolutionary-ecological perspective. Sinauer, Sunderland, MA.
- USFWS. 1999. Status review for westslope cutthroat trout in the United States. USDI-Fish and Wildlife Service. Regions 1 and 6. 188 pp.
- USFWS. 2001. Status review for Bonneville cutthroat trout (*Oncorhynchus clarki utah*) USDI-U.S. Fish and Wildlife Service. 153 pp.

USFWS. 2000. Status review for Rio Grande cutthroat trout in the United States. US Fish and Wildlife Service.

USFWS. 2006. Endangered and threatened wildlife and plants: 12-month finding for a petition to list the Yellowstone cutthroat trout as threatened. Federal Register vol. 71: 8818-8831.

Utah Division of Wildlife Resources. 2000. Cutthroat trout management: a position paper, genetic considerations associated with cutthroat trout management. Publication Number 00-26. Utah Division of Wildlife Resources, Salt Lake City, Utah.

Whelan, J. 1993. Bonneville cutthroat trout status and management information. USDA-Forest Service. Ely Ranger District. Ely, NV. 6pp.

Young, M. K. 1995. Conservation assessment for inland cutthroat trout. General Technical Report RM-256, U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

Appendix B. Fisheries professionals who participated in the YCT 2006 status update and their experience level.

Name	Affiliation	Position Title	Highest Degree	Years Experience	Years of Cutthroat Trout Mgt/Conservation Experience
Matt Woodard	Trout Unlimited	Biologist	BS	5	5
James Capurso	USDA-Forest Service	Fishery Biologist	MS	22	22
Peggy Miller	Utah Division of Wildlife	Biologist-GIS	MS		
Dennis Oberlie	Wyoming Game and Fish	Biologist-GIS	BS		
Tracy Stephens	Wyoming Game and Fish	Fishery Biologist	MS	5	5
Paul Burnett	Utah Division of Wildlife	Biologist-GIS	MS	7	6
Ryan Baxter	Penn State University	GIS/Database			
James Spayd	Penn State University	GIS/Database			
Evan Brown	Idaho Fish and Game	GIS/Database			
Brad Ingoe	Idaho Fish and Game	GIS/Database			
Mark Novak	USDA-Forest Service	Fishery Biologist	MS	18	16
Dan Garren	Idaho Fish and Game	Biologist-GIS	MS	10	5
Corey Lyman	USDA-Forest Service	Fishery Biologist	BS	5	5
Jim Fredricks	Idaho Fish and Game	Fishery Manager	MS	16	13
Lee Mabey	USDA-Forest Service	Fishery Biologist	MS	20	15
Jim Gregory	Gregory Aquatics	Fishery Biologist	MS	12	12
Doug Magargle	Idaho Fish and Game	Fishery Manager	MS	10	7
Tony Lamanski	Idaho Fish and Game	Fishery Biologist	MS	13	7
Bill Schrader	Idaho Fish and Game	Fishery Biologist	MS	23	20
Dick Scully	Idaho Fish and Game	Fishery Manager	PhD	23	16
Scot Shuler	USDA-Forest Service	Fishery Biologist	MS	18	15
Jim Darling	Montana Fish, Wildlife & Parks	Fishery Manager	MA	30	19
Pat Brorth	Montana Fish, Wildlife & Parks	Fishery Biologist	MS	16	8
Scott Opitz	Montana Fish, Wildlife & Parks	Fishery Biologist	MS	11	2
Scott Barndt	USDA-Forest Service	Fishery Biologist	MS	12	9
Darrin Watschke	USDA-Forest Service	Fishery Biologist	MS	8	8
Jim Olsen	Montana Fish, Wildlife & Parks	Fishery Biologist	MS	4	4
Dave Hergenrider	Montana Fish, Wildlife & Parks	Fishery Technician		25	20

Name	Affiliation	Position Title	Highest Degree	Years Experience	Years of Cutthroat Trout Mgt/Conservation Experience
Bill Bradshaw	Wyoming Game and Fish	Fishery Biologist	MS	30	20
Will Young	USDA-Forest Service	Fishery Biologist	MS	10	5
Ray Zubik	USDA-Forest Service	Fishery Biologist	MS	23	15
Steve Yekel	Wyoming Game and Fish	Fishery Manager	MS	30	28
Brad Shepard	Montana Fish, Wildlife & Parks	Fishery Biologist	MS	25	23
Dawn Anderson	Montana Fish, Wildlife & Parks	GIS/Database	BS		
Steve Carson	Montana Fish, Wildlife & Parks	GIS/Database	MS		
Joe Deromedi	Wyoming Game and Fish	Fishery Biologist	MS	11	6
Dave Skates	USDI-Fish and Wildlife Service	Fishery Biologist	BS	30	23
Jason Burkhardt	Wyoming Game and Fish	Fishery Biologist	MS	8	6
Ken Ostrum	USDA-Forest Service	GIS/Database	BS		
Dan Mahony	Yellowstone National Park	Fisheries Biologist	MS	26	23
Todd Koel	Yellowstone National Park	Fisheries Biologist	PhD	12	6

Appendix C Assessment Protocol and Data Tables

Yellowstone Cutthroat Trout Range-wide Database Update:
Historical Range, Current Status, Risk and Population Health Determinations, Population
Restoration Potential and Expansion Protocols
2006
(Prepared by Bruce May)

This revision provides information for updating a range-wide status and conservation database for Yellowstone cutthroat trout (YCT; *Oncorhynchus clarkii bouvieri*) including separate information on the large and fine spotted forms. This update will: 1) refine estimates of historically occupied habitat; 2) update information on current distribution and identify specific attributes associated with current distribution; 3) identify any new conservation populations and revise information for currently identified populations, including assessing relative population health using a ranking system approach adapted from Rieman et al. (1993) and evaluating risks associated with genetic introgression and catastrophic disease; and 4) evaluate potential for further expansion and restoration of conservation populations within historical habitats. This revised protocol is similar to protocols recently used for assessing Bonneville and Colorado River cutthroat trout status and conservation and is based on initial protocols developed for assessing westslope and Yellowstone cutthroat trout (May et al. 2003; Shepard et al. 2003). Portions of this database are substantially based on expert opinion and these portions, particularly for describing historically occupied range, are qualitative. However, where data are available these data are used and referenced. The protocol represents a modified version of the original Yellowstone cutthroat assessment protocol that improves and updates the previously compiled information on YCT status. This database update is being done as a critical component of the coordinated range-wide conservation effort for YCT. Completion of this update will help meet the objectives of the Multi-state YCT conservation effort in a number of respects. First, the initial status update completed in 2001 was intended to be the first formal “snap shot” in time, or benchmark, for YCT distribution, relative population health, and risk status. This 2006 update will evaluate changes that have occurred over the past five years based on new information collected to date.

Second, this update will use National Hydrography Dataset (NHD) as the base geographic information system (GIS) hydrography layer for the effort (see <http://nhd.usgs.gov/> for more information on NHD). The 2001 status assessment used a 1:100,000 latitude-longitude stream identifier (LLID) layer. The NHD layer has become the most nationally accepted GIS layer for displaying stream and river hydrography. In addition, much of the stream and river mapping has been done at the 1:24,000 scale for NHD, and this update will use this scale for areas where it is available. However, 1:24,000 scale NHD data are not available for some watersheds, so 1:100,000 scale NHD hydrography will be used for these areas and an effort will be made to correct the information to the 1:24,000 scale as it becomes available. We expect that most of the area of concern will be available at the 1:24,000 mapping scale. The USFS Natural Resource Information System (NRIS) has ArcGIS tools available that should greatly assist with this process. An event creation tool, developed by the NRIS team, will be used to geo-reference YCT population segments. This tool utilizes a “point-and-click” user interface to reference these population segments against the NHD stream network.

Third, to maintain continuity and consistency, only those streams identified on the NHD stream layer will have information entered into the database. Applying this criterion will mean that some intermittent and ephemeral streams that could potentially provide habitats used or occupied by YCT, especially during high-flow periods, will be omitted. It is anticipated that these streams will be added during subsequent efforts to update the NHD stream layer. This version of the database will include information for lakes and reservoirs identified on the NHD lake layer.

Fourth, sources of information will be identified and linked to rated levels of reliability to better judge reliability. Data source tables will be created to track how information was derived (Table 1). Information associated with judgment calls and anecdotal sources, in general, may be viewed as being less reliable and/or accurate than information developed as part of detailed surveys and studies that have undergone substantial analysis and review.

Finally, all data will be entered in “real-time” at workshops with groups of experts evaluating all waters within a 4th code HUC and GIS and/or database experts entering and editing those evaluations until the entire group has reached consensus within a particular HUC. There are 39 4th level HUCs within the historic range of YCT. During the completion of the assessment for each HUC, the teams will be asked to employ a systematic approach to ensure that all information is included in the database. The use of 4th level HUCs will be for accounting purposes only. All data will be geo-referenced as either points (e.g., barrier locations), cutthroat mapping segments (e.g., stream segments occupied by YCT), or discrete populations that make up conservation populations, using a team approach that will include fishery biologists and the GIS-data entry person as a critical member of the team.

Table 1. Example look-up table for data sources with relative index values for information reliability and accuracy.

Information Source	Relative Degree of Reliability
Anecdotal information	Lower 1
Letter	Lower 1
Professional judgment	Lower 2
Data files	Moderate 3
Agency report	Moderate 3
Thesis or dissertation	Higher 4
Published paper	Higher 5

This protocol is partitioned into four primary components for conducting this database update. First, the historical range that was occupied by YCT at the time of the first European exploration (approximately 1800) of the Northern Rocky Mountains, as determined in the 2001 assessment, will be adjusted with any new information. Second, new information associated with current distribution of YCT along with density, genetic status, phenotype (spotting pattern), presence of non-native species and habitat information will be developed and displayed on a mapping segment basis (e.g., stream or lake). Third, all conservation populations (either as an individual stream or a network of streams and lakes [lacustian/adfluvial] occupied by YCT) will be identified, and the relative health and risks to persistence for each population will be evaluated based on three aspects: 1) genetic introgression, 2) disease, and 3) population size and demographics. Health and risk determinations represent relative evaluations indicating higher or lower levels of concern. Locations of lakes that support YCT will be shown on the maps. To track status information for both spotted forms, each data table will have an identifier to indicate

fine spotted only, large spotted only and large and fine spot YCT in sympatry. YCT populations supported entirely by annual or routine stocking will not be included as part of this assessment. The exception would be those populations serving as wild broods that require periodic stocking to bring in new genetic material as part of the brood maintenance plan. The fourth component of the database will provide information on the potential for creation or expansion of conservation populations within the conservation planning boundary.

The definitions of terms used for this protocol are provided in italics as they are first used.

Population mapping unit (segment) – each YCT occupied stream, or segment of stream, will be treated as a separate mapping unit or segment. Specific information relative to stocking record, presence of non-native fish, YCT density, habitat quality and relative stream segment width will be recorded for each segment. Connectivity between these segments will be the basis for identification of conservation populations.

Conservation Populations – conservation populations represent a combination of mapping segments that when united together represent a conservation unit. The identification of conservation populations is primarily the responsibility of the State fishery agencies. Conservation populations can exist in a genetically unaltered condition (e.g., core conservation populations with genetic analysis indicating greater than 99% purity and/or there is reason to believe that the genetics are unaltered) and/or they can be based on unique ecological, genetic and behavioral attribute of significance even with some level of genetic introgression (See Cutthroat Trout Management: A Position Paper – Genetic Considerations Associated with Cutthroat Trout Management). Conservation populations may exist as a network of subpopulations or streams; or they may exist as an independent stream or stream segment.

Core Conservation Population – *Those conservation populations that are known to be genetically unaltered by hybridization or with an extremely high probability that the population is unaltered by hybridization. Stream segments for these conservation populations have been tested and found to be unaltered or stream segments that are suspected to be unaltered and also have no record of stocking with potentially hybridizing species and no potentially hybridizing species present.*

Networked-population – *infers that interbreeding between subpopulations (population mapping segments) can occur within a few generations (3-15 years). Also referred to as a connected or meta-population. These populations occupy two or more stream segments that are connected or networked together. All subpopulations within a networked population must have at least the potential for genetic exchange among all other subpopulations within the networked population.*

Sub-Population – *A discrete component of a meta-population or networked population. Usually associated with individual streams and/or stream segments.*

Non-Networked Population (Isolated or Independent Population) – *populations that occupy a single stream or stream segment.*

Genetic Integrity Risk – *risk of initial or on-going genetic introgression (hybridization) with introduced species or subspecies.*

Relative Population Health – *evaluation of relative health based on several characteristics associated with the population. These characterizations can be linked to the influences of deterministic or stochastic factors that could lead to reduced viability for a population.*

Linked to temporal attributes, population size, production considerations and degree of connectedness.

Significant Disease (Pathogens) Risk – *Those diseases and the associated pathogens that have the potential to cause significant population decline. Including, but not limited to, the following: whirling disease, furunculosis, infectious pancreatic necrosis virus, etc.*

Competing Species – *Those species that compete with cutthroat trout for food and space. Can be salmonid or non-salmonid. Generally, non-natives that have been introduced within cutthroat trout habitats. Certain competing species (i.e., brown and brook trout) are predatory on cutthroat trout. Introduced rainbow trout can be viewed as both a competing and hybridizing species.*

Hybridizing Species – *Those species or subspecies of trout that readily hybridize with YCT, primarily introduced rainbow trout. Can also include subspecies of cutthroat trout that have been introduced into habitats outside of their respective historic range.*

Genetic, density and habitat information will be developed for each mapping segment. Genetic and disease risks along with a relative population health determination will be completed for each conservation population.

Barriers

All new barriers, and new information on existing barriers, of significance to YCT conservation will be added to the existing database. Since barriers to fish movement (either long-term historical, natural short-term, or anthropogenic barriers) are significant components to conservation, each known significant passage barriers will be identified as a map point. Specific information associated with each barrier will be used to assess whether individual stream segments were likely historically occupied by YCT, to assess potential influences of genetic introgression or disease to existing YCT populations, or to determine whether existing subpopulations are connected with other subpopulations. The identification of barrier location and distinguishing characteristics are very important.

To determine the historical distribution, those barriers that represent long-term geologic features that would serve to influence historical distributions will be identified, where known. These are barriers that would have precluded YCT occupation on or before 1800 (i.e., the segments were historically barren of YCT). These barrier locations will be located (as points in ArcGIS) on the stream and river hydrography layers. During mapping of current YCT distributions, other significant barriers (e.g., natural short-term and/or anthropogenic barriers) will be identified and located (as points in ArcGIS) and their associated characteristics, including barrier type (Table 2), blockage extent (Table 3), and significance (Table 4), will be determined and entered into data tables that are linked to the GIS points. Only barriers believed to have a significant influence on cutthroat distribution or population integrity will be identified. An attempt will be made to include all total barriers; however, surveys of all waters within the historical range of YCT to identify fish barriers have not been completed, so only known barriers will be identified. The source of information used to locate each barrier and document its associated characteristics will be entered into a separate data table (Table 5). If a particular barrier extends over an long distance (e.g., temperature or chemical barrier) the downstream point will be located on the GIS. Barrier identification will be the first action taken of the four parts of the database update. Starting with the lower-most portion of the 4th code HUC, barriers will be located from the downstream most to the upstream-most reaches in a systematic fashion until the mainstem and all tributaries and sub-tributaries are covered, and all known significant barriers have been identified. Barrier significance is linked either to how a barrier is influencing current distribution, or how a barrier could be important to future conservation.

Table 2. Types of barriers to upstream fish movement (Check the one that best applies to each barrier).

Code	Barrier Type
1	Water diversion
2	Fish culture facility/research facility
3	Temperature
4	Bedrock
5	Culvert
6	Debris
7	Insufficient flow
8	Manmade Dam
9	Manmade temporary restoration barrier
10	Pollution
11	Beaver dams
12	Velocity barrier
13	Waterfall
14	Unknown

Table 3. Extent of blockage caused by barriers (Check the one that best applies).

Code	Blockage Extent
1	Complete
2	Partial
3	Unknown

Table 4. Barrier significance (Check all that apply for each barrier).

Code	Barrier Significance
1	Historically significant – Limited historical distribution
2	Prevents or limits introgression
3	Prevents ingress of competing species
4	Temporary, but presently prevents introgression or ingress of competing species
5	Confines population to small area of usable habitat
6	Limits or precludes opportunity for population re-founding
7	Limits expression of life history characteristics
8	Unknown

Table 5. Information sources associated with the barrier (Check one that best applies).

Code	Barrier Information Source
1	Judgment - Anecdotal and/or extrapolated information from other streams
2	Judgment - Ocular reconnaissance
3	Minor sampling – Minor amount of data collected (e.g., height or velocity)
4	Major sampling – Major amount of data collected including fish tagging

Part 1 – Historical Distribution

The historical distribution of YCT, including lakes, will be identified and any changes to past information or new information on historical distribution will be recorded. To the extent possible, historical distributions of both spotting forms will be identified. The historically occupied range of YCT will be assessed based on their hypothesized distribution at the time Europeans first entered the Rocky Mountain West (approximately 1800). The NHD hydrography layers (1:24,000 and 1:100,000 scales) will be used to maintain consistency of information. Fishery professionals familiar with each major drainage basin (4th code HUC) will define historical distribution by adjusting the NHD stream layer within each HUC. The historical range will be based primarily on historical fisheries data, fisheries reports, and published historical accounts, augmented with personal knowledge of the area, known anecdotal information, known habitat restrictions, and known barriers of historical significance. Barriers of historical significance are those that would have precluded YCT from occupying stream segments at any time prior to 1800. These barrier determinations, by necessity, will be based primarily on professional judgment (Table 6).

Table 6. Reasons to exclude or include a stream and lake segments as historical YCT habitat.

Include or exclude		Reason
Exclude		Habitat limited – Primarily based on judgment regarding gradient, elevation, temperature
Exclude		Geologic barrier – Based on judgment. Must correspond to a mapped barrier location.
Include		Anecdotal information (e.g., newspaper, letter, journal, etc.)
Include		Historical scientific survey data (e.g., published report)
Include		Judgment

Part 2 -- Current Distribution--Genetic Status, Densities and Habitat Conditions

The existing database will be updated with all new information on current distribution information for streams and lakes. The current distribution information will also be tracked by spotting pattern. This part of the analysis will identify all stream segments and lake units currently occupied by YCT without regard to genetic makeup. This is not an identification of conservation populations, which will come in Part 3. Before identifying those stream and lake segments currently occupied by YCT, the process of identifying all other barriers significant to current distribution of YCT must be completed. These additional barriers should include any barrier that does, or could, significantly influence YCT distribution, life history expression, spawning, competition and hybridization. After locating these barriers, the lower and upper bounds of all stream segments and lakes presently occupied by self-sustaining populations of YCT will be located. For each stream segment and lake segment that currently supports self-sustaining YCT, the data, and data source, used to justify inclusion will be identified (Tables 7 to 23). Two potential types of self-sustaining YCT populations could be present: 1) aboriginal populations; or 2) restored populations (Table 8). A determination will be made relative to the migratory nature of the YCT that occupy each stream and lake segment (Table 9). Only self-sustaining populations (i.e., no routine augmentation with hatchery fish) of YCT will be addressed in this status assessment. To complete Part 2 each 4th-code HUC working group will review the May et al. (2003) information displayed on mapped stream and lake layers and make any changes based on current information for all habitats currently occupied by YCT. All potentially occupied habitats must be reviewed, so workgroups will work in a systematic fashion from the downstream end of each HUC to the headwaters. The specific information associated with current occupancy will be tracked either by stream segment or by each lake or reservoir (Tables 7 to 23). Current occupancy by spotting pattern will be tracked. When delineating stream segments currently occupied by YCT, barrier locations must be considered and included in the rationale for delineating each segment (in addition, barrier significance attributes may be adjusted as the workgroup determines how each barrier might be affecting YCT within each stream segment). Information associated with each stream segment occupied by YCT must be recorded as each segment is identified (Tables 7 to 23). Remember, each identified stream segment currently occupied by YCT must have all attributes in common. If one or more attributes change, a new segment is created. For lakes, the attributes will represent a generalized view of the entire lake. There will be identifiers associated with each table to denote whether the information in the respective tables are associated with lake or stream habitats and with the respective spotting patterns. Table 7 identifies the source of information associated with current distribution displayed in the GIS layer. Table 11 identifies fish stocking associated with the occupied stream or lake segments. Genetic information and status will be identified for each

YCT mapping segment (Tables 12 and 13). For Table 13, base the category determination on genetic information from the largest sample and/or the most recent sample.

Relative density information will be used to approximate effective population size for conservation populations identified in Part 3 of the protocol. Relative density or density estimates for a stream mapping segments will be recorded as the number of sexually mature YCT adults (e.g., 15 cm and longer for small streams and 30 cm and longer for large streams and rivers; Tables 14 and 15). If a stream mapping segment supports both non-migratory and migratory YCT (including those YCT that occupy lakes but use streams for spawning), base the density estimate on fish 30cm and larger. When actual density estimates are reported they must be linked to the estimator that was used to make the estimate (Table 14). There will be no density information associated with lake segments; YCT associated with lake mapping segments will be included as part of the density estimates of the stream segments used for spawning by lake dwelling YCT. Habitat information will be identified for each YCT mapping unit (Table 17-21). The presence of non-native fish will be recorded for each stream segment and lake occupied by YCT (Tables 22 and 23). Total stream length and lake surface acres currently occupied will be developed through GIS capabilities.

Table 7. Source of information associated with mapped components (lakes or streams) of YCT current distribution (Check one that best applies).

Code	Source of YCT density information
1	Judgment-extrapolated information from other areas
2	Judgment - Ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed population sampling
6	Unknown

Table 8. Origin of self-sustaining YCT population (Check one that best applies).

Code	Origin
A	Aboriginal – naturally occurring population
R	Restored – human restoration to start population
U	Unknown

Table 9. Stream habitat mapping segment provides habitat for the following life histories. (Check those that best apply).

Code	Life Histories Associated with Mapping Segment
	Non migratory
	Migratory
	Combination
	Unknown

Table 10. Source of information associated with Tables 8 and 9 (Check one that best applies).

Code	Source of YCT density information
1	Judgment-extrapolated information from other areas
2	Judgment - Ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed population sampling
6	Unknown

Table 11. Fish stocking associated with the occupied stream segment or lake (Check all that apply).

Code	Fish Stocking Status
1	No record of fish stocking
2	Record of rainbow stocking
3	Record of brown trout stocking
4	Record of brook trout stocking
5	Record of lake trout stocking
6	Record of fine-spotted YCT stocking
7	Record of large-spotted YCT stocking
8	Record of other cutthroat trout subspecies being stocked. Specify:
9	Other non-native fish stocked. Specify:

Table 12. Genetic status of YCT within a stream segment or lake (Check one that best applies)

Code	Genetic Status
1	Genetically unaltered (<1% introgression detected) as a result of introduced species interaction– tested via electrophoresis or DNA
2	>1% and ≤10% hybridized with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
3	>10% and ≤25% hybridized with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
4	>25% hybridized with introduced species – tested via allozyme or DNA and introgression indicated to be from a hybrid swarm
5	Not genetically tested -- Suspected unaltered with no record of stocking or contaminating species present
6	Not genetically tested -- Potentially hybridized with records of introduced hybridizing species being stocked or occurring in stream
7	Hybridized and pure populations co-exist (sympatric mixed-stock) in stream (use only if there is evidence of reproductive isolation, non-random mating, and/or genetic testing has been completed)

NOTE: These categories are compatible with the interstate cutthroat genetics white paper.

Table 13. Specify the specific information associated with genetic sampling and analysis. More than one entry can be made for a stream segment or lake. (Add the specific genetic information in this table).

Sample Number	Collection Date	Collection ID	Number of Fish Sampled	Analysis Date	Analysis Code	% Non-YCT Genes

Analysis Code	Genetic Analysis
1	Allozymes
2	PINES
3	Microsatellites
4	DNA

Table 14. Population density (numbers per mile) of sexually mature adults (15 cm small streams with non-migratory fish and 30 cm for larger streams and rivers with non-migratory and migratory fish) within stream mapping segment. Include the spawning density of migratory fish that use the segment for reproduction (Check the one that best applies).

Code	Mapping Segment Adult Fish Density
1	0 to 50 fish per mile (Specific density within this range, if available _____)
2	50 to 150 fish per mile (Specific density within this range, if available _____)
3	151 to 400 fish per mile (Specific density within this range, if available _____)
4	401 to 1000 fish per mile (Specific density within this range, if available _____)
5	Over 1000 fish per mile (Specific density within this range, if available _____)
6	1001 to 2000 fish per mile (Specific density within this range, if available _____)
7	Over 2000 fish per mile (Specific density if available _____)
8	Unknown

Table 15. Population estimates of YCT 15 cm and larger) expressed as number per mile (Complete with specific sample information that applies). Use this information to provide the specific density value for Table 11.

Sample ID	Sample Date	Estimated fish/mile	Coefficient of Variation %	95% Confidence Interval	Estimate Type Code

Code	Population Estimate Type
	3 pass removal
	2 pass removal
	Relative abundance expansion
	Mark-recapture
	Census from spawning trap

Table 16. Source of population density information (Check one that best applies).

Code	Source of YCT density information
1	Judgment-extrapolated information from other areas
2	Judgment - ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed population sampling

Table 17. Relative quality of occupied stream habitat (Check one that best applies). Refer to attachment B for optimal desired habitat reference conditions.

Code	Habitat Quality Determination
1	Excellent habitat quality (e.g., majority of attributes in optimal condition, ample pool environment, low sediment levels, optimal temperatures, quality riparian habitat, etc.)
2	Good habitat quality (may have some habitat attributes that are slightly less than ideal)
3	Fair habitat quality (has a greater number of attributes that are less than ideal)
4	Poor habitat quality (most habitat attributes reflect inferior conditions)
5	Unknown

Table 18. For stream segment habitat quality determinations rated as good to excellent, identify the three most important habitat characteristics that influenced the quality determination (Check the three that best apply). Refer to attachment B for optimal desired habitat reference conditions.

Code	Quality Characteristics of Primary Importance for Good to Excellent Habitat
	Substrate fine sediment (less than 6.3 mm) levels generally within 0 to 24%.
	Water temperatures within 8 to 16 C during spawning and incubation periods.
	Pool habitat within 35 to 60% of total stream habitat area.
	Amount of stream habitat in excess of 6 miles.
	Stream shading within 50 to 70% during mid-day.
	Streambank vegetative cover greater than 25%
	Streambank stability greater than 90%

Table 19. For stream segment habitat quality determinations rated as fair to poor, identify the three most important habitat characteristics that influenced the quality determination (Check the three that best apply). Refer to attachment B for optimal desired habitat reference conditions.

Code	Habitat Quality Determination
	Substrate fine sediments (less than 6.3mm) exceed 25%.
	Water temperatures in summer consistently above 16 C or below 8C.
	Amount of pool habitat either below 35% or above 60%
	Amount of stream habitat less than 17 miles.
	Mid-day stream shading either less than 50% or greater than 70%.
	Streambank vegetative cover less than 25%.
	Streambank stability less than 75%.

Table 20. Approximate width of occupied stream segment (Check one that best applies).

Code	Average width of occupied stream segment
1	< 5 feet
2	5 to 15 feet
4	15 to 25 feet
5	25 to 50 feet
6	Over 50 feet
7	Unknown

Table 21. Source of stream habitat quality and width information Check **one** that best applies).

Code	Source of habitat information
1	Judgment-extrapolated information from other streams
2	Judgment - ocular reconnaissance
3	Spot habitat sampling
4	Trend habitat sampling
5	Detailed habitat sampling

Table 22. Presence of non-native fish sympatric with YCT in the mapping segment stream or lake. In situations where fine-spotted and large-spotted YCT are in natural sympatry do not list either as non-native. (Check all that apply).

Code	Presence of Non-Native Fish
1	No non-native fish present
2	Rainbow trout
3	Brown trout
4	Brook trout
5	Lake trout
6	Fine-spotted YCT
7	Large-spotted YCT
8	Other cutthroat trout subspecies. Specify:
9	Other trout. Specify:
10	Other fish. Specify:
11	Unknown

Table 23. Source information associated with presence of non-native fish (Check one that best applies).

Code	Source of non-native fish information
1	Judgment-information extrapolated from other streams
2	Judgment -- ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed sampling
6	Unknown

Part 3 -- Change in Focus – Identification of Individual Conservation Populations and Application of Relative Health and Risk Evaluations for each Population

At this point the assessment will change from a focus on YCT occupied mapping segments to a level of assessment related to specific conservation populations and factors that have potential to influence the well-being of these populations. A determination will be made relative to which occupied mapping units (i.e., lake and streams) will be combined into specific conservation populations each having conservation as the primary management focus. Please refer to the definition of conservation populations. Remember: genetics is only one of many factors that can be used to identify a conservation population.

A connected or population network cannot have a total barrier within the population's stream network. Both networked populations and independent populations can serve as conservation populations. Identify the nature of subpopulation networks or connectedness of the population (Table 24). Conservation populations can be genetically unaltered (i.e., core conservation populations), or they can reflect a focus on unique traits and characteristics in the presence of documented or potential hybridization (i.e., conservation populations) (Table 25). Identify the life history attributes of the population (Table 26). Information on conservation activities and

human-uses (e.g., land uses) will be identified for each conservation population (Tables 27 and 28). It is also important to note that no degree of significance is attributed to the conservation activities or the human uses that are identified as being associated with each conservation population. The significance of the conservation activities and/or human uses to each specific conservation population will have to be addressed in subsequent specific assessments.

Table 24. Degree of network or connectedness associated with the conservation population (Check one that best applies).

Code	Degree of Connectedness
1	Strongly networked. Migratory forms (fluvial/ad-fluvial) must be present and migration corridors must be open (significant connectivity). Occupied habitat consists of numerous (> 5) individual streams w/ sub-populations.
2	Moderately networked. Migratory forms are present but connection periodically disrupted. Genetic exchange limited at times. Occupied habitat consists of a few (4-5) individual streams w/ sub-populations.
3	Weakly networked. Questionable whether migratory forms exist within connected habitat; however possible infrequent straying of adults within occupied connected habitat. Occupied habitats consist of 2 to 3 streams w/ sub-populations.
4	Population not networked or connected. Population functions as an independent entity (single stream or stream segment with <u>no</u> interaction with other sub-populations.

Code	Source of connectedness information
1	Judgment-information extrapolated from other streams
2	Judgment -- ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed sampling
6	Unknown

Table 25. Conservation population qualifier (Check one that best applies)

Code	Conservation Population Qualifier
1	Core Conservation Population (must be tested genetically unaltered – greater than 99% YCT genes and/or only have stream and lakes segments suspected of being unaltered... Tables 12 and 13).
2	Known or Probable Unique Life History (fluvial, ad-fluvial, or non-migratory) Or may include populations that represent the last, best YCT populations within a given watershed or drainage basin.
3	Known or Probable Ecological Adaptation to extreme environmental condition (e.g., temperature, alkalinity, pH, sediment)
4	Known or Probable Predisposition for large size or unique coloration
5	Other – There is insufficient information to place the population in another category but professional judgment indicates the population and the habitat that is occupied are likely to become part of the YCT conservation focus.

Code	Source of connectedness information
1	Judgment-information extrapolated from other streams
2	Judgment -- ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed sampling
6	Unknown

Table 26. Specific life history attributes associated with the conservation population (Check all that apply).

Code	Life History Attributes
1	Fluvial disperses locally in one stream or a group of small streams as the home range)
2	Individuals moving from larger river into tributaries to spawn.
3	Lacustrine (lake) fish moving into lake tributaries to spawn
4	Lake fish moving into outlet stream to spawn
5	Unknown

Code	Source of connectedness information
1	Judgment-information extrapolated from other streams
2	Judgment -- ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed sampling
6	Unknown

Table 27. Conservation activities associated with the conservation population (Check all that apply).

Code	Conservation Actions
1	Water lease/In-stream flow enhancement
2	Channel restoration
3	Bank stabilization
4	Riparian restoration
5	Diversion modification
6	Barrier removal
7	Barrier construction
8	Culvert replacement
9	Installation of fish screens to prevent loss
10	Fish ladders to provide access
11	Spawning habitat enhancement
12	Woody debris placement
13	Pool development
14	Increase irrigation efficiency
15	Grade control
16	In-stream cover habitat
17	Re-founded population
18	Riparian fencing
19	Physical removal of competing/hybridizing species
20	Chemical removal of competing/hybridizing species
21	Public outreach efforts at site (Interpretative site)
22	Population Expansion (e.g., expanding the occupied area of a specific population)
23	Population supplementation (e.g., to implement genetic swamping or to reduce potential of bottle necking, etc.)
24	Special Angling Regulations
25	Land-use mitigation direction and requirements (e.g., Forest Plan direction, regulation, permit req., coordination stipulations, etc.)
26	Population covered by special protective mgt emphasis (e.g., Nat'l Park, wilderness, special mgt area, conservation easement, etc.)
27	Other:
28	None:

Table 28. Human-use associated with conservation population. (Check all that apply).

Code	Activity
1	Timber harvest
2	Range (livestock grazing)
3	Mining
4	Recreation (non-angling)
5	Angling
6	Roads
7	De-watering
8	Fish stocking (e.g., non-native fish)
9	Hydroelectric, water storage and/or flood control
10	Other
11	None
12	Unknown

Conservation Population Risk and Health Evaluations

Only conservation populations will be evaluated for relative genetic and disease influences and general population health. It is important to note that these evaluations are not intended to define the inherent probability of persistence or exclusion, but rather to identify index conditions that put a population at greater or lesser risk based on certain attributes.

Genetic Stability Assessment

A genetic stability ranking will be made for each conservation population (e.g., Network- or non-networked) using an index ranking of 1 to 4 to indicate lower to progressively higher levels of possible risk (Table 29). The index should not be viewed as an absolute but rather as an indicator of possible or potential genetic influences

Table 29. Genetic index ranking (Check one that best applies).

Rank	Genetic stability or Risk Characterization
1	Introduced potentially hybridizing fish cannot interact with existing YCT population. Barrier provides complete blockage to upstream fish movement or potentially hybridizing fish are not present in same or adjacent drainages.
2	Introduced potentially hybridizing fish are in same stream and/or drainage further than 10 km from YCT population, but not in same stream segment as YCT, or within 10 km where existing barriers exist, but may be at risk of failure .
3	Introduced potentially hybridizing fish are in same stream and/or drainage within 10 km of YCT population and no barriers exist between introduced species and YCT population. However, introduced hybridizing species have not yet been found in same stream segment as YCT population.
4	Introduced potentially hybridizing fish are sympatric with YCT in same stream segment.

Significant Disease Influence Assessment

A significant disease influence ranking will be made for each (networked or non-networked population) using a ranking index of 1 to 5 to indicate low to progressively higher levels of risk associated with the possible or potential influence of significant diseases (Table 30). Population isolation and security are important considerations, but cannot be viewed as absolutes. The diseases of concern are those that cause severe and significant impacts to population health and include, but are not limited to, whirling disease, furunculosis, infectious pancreatic necrosis virus, etc. The assessment should be completed and/or reviewed by fish health professional. The level of influence should not be viewed as an absolute but rather as an indicator of possible or potential disease influences.

Table 30. Significant diseases risk influence index (Check one that best applies).

Rank	Risk Characterization
1	Significant diseases and the pathogens that cause these diseases have very limited opportunity to interact with existing YCT population. Significant disease and pathogens are not known to exist in the stream or watershed associated with YCT population. Barrier provides complete blockage to upstream fish movement. Stocking of fish from other sources does not occur.
2	Significant diseases and/or pathogens have been introduced and/or identified in same stream and/or drainage further than 10 km from YCT population, but not in same stream segment as YCT, or within 10 km where existing barriers exist, but may be at risk of failure. Stocking of fish from others source areas requires fish health screening and pathogen free clearance.
3	Significant diseases and/or pathogens have been introduced and/or have been identified in same stream and/or drainage within 10 km of YCT population and no barriers exist between disease and/or pathogens and diseased fish species and the YCT population. However, diseases and/or pathogens have not yet been found in same stream segment as YCT population.
4	Significant disease and/or pathogens and disease carrying species are sympatric with YCT in same stream segment but YCT have not tested positive.
5	YCT population is known to be positive for significant disease and/or pathogens are present. YCT population has a history of impacts from significant diseases. Environmental and/or biological conditions may have intensified disease impact.

Conservation Population Relative Health Assessment

A relative population health assessment will be completed for each networked or non-networked population using an index ranking that includes consideration of four factors (see attachment A). General population health will be indexed from low to high by using a 1 to 4 ranking system based on four variables identified by Rieman et al. 1993 (Table 31). The ranking for temporal variability will be derived as a cumulative total length of stream segments identified as being part of the conservation population. Population size of YCT that are sexually mature (see criteria above) will be derived from the density information associated with the stream segments and lakes that make up each conservation population. Population production will be ranked using stream segment information associated with habitat quality, presence of non-native fish, and potential for disease (see attachment A). The degree of connectedness will be taken from Table 24. These four main factors will be weighted to derive a final index as follows: Temporal Variability = 0.7; Population Size = 1.2; Population Production (Growth/Survival) = 1.6; and Isolation = 0.5 (D. Lee, USDA Rocky Mountain Research Station, Boise, Idaho, personal communication). The index value for relative population health should not be viewed as an absolute but rather as an indicator of possible or potential health.

Table 31. Ranks of various types of general health indicators associated with conservation populations. Individual variable rankings to be generated from the information associated with currently occupied habitat data and specific conservation population information.

Variable	Description	Rank	Criteria
Temporal Variability – Influence of stochastic catastrophic events on a whole population	Habitat Quantity -- Stream length occupied will be used to index temporal variability. Assumption is that larger habitat patch sizes will be less likely to be in synchrony with regard to stochastic events and, to a degree, with deterministic influences. Ranking for temporal variability will be derived as a cumulative total of stream segments identified as being part of the conservation population. If a lake is part of the habitat supporting a population adjust the ranking to the next higher level.	1	At least 50 miles of occupied habitat
		2	20 to 49 miles of occupied habitat
		3	6 to 19 miles of occupied habitat
		4	< 6 miles of occupied habitat
Population Size – Associated with the number of mature, potentially sexually reproductive fish in the YCT population.	Defined as the number of fish greater than 15 cm for small streams and 30 cm for larger rivers (refer to density determinations and/or specific population survey information ... Tables 14 and 15). Population size will be derived from summing the demographic information associated with the stream segments identified for each conservation population and adjusting the total to reflect the amount of occupied habitat.	1	> 2,000 Adults
		2	500 – 2,000 Adults
		3	50 – 500 Adults
		4	< 50 Adults
Population Production (Growth/ Survival) – Influence of deterministic demographic factors on whole population See Attachment A	Factors that influence population production include habitat quality, disease, competition, and predation. Important considerations include land-use influence on habitat that could be influencing a population's potential. As important would be the application of enhancement actions targeted to improve population condition.	1	Greater than 50% of habitat in excellent condition; no non-native competitive species present; no catastrophic diseases present.
		2	Greater than 50% of habitat in good and excellent condition; non-native competitive species maybe present in low numbers; catastrophic diseases present in close proximity.
		3	Greater than 50% of habitat in fair, good and excellent condition; non-native competitive species may be present in high numbers; catastrophic diseases present in close proximity.

Variable	Description	Rank	Criteria
		4	Greater than 50% of habitat in poor condition Population associated with poor quality habitat; non-native competitive species present in high numbers; catastrophic diseases, if present, sympatric with population.
Population Connectivity	Relates to the degree of networking associated with the conservation population. Select from information in Table 24.	1	<u>Strongly networked.</u> Migratory forms must be present and migration corridors must be open (connected). Occupied network consists of numerous streams (>5).
		2	<u>Moderately networked.</u> Migratory forms are present, but connection with migratory populations disrupted at a frequency that allows only occasional genetic exchange. Occupied network consists of several streams (4-5).
		3	<u>Weakly networked.</u> Questionable whether migratory form exists within connected habitat; however, possible infrequent straying of adults into area occupied by population. Occupied network consists of 2-3 streams.
		4	<u>Population not networked.</u> Population functions as a single entity. Generally only one stream or stream segment involved.

While headwater YCT populations may include those isolated by impassible barriers to upstream fish movement (and thus could not be re-founded or receive external genetic material without human intervention), these headwater populations may be important sources for re-founding and augmenting lower populations.

Part 4. Evaluation of Potential YCT Population Restoration and Expansion Opportunities.

This evaluation will be based on an initial range-wide review of historically occupied stream segments and lakes that are not currently associated with conservation populations. This

mapping exercise will facilitate assessment of potential restoration and/or expansion opportunities for these stream segments and lakes. Similar to the mapping exercise associated with currently occupied stream segments and lakes, lower and upper bounds of all stream segments within the historical range that are believed to have habitat suitable for supporting self-sustaining populations of YCT will be identified and evaluated. Using the base historical hydrography layer within each 4th level HUC overlaid with currently occupied habitat specifically for conservation populations, each team will systematically proceed to identify and evaluate YCT restoration and expansion potentials on a stream and lake segment basis. Locations of complete barriers, or partial barriers having the potential to be upgraded to complete barriers, are logical break points.

Only historically occupied habitat will be evaluated in this exercise. Other suitable habitat (i.e., suitable habitat that exists above historical barriers and other suitable habitats where YCT were likely extirpated prior to 1800) will be dealt with in a subsequent assessment. The initial step in this assessment of restoration and/or expansion potential will be to identify which historically occupied stream segments are currently unsuitable for sustaining YCT populations. The associated reasons for the unsuitable determination will be linked to physical habitat (e.g., insufficient flows or degraded habitat), temperature conditions or both (Table 32 and 33). An effort will be made to evaluate all historical habitats that remain suitable. The assessment teams are encouraged to identify as large a number of segments as possible. The specific information will be tracked on a stream segment or individual lake basis.

Table 32. General habitat inability to support self-sustaining populations of Yellowstone cutthroat trout. (Identify the one that best applies)

Code		Non-native Fish Stocking and/or Presence Status
1	H	The stream or stream segment has habitat that is incapable of supporting a self-sustaining population of YCT (i.e., there are severe habitat deficiencies).
2	T	The stream or stream segment has water temperatures that preclude supporting a self-sustaining population of YCT (i.e., water temperature that are too high or too low).
3	HT	The stream or stream segment has both habitat and temperature deficiencies.

Table 33. Source of habitat capability to support self-sustaining populations of Yellowstone cutthroat trout information. (Identify the one that best applies).

Code	Source of habitat information
1	Judgment-extrapolated information from other streams
2	Judgment - ocular reconnaissance
3	Spot habitat sampling
4	Trend habitat sampling
5	Detailed habitat sampling

Consideration of barrier locations will be important in defining the nature of stream segments. Remember, each identified stream segment must have all attributes in common. If one or more attributes change, a new segment should be created. Table 34 addresses fish stocking and/or fish presence associated with the stream segment. Table 35 identifies habitat attributes associated

with the stream segment. Table 36 identifies the relative significance of any fishery associated with the segment. Table 37 identifies the relative complexity of removal (chemical and/or physical removals) of any existing fish within the potential restoration or expansion segment. The sources of information from the above tables will be combined in Table 38.

Table 34. Fish stocking and/or presence of fish associated with the restoration or expansion stream segment. (Check the one that best applies)

Code	Non-native Fish Stocking and/or Presence Status
1	No record of fish stocking and the segment or lake is barren
2	Record of stocking YCT and/or hybridized YCT are the only trout present but they are not part of a conservation population.
3	Record of non-native trout stocking and/or the presence of non-native trout in low numbers. Includes all non-native trout: rainbow, brown, brook, lake, and other cutthroat. Hybridized YCT may or may not be present.
4	Record of non-native trout stocking and/or the presence of non-native trout being present in high numbers. Includes all non-native trout: rainbow, brown, brook, lake, and other cutthroat. Hybridized YCT may or may not be present
5	Unknown presence or stocking record of non-native trout.

Table 35. Habitat quality of the potential restoration or expansion segment. (Check the one that best applies)

Code	Habitat Quality Determination
1	Excellent habitat quality (e.g., ample pool environment, low sediment levels, optimal temperatures (summer and winter), quality riparian habitat, ample depths and good water quality etc.)
2	Good habitat quality (may have some habitat attributes that are slightly less than ideal)
3	Fair habitat quality (has a greater number of attributes that are less than ideal)
4	Poor habitat quality (most habitat attributes reflect inferior conditions)
5	Habitat quality unknown

Table 36. Relative significance of any fishery associated with the potential restoration or expansion segment or lake. (Check the one that best applies)

Code	Relative Significance of a Fishery
1	No fishery present
2	Minor fishery (i.e., minimal use, use days generally less than 100 days/year)
3	Moderate fishery
4	Major fishery (i.e., significant level of use, use days generally exceed 1000 days/year)
5	Significance unknown

Table 37. Relative complexity associated with removal of any fish associated with the potential restoration or expansion segment or lake. (Check the one that best applies)

Code	Relative Complexity of Non-native Fish Removal
1	No fish present
2	Minor complexity (e.g., simple drainage, few fish, low flows, simple habitats, small lake etc.)
3	Moderate complexity
4	Major complexity (e.g., significant flows, multiple channels, many fish, complex habitats, large lake etc.)
5	Unknown complexity

Table 38. Source information for the potential YCT restoration or expansion stream or lake segment. (Check the one that best applies to the combination of the four attributes)

Code	Description
1	Judgment-information extrapolated from other streams
2	Ocular reconnaissance
3	Spot sampling
4	Trend sampling
5	Detailed sampling
	Unknown

A generalized restoration or expansion opportunity assessment for each potential restoration stream and lake segment will be done by electronic ranking of the information contained in Tables 34 through Table 37. Restoration potentials will be ranked using a 1 to 4 ranking system for each of the four variables identified above (Table 39). The ranks assigned to each of the variables will be combined into a rating of overall restoration potential for each stream segment. The four variables will be weighted equally to derive the overall restoration ranking. The overall score will be divided into logical rankings associated with restoration potential (High Restoration Potential = 4 to 6; Intermediate Restoration Potential = 7 to 9; Low Restoration Potential = 10 to 13; and, Very Low Restoration Potential = 14 to 16). If a complete or partial barrier that has the potential to become a complete blockage occurs in the lower portion of a segment, the ranking will be elevated to the next higher restoration or expansion rank. The identification of one or more unknown conditions associated with the restoration variables will result in labeling that segment as having unknown restoration potential.

Table 39. Summarization of the factors considered in the assessment of restoration or expansion potential.

Variable	Description	Rank	Criteria
Biological considerations associated with YCT restoration opportunities	Specifically addresses the biological considerations associated the presence of other trout in potential restoration segments (Table 28).	1	No record of fish stocking <u>and</u> the segment is barren
		2	Hybridized YCT are present in the absence of other trout and segment is not part of a conservation population.
		3	YCT maybe present and non-native trout present in low numbers. Segment not part of conservation population.
		4	YCT maybe present and non-native trout present in high numbers. Segment not part of conservation population
Habitat	Specifically addresses habitat quality of	1	Excellent habitat quality

Variable	Description	Rank	Criteria
considerations associated with YCT restoration opportunities	potential restoration segments. See habitat quality ranking in Table 19	2	Good habitat quality
		3	Fair habitat quality
		4	Poor habitat quality
Social and political considerations associated with YCT restoration opportunities	Specifically addresses the relative significance of an existing fishery (Table 36).	1	No fishery present.
		2	Minor fishery (i.e., minimal use)
		3	Moderate fishery
		4	Major fishery (i.e., significant use level)
Relative complexity considerations associated with YCT restoration opportunities	Specifically addresses the complexity of non-native trout or hybrid YCT removals (chemical or physical) (Table 37).	1	No fish present
		2	Minor complexity.
		3	Moderate complexity.
		4	Major complexity.

Attachment A

Relative Population Health Evaluations

As indicated in the status update protocol each conservation population will receive a generalized population health assessment based on four (4) variables identified by Rieman et.al. (1993). Variables will be ranked based on information contained in the current distribution portion of the geo-database. The variables are related to both deterministic (e.g., changes that are predictable) and/or stochastic (e.g., changes due to chance events) processes that could influence the well-being of a population of YCT. It should be noted that this relative health evaluation should not be viewed as an absolute but rather as a relative index of possible or potential health influences associated with the population.

Temporal Variability As used in this health evaluation, temporal variability is linked to the population's ability to withstand stochastic influences to the occupied habitat. As such, the amount of occupied habitat becomes a significant indicator of how influential environmental (e.g., fire or drought) or hydrologic (e.g., flooding) events are likely to be to the population. The assumption is that increased habitat provides a greater opportunity for increased habitat complexity and a greater resistance to catastrophic events that could influence the entire population. To receive a low temporal risk ranking we are calling for at least 50 miles of occupied habitat to be present. On the other end of the scale, a very high temporal risk ranking would be associated with occupied habitat of less than 6 miles. The temporal risk ranking will be derived as a cumulative total of stream segments identified as being part of the specific conservation population.

Population Size Variability of Individuals Larger than 15 cm in small streams and 30 cm in rivers. As used in this risk evaluation, this is the population density of the combined mapping segments. The size thresholds are viewed as reasonable lengths associated with YCT that would be sexually active (e.g., related to the effective population). The concept of effective population size plays an important role in the long-term conservation scenario of a population by being

related to genetic drift, loss of genetic diversity and population inbreeding. Effective population size is also important in maintaining “critical population mass” needed for adjustments from migration and natural selective influences. A larger sexually active population size, in general, reflects conditions where all life stages are represented in the population. The population size will be derived from the density information. To receive a low adult population size risk ranking we are calling for an adult population size of greater than 2000 individuals. At the other end of the risk scale, a very high risk ranking would be associated with an adult population size of less than 50 adults.

Population Production (Growth/Survival) Variability Factors that influence population production include habitat quality, disease, competition and predation. Human uses and land management activities that influence habitat quality as well as efforts to enhance habitat are important but their effects will not be addressed in this assessment. In this assessment these activities are listed, but no degree of significance or influence is determined for a YCT population. To incorporate this type of information would require site-specific detail, which was not included in the database, and it would rely on interpretation of the effects. To a significant degree population production factors reflect deterministic processes. The development of a ranking for population production will include consideration of the database information associated with habitat condition, presence of competitive fish and presence of catastrophic disease associated with the conservation population. For the purposes of developing an initial ranked score associated with population production, habitat quality will be the primary consideration. The final population production score assigned to the conservation population will be increased by one level if non-native fish are sympatric with the population and/ or disease is present. The composite scores for population production variable ranking can range from 2 to 8 with a 2 being the best production ranking and 8 being the worst ranking. Partitioning of the initial ranked scores for population production follows: High Population Production = 2; Intermediate Population Production = 3 to 4; Low Population Production = 5 to 7; and, Very Low Population Production = 8. The final ranked score will reflect an adjustment to account for the presence of non-native fish competition and predation. If non-native fish are sympatric with the conservation population, the ranked score should be adjusted to the next higher population production level (i.e., Example: If the initial ranked score falls within the intermediate population production range (score of 3 to 4) and non-native fish are present; the final ranked score will automatically be changed to the low population production level). The final ranking will be inserted as the population production potential ranking in Table 31.

Table A1. Ranks of the various habitat quality and disease determinations for the population production factors

Variable	Description	Rank	Criteria
Habitat quality –	Habitat Quantity – Derived from the occupied stream segment habitat quality information contained in the database (Table 19).	1	> 50% of occupied stream segments judged to have a excellent habitat rating.
		2	> 50% of occupied stream segments judged to have excellent and good habitat ratings.
		3	> 50% of occupied stream segments judged to have excellent, good and fair habitat ratings.
		4	> 50% of occupied stream segments judged to be in poor habitat condition.
Presence of catastrophic disease	Developed from the risk assessment associated with significant disease (Table 30).	1	Significant diseases not known to exist and/or complete barrier to fish migration present.
		2	Significant diseases not in close proximity and/or barriers at risk of failure.
		3	Disease in close proximity and no barrier exists.
		4	Disease sympatric with population and/or known to be infected.

Population Connectivity (network) Viable Populations of YCT exist as either independents or networks. Independent populations operate as a discrete entity usually within a single stream. A population network (often referred to as a meta-population) consists of several local streams (sub-populations) operating with a level of movement and genetic exchange. Most often population networks represent several local sub-populations each occupying a specific component (e.g., specific streams) of a drainage network. In general, the diversity of local sub-populations and the nature of connectivity within the population network contribute to the stability of the population, especially in terms of how stochastic events might influence population performance through time. The basis for ranking population connectivity will be taken directly from the database (Table 19).

These four main factors will be weighted to derive a final index value using the following weighting criteria: Temporal Variability = 0.7; Population Size = 1.2; Population Production (Growth/Survival) = 1.6; and Isolation = 0.5. The individual factors and the final composite index scores represent only a relative indicator of population health. They should not be viewed as absolutes but rather as indicators of possible or potential health influences associated with each population.

Attachment B

Riverine Habitat – Quality Reference Conditions for Cutthroat Trout Habitat. The values identified in the table should not be viewed as absolutes or management standards. They are intended to provide reference conditions reflecting quality and quantity considerations for this status assessment. Application of this specific habitat information will require professional judgment by qualified biologists. Not all habitat attributes are applicable to every stream situation.

HABITAT - Reference Conditions	Reference Condition Values	Sources
SPAWNING HABITAT		
Substrate composition		
Surface fines	<20%(B&E channels)	10
Granitics	<25% (C channels)	
Other geologies	<20% (All channels)	
Fines by depth		
- % Fines (less than 6.3 mm)	0-24%	1,2,8,9
- % Fines (2.3 mm)	0-10%	3,4,5,9
% Gravel (0.5 - 3.0 in)	50%	9
Water temperature - mean daily range during spawning and incubation. (C)	8-13	3,4,5,13,14
Spawning access	As needed to protect and/or provide for the specific population.	9
Quantity-% of total spawning area	>5%	3,4
REARING HABITAT (Juvenile and Adult)		
Rearing access	As needed to protect and/or provide for the specific population.	9
Pool habitat – Percent of total area	35-60%	3,4,5,14
Percent of pools rated “high quality and complexity”	>30%	3,4,5
Habitat quantity – General length of occupied habitat associated with high habitat quality and high density.	>6 miles	12,13,15
Length associated with lower quality habitat and density.	>17 miles	
Pool habitat – Number of “primary” pools per mile		
B Channels – Combined geologies	60 (0-5' wet width) 61 (5-10' wet width) 53 (10-15' wet width) 40 (15-20' wet width) 24 (20-25' wet width) 20 (25-30' wet width) 15 (30-35' wet width) 11 (35-40' wet width)	10
C Channels – Combined geologies	99 (0-5' wet width) 99 (5-10; wet width)	10

Note: For pool frequencies in other geologies, see reference 10.	56 (10-15' wet width) 53 (15-20' wet width) 21 (20-25' wet width) 30 (25-30' wet width) 44 (30-35' wet width) 12 (35-40' wet width) 4-16 (>40' wet width)	
Streambed composition Embeddedness Predominant sizes	<30% >50% C+B	2,9 3,4
Stream shading (%) (between 10:00 am to 2:00 pm)	50-76	3,4
Stream Cover Streams in meadows dominated by grass, sedge, forb – shading would be provided by low growth overhanging vegetation; % of potential based on vegetation type plus instream cover (%) (all forms combined)	>25	3,4,9
Streambank stability (% of potential based on inherent capability associated with natural riparian communities)	>90	6,10
HABITAT – Reference Conditions	Optimal Condition Values	Sources
REARING HABITAT - Continued		
Instream debris (instream LWD in meadow situations would not be applicable). Number of LWD per mile (LWD = pieces of wood over 4” in diameter) B Channels – Combined geologies	50 (0-5' wet width) 171 (5-10' wet width) 217 (10-15' wet width) 207 (15-20' wet width) 95 (20-25' wet width) 113 (25-30' wet width) 79 (30-35' wet width) 75 (35-40' wet width) 42-49 (>40' wet width)	10
C Channels – Combined geologies Note: For LWD frequencies for other geologies, see reference 10	60 (0-5' wet width) 60 (5-10' wet width) 187 (10-15' wet width) 120 (15-20' wet width) 74 (20-25' wet width) 138 (25-30' wet width) 132 (30-35' wet width) 68 (35-40' wet width) 32-48 (>40' wet width)	10

Water Temperatures (mean daily range C)	8-16	3,4,5,10
Watershed area – (Sq Miles)	>9 sq miles (approx 15 sq km)	14
Base stream flow (% of average annual daily)	>50	3,4,7

The following codes apply: Source codes are reference sources (see below for citations and in literature for references); substrate size codes are F = fines, G = gravel, C = cobble, B = boulder, and Bed = bedrock. Number 9 indicates that the present fisheries staff working on cutthroat has made this determination based on professional field observation and personal review of existing literature. In the case of spawning habitat, sediment levels would be associated with substrate strata that are related to egg pocket formation (for the smaller trout species this would generally be less than 4" in depth). Base stream flow guidelines may exceed that contingent upon existing water rights.

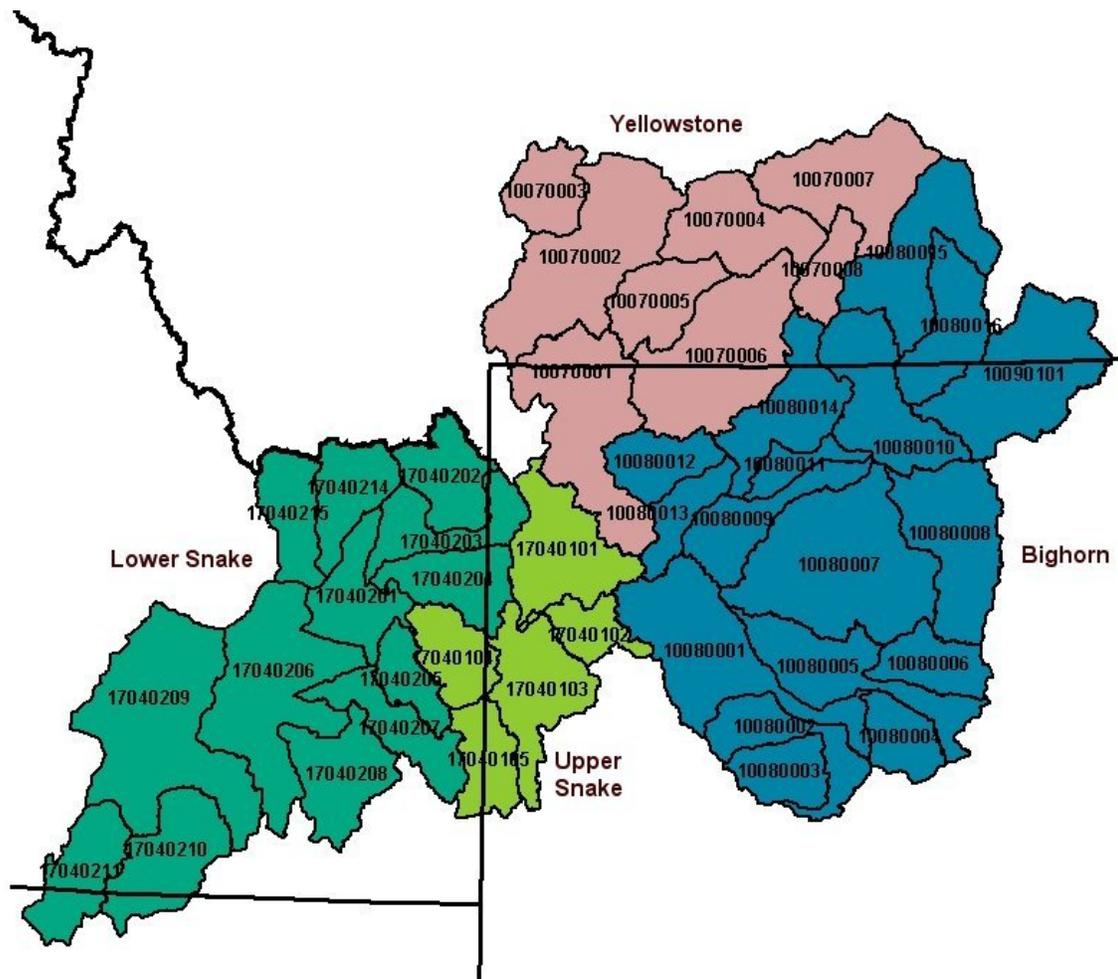
References

1. Platts, W. S. (in prep.) Evaluation of the FISH/SED model.
2. Stowell, R., Espinosa, A., Bjornn, T. C., Platts, W. S., Burns, D. C., and J. S. Irving. 1983. Guide for predicting salmonid response to sediment yields in Idaho Batholith watersheds. U.S. Forest Service, Northern and Intermountain Regions, Missoula, Montana.
3. Hickman, T., and R. F. Raleigh. 1982. Habitat suitability index models: Cutthroat trout. U.S.D.I. Fish and Wildlife Service. FWS/OBS-82/10.5, Fort Collins, Colorado.
4. Raleigh, R. F., Hickman, T., Solomon, R. C., and P. C. Nelson. 1984. Habitat suitability information: Rainbow trout. U.S. Fish and Wildlife Service. FWS/OBS-82/10.60, Fort Collins, Colorado.
5. Hubert, W. A., Helzner, R. S., and P. C. Nelson. 1985. Habitat suitability index models and instream flow suitability curves: Arctic grayling riverine populations. U.S. Fish and Wildlife Service Biological Report 82(10.110), Fort Collins, Colorado.
6. Sawtooth National Forest. 1988. Riparian stratification and inventory approach. Sawtooth National Forest, Idaho.
7. Binns, N. A. and F. M. Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. Transactions of the American Fisheries Society 108: 215-228.
8. Witzel, L. D. and H. R. MacCrimmon. 1983. Embryo survival and alevin emergence of brook char, *Salvelinus fontinalis*, and brown trout, *Salmo trutta*, relative to redd gravel composition. Canadian Journal of Zoology 61: 1783-1792.
9. Professional Judgment. In many instances the individual aquatic biologist may be compelled to rely on personal judgments when addressing current habitat quality and quantity conditions and the influence of land use upon the aquatic habitats.

10. Overton, K et al. 1994. Summary of stream channel attributes that represent natural conditions; Salmon River Basin, Idaho. Intermountain Research Station, Boise, Idaho.
11. Annon. 1995. Ecosystem analysis at the watershed scale. Federal Guide for Watershed Analysis. Version 2.2. Portland Oregon, 26 pp.
12. Hiltibrandt R. H. and J. L. Kershner,. 2000. Conserving inland cutthroat trout in small streams: How much stream is enough. N. Amer. Journ. Fish. Mgt. 20:513-520.
13. Harig, A. L., K. D. Fausch and M. K. Young. 2000. Factors influencing success of greenback cutthroat trout translocations. N. Am. Journ. Fish. Mgt. 20:994-1004.
14. Harig, A. L. and K. D. Fausch. 2002. Minimum habitat requirements for establishing translocated cutthroat trout populations. Ecological Applications. 12(2): 535-551.
15. Kershner, J. L. 1995. Bonneville cutthroat trout. In USDA-Forest Service RM-GTR-256. pp. 28-35.
16. Behnke, R. J. 1992. Native trout of Western North America. Monograph 6, American Fisheries Society. Bethesda, Maryland.
17. May, B. E., W. Urie, and B. B. Shepard. 2003. Range-wide status of Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*): 2001. USDA Forest Service, Gallatin National Forest, Bozeman, Montana,
18. Shepard, B. B., B. E. May, and W. Urie. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) in the United States: 2002. Montana Fish, Wildlife & Parks for the Westslope Cutthroat Trout Interagency Conservation Team. Helena, Montana.

Appendix D. Assessment data summaries by Geographic Management Unit and HUCs

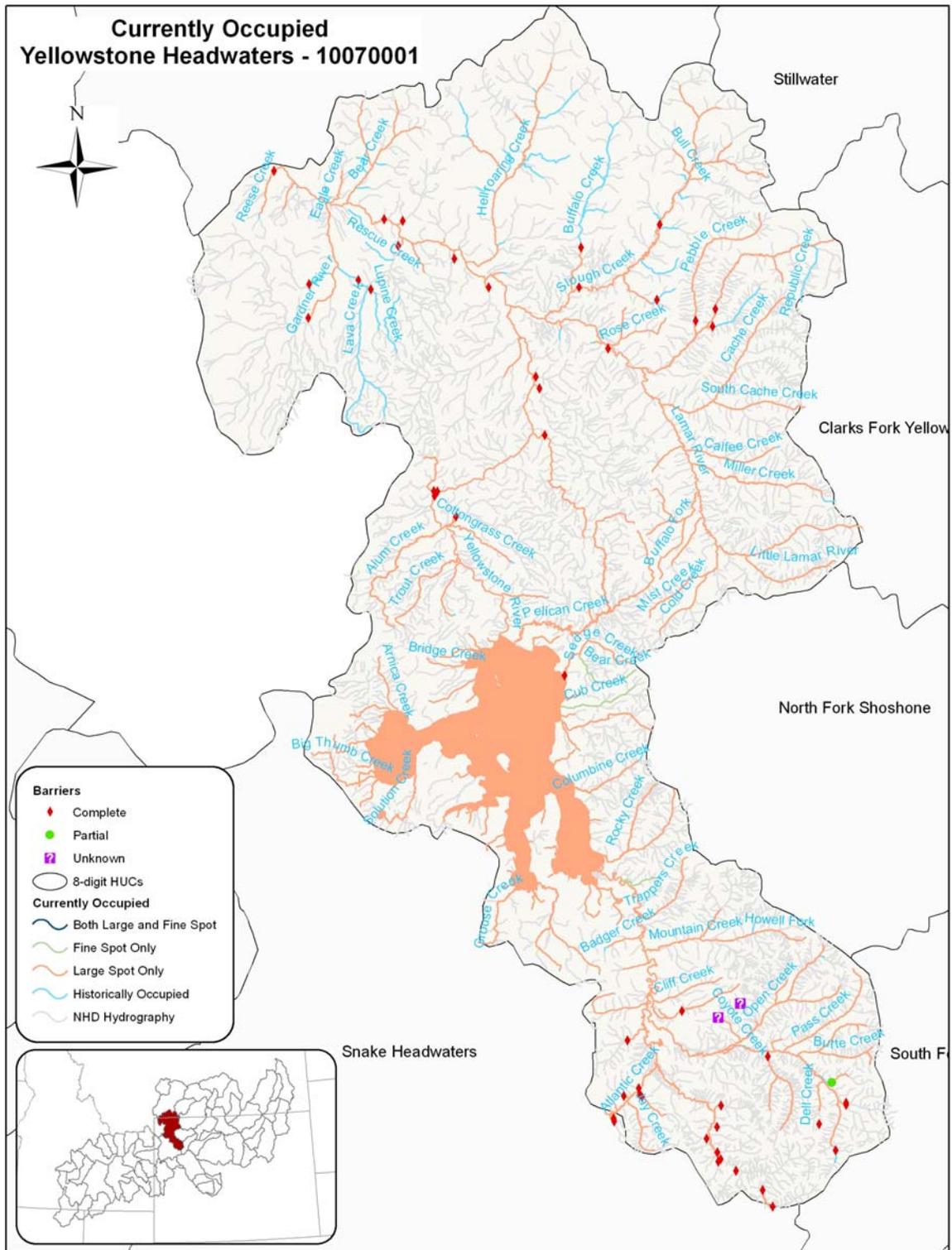
The information contained in this appendix will be displayed via geographical management units (GMU). Each GMU contains a number of 4th level hydrologic units that were grouped together to form a sub-geographical area of the YCT historical range. Creation of these GMUs was intended to enhance conservation planning, implementation and reporting.

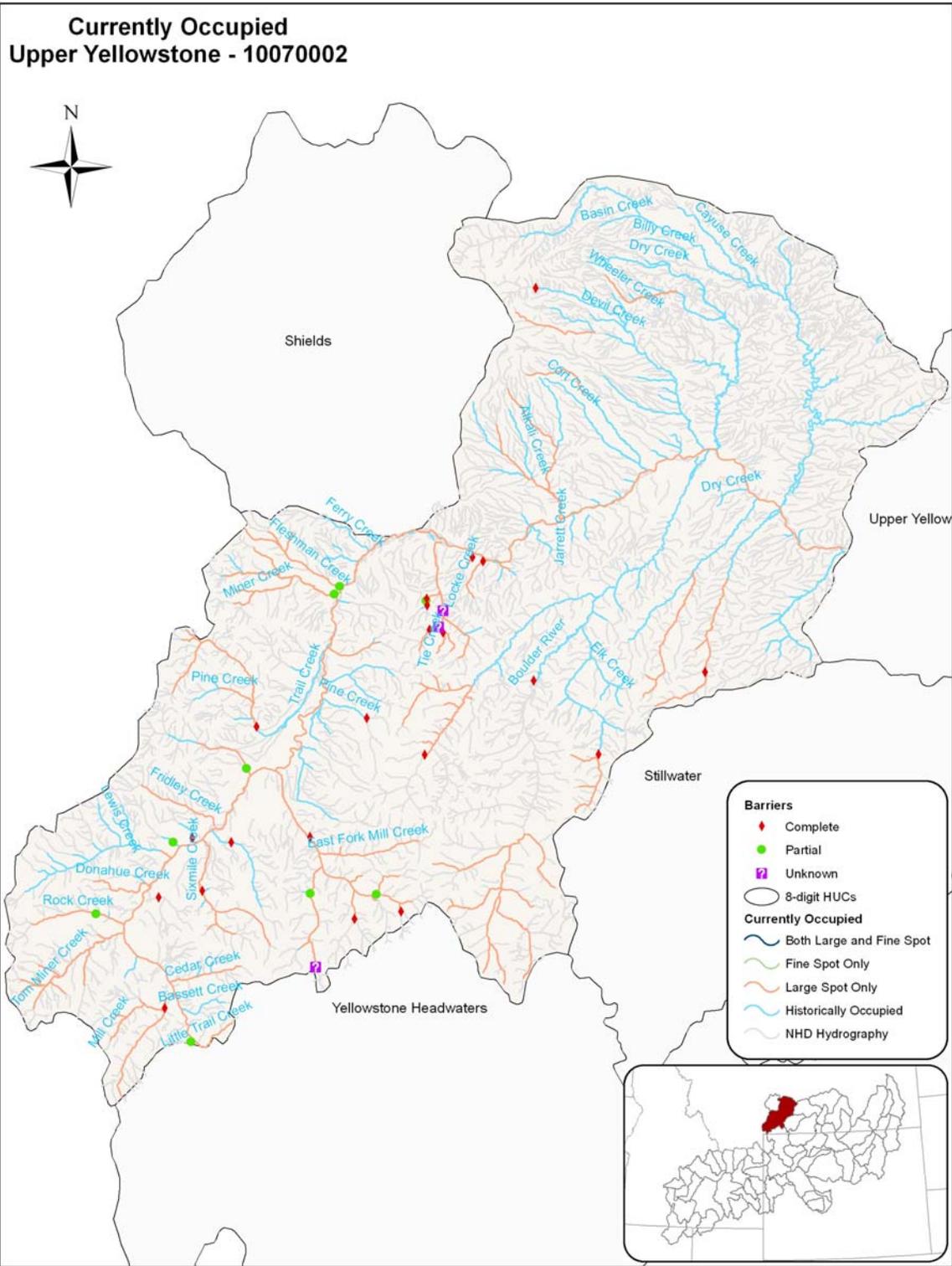


Geographical management units (GMU) and associated 4th level hydrologic units

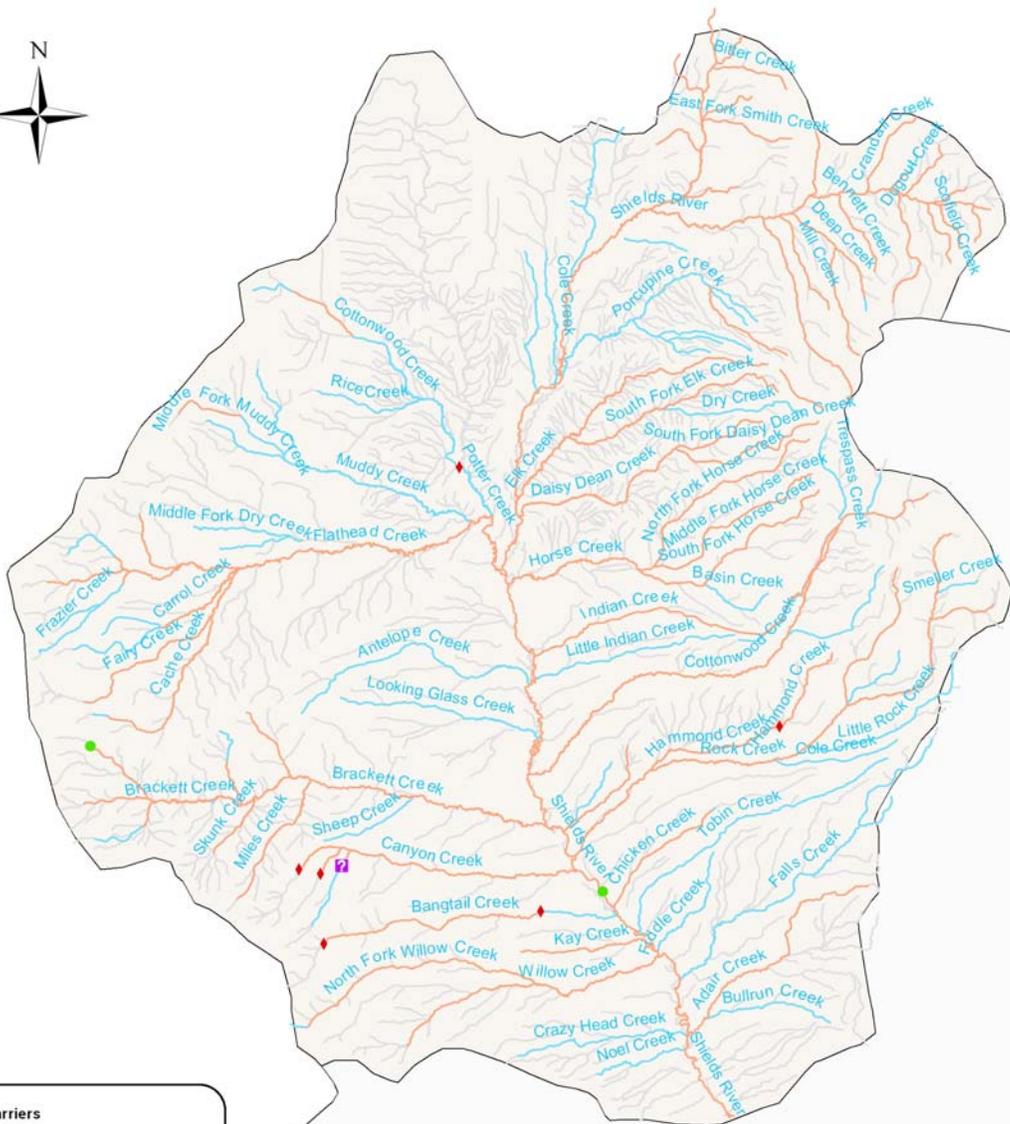
Upper Yellowstone Geographical Management Unit

The Upper Yellowstone GMU contains 8 4th level HUCs. The uppermost watershed encompasses the headwaters of the Yellowstone River. The lowermost watershed is along the north side of the Yellowstone River near the confluence of the Bighorn and Yellowstone rivers.





Currently Occupied Shields - 10070003



Barriers

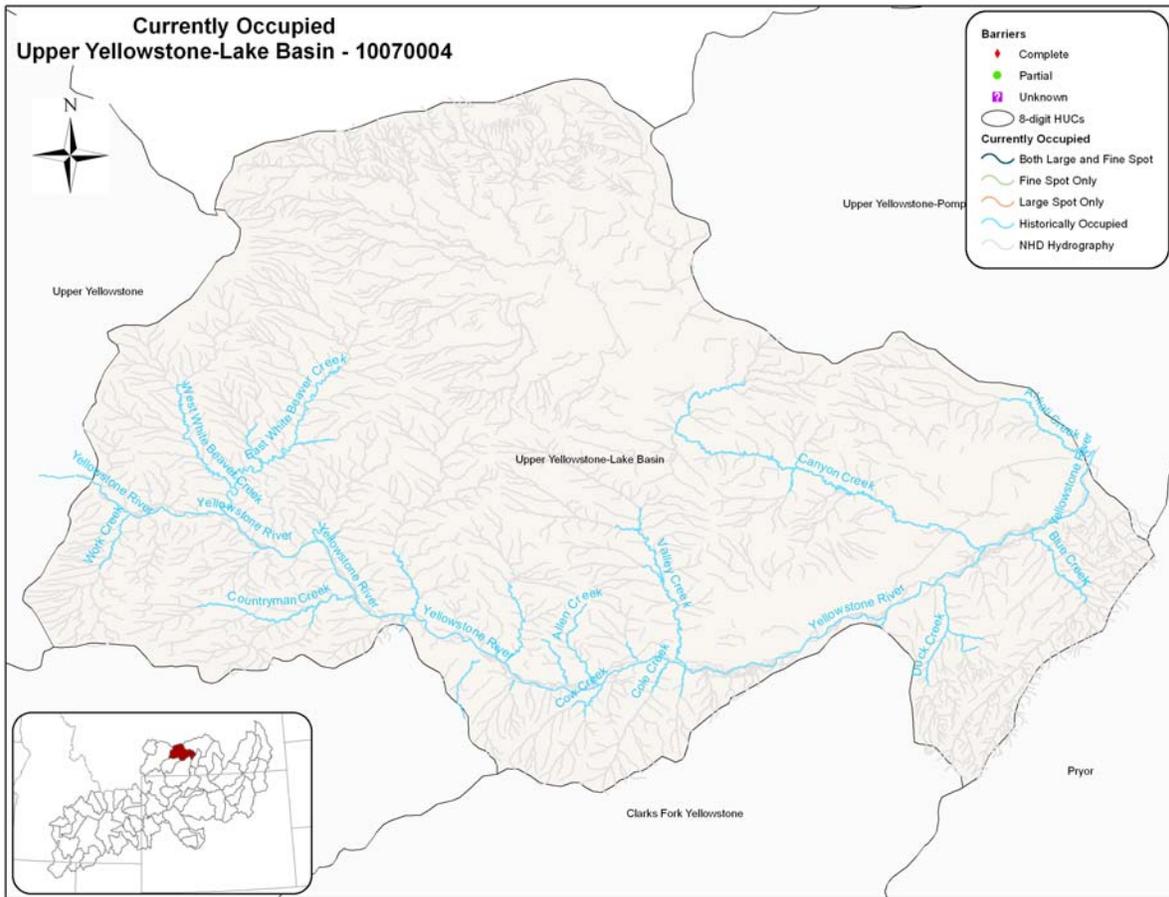
- ◆ Complete
- Partial
- Unknown
- 8-digit HUCs

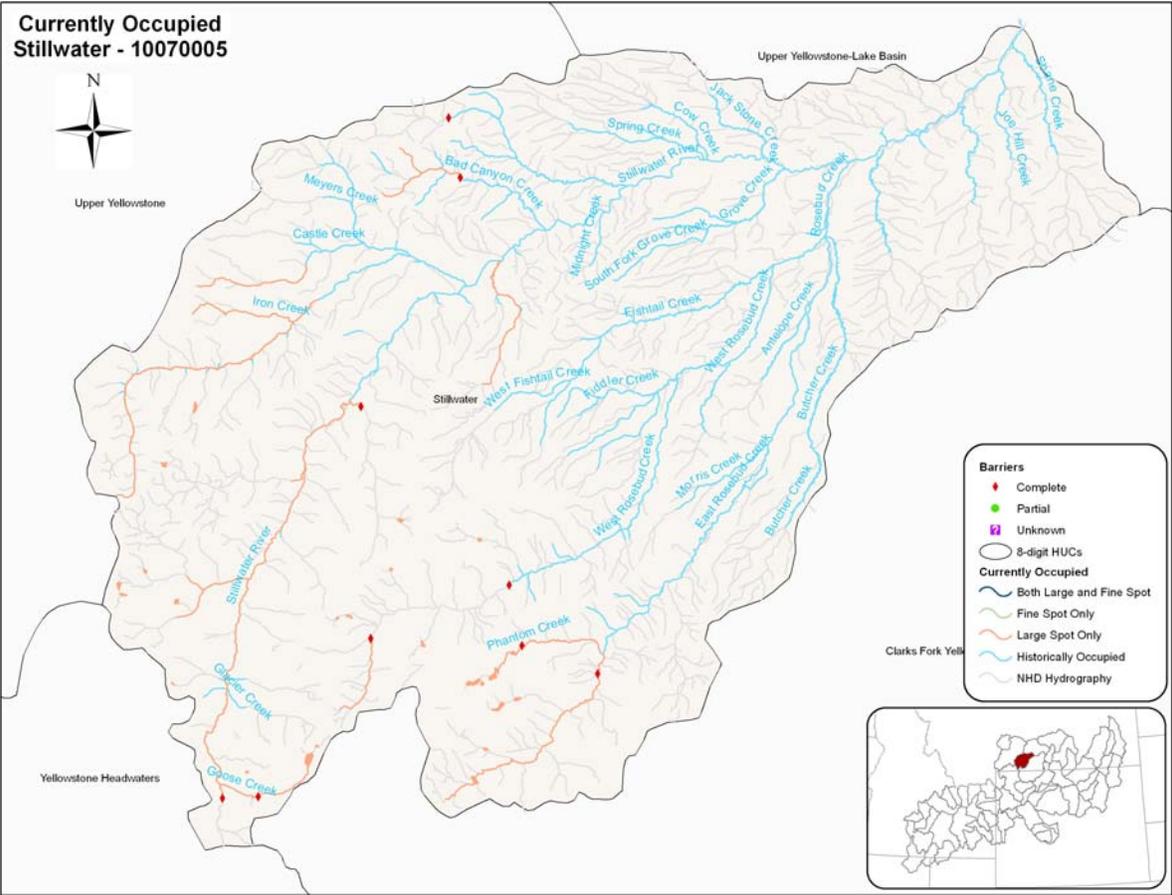
Currently Occupied

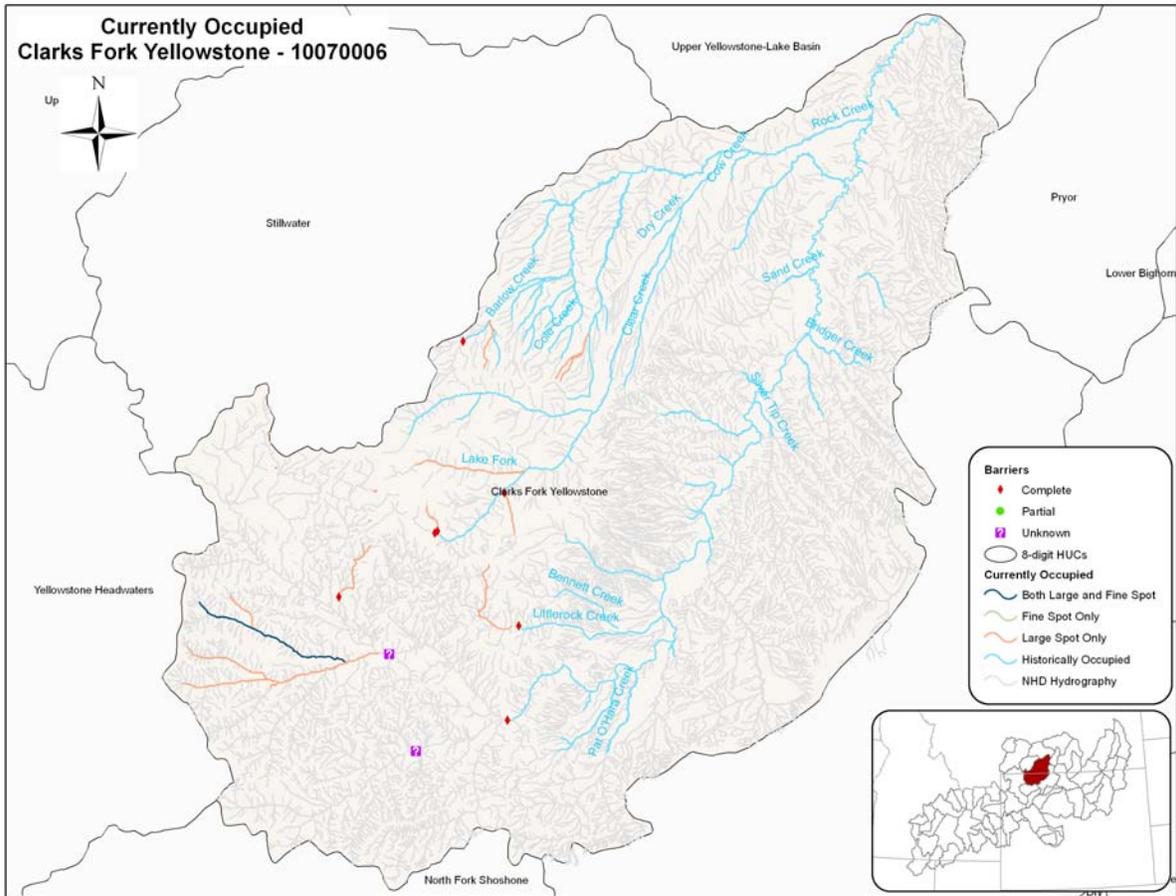
- Both Large and Fine Spot
- Fine Spot Only
- Large Spot Only
- Historically Occupied
- NHD Hydrography

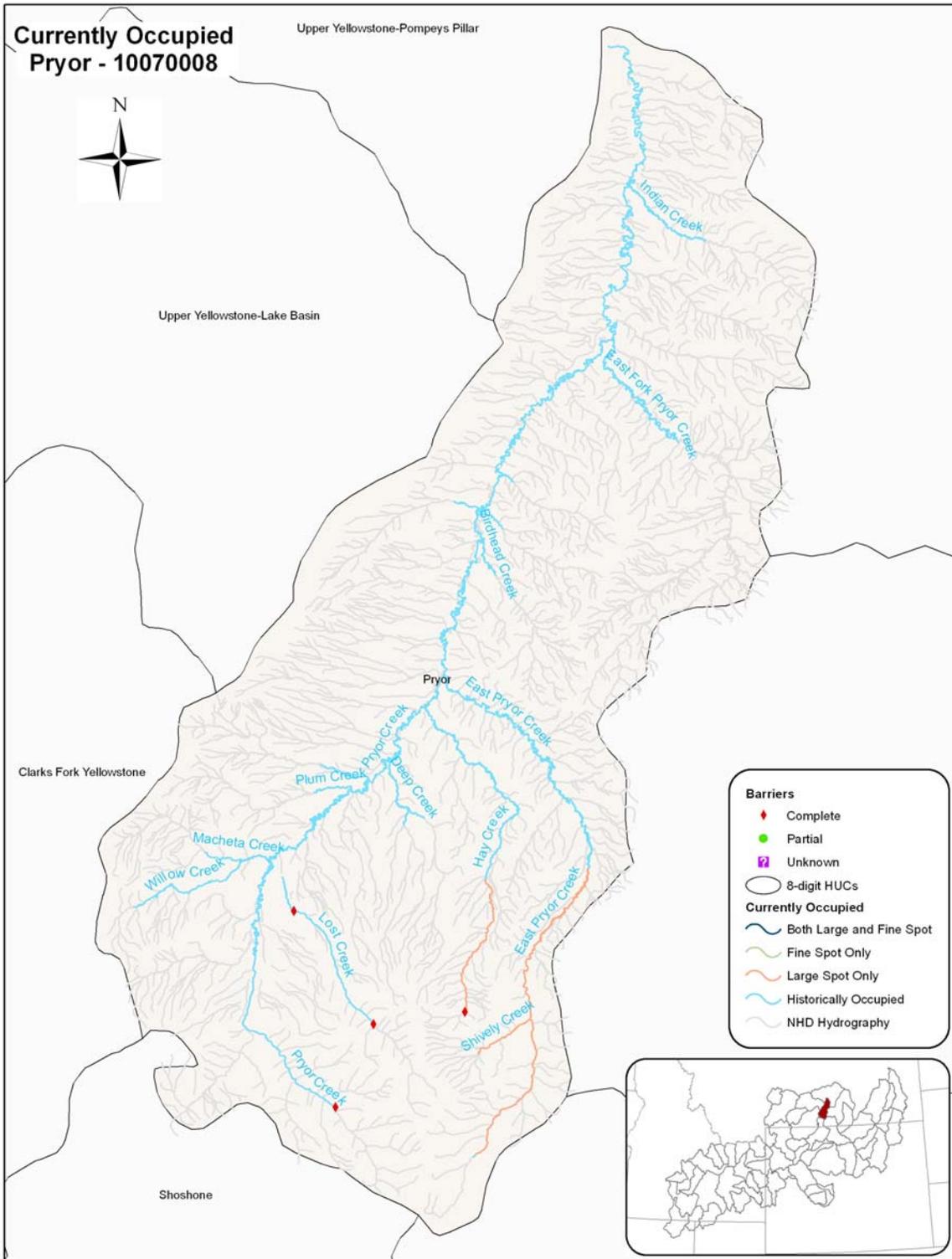
Upper Yellowstone











Historic – Upper Yellowstone GMU

Name	ID #	Historically Occupied Miles	Historical Lakes	Lake Acres
Yellowstone Headwaters	10070001	952.47	1	84441.99
Upper Yellowstone	10070002	1115.96		
Shields	10070003	682.12		
Upper Yellowstone-Lake Basin	10070004	287.99		
Stillwater	10070005	416.22		
Clarks Fork Yellowstone	10070006	524.61		
Upper Yellowstone-Pompey's Pillar	10070007	273.41		
Pryor	10070008	225.89		
Totals		4478.67	1	84441.99

Current Distribution – Upper Yellowstone GMU

Name	ID #	Spotting Pattern	Currently Occupied Miles	Currently Occupied KM
Yellowstone Headwaters	10070001	Fine Spot Only	17.15	27.6
Yellowstone Headwaters	10070001	Large Spot Only	914.54	1471.91
Upper Yellowstone	10070002	Large Spot Only	560.24	901.8
Shields	10070003	Large Spot Only	452.68	728.41
Stillwater	10070005	Large Spot Only	103.4	166.49
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	15.5	24.93
Clarks Fork Yellowstone	10070006	Large Spot Only	81.03	130.34
Pryor	10070008	Large Spot Only	26.78	43.11

Name	ID #	Spotting Pattern	Number of Lakes	Surface Acres
Yellowstone Headwaters	10070001	Large Spot Only	4	84819.06
Stillwater	10070005	Large Spot Only	24	647.53
Clarks Fork Yellowstone	10070006	Large Spot Only	4	50.8

Name	HUC8	Spotting	Origin	Life History	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	Aboriginal - naturally occurring population	Migratory	10.43
Yellowstone Headwaters	10070001	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	6.72
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Combination	460.57
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Migratory	325.85
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	55.41
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Unknown	56.14
Yellowstone Headwaters	10070001	Large Spot Only	Restored - human restoration to start population	Non migratory	16.57
Upper Yellowstone	10070002	Large Spot Only	Aboriginal - naturally occurring population	Combination	293.2
Upper Yellowstone	10070002	Large Spot Only	Aboriginal - naturally occurring population	Migratory	80.21
Upper Yellowstone	10070002	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	97.9
Upper Yellowstone	10070002	Large Spot Only	Aboriginal - naturally occurring population	Unknown	5.4
Upper Yellowstone	10070002	Large Spot Only	Restored - human restoration to start population	Non migratory	83.53
Shields	10070003	Large Spot Only	Aboriginal - naturally occurring population	Combination	350.14
Shields	10070003	Large Spot Only	Aboriginal - naturally occurring population	Migratory	64.65
Shields	10070003	Large Spot Only	Aboriginal - naturally occurring population	Unknown	34.36
Shields	10070003	Large Spot Only	Unknown	Unknown	3.53
Stillwater	10070005	Large Spot Only	Aboriginal - naturally occurring population	Combination	18.39
Stillwater	10070005	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	14.3
Stillwater	10070005	Large Spot Only	Restored - human restoration to start population	Combination	5.86
Stillwater	10070005	Large Spot Only	Restored - human restoration to start population	Non migratory	28.82
Stillwater	10070005	Large Spot Only	Unknown	Non migratory	36.03
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	Restored - human restoration to start population	Non migratory	15.5

Clarks Fork Yellowstone	10070006	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	12.72
Clarks Fork Yellowstone	10070006	Large Spot Only	Restored - human restoration to start population	Combination	9.31
Clarks Fork Yellowstone	10070006	Large Spot Only	Restored - human restoration to start population	Non migratory	59
Pryor	10070008	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	20.21
Pryor	10070008	Large Spot Only	Restored - human restoration to start population	Non migratory	6.57

Name	HUC8	Spotting	Origin	Life History	Acres	Count of Lakes
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Combination	178.51	1
Yellowstone Headwaters	10070001	Large Spot Only	Aboriginal - naturally occurring population	Migratory	84640.55	3
Stillwater	10070005	Large Spot Only	Restored - human restoration to start population	Non migratory	543.23	22
Stillwater	10070005	Large Spot Only	Unknown	Non migratory	104.3	2
Clarks Fork Yellowstone	10070006	Large Spot Only	Restored - human restoration to start population	Non migratory	50.8	4

Name	HUC8	Spotting	Stocking	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	No Record	3.65
Yellowstone Headwaters	10070001	Fine Spot Only	YCT Stocking only	13.5
Yellowstone Headwaters	10070001	Large Spot Only	No Record	381.39
Yellowstone Headwaters	10070001	Large Spot Only	Non-Native Stocking	105.03
Yellowstone Headwaters	10070001	Large Spot Only	YCT Stocking only	428.12
Upper Yellowstone	10070002	Large Spot Only	No Record	94.71
Upper Yellowstone	10070002	Large Spot Only	Non-Native Stocking	311.72
Upper Yellowstone	10070002	Large Spot Only	YCT Stocking only	153.81
Shields	10070003	Large Spot Only	No Record	129.2
Shields	10070003	Large Spot Only	Non-Native Stocking	247.03
Shields	10070003	Large Spot Only	YCT Stocking only	76.45
Stillwater	10070005	Large Spot Only	No Record	5.27
Stillwater	10070005	Large Spot Only	Non-Native Stocking	64.49
Stillwater	10070005	Large Spot Only	YCT Stocking only	33.64
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	Non-Native Stocking	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	No Record	44.63
Clarks Fork Yellowstone	10070006	Large Spot Only	Non-Native Stocking	25.36
Clarks Fork Yellowstone	10070006	Large Spot Only	YCT Stocking only	11.04
Pryor	10070008	Large Spot Only	No Record	9.21
Pryor	10070008	Large Spot Only	Non-Native Stocking	17.57

Name	HUC8	Spotting	Stocking	Number of Lakes	Acres
Yellowstone Headwaters	10070001	Large Spot Only	No Record	3	377.07
Yellowstone Headwaters	10070001	Large Spot Only	YCT Stocking only	1	84441.99
Stillwater	10070005	Large Spot Only	No Record	9	203.12
Stillwater	10070005	Large Spot Only	Non-Native Stocking	3	79.97
Stillwater	10070005	Large Spot Only	YCT Stocking only	12	364.44
Clarks Fork Yellowstone	10070006	Large Spot Only	No Record	1	17.89
Clarks Fork Yellowstone	10070006	Large Spot Only	YCT Stocking only	3	32.91

Name	HUC8	Spotting	Genetics	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	Not Tested - Suspected Unaltered	17.15
Yellowstone Headwaters	10070001	Large Spot Only	Unaltered (< 1%)	402.27
Yellowstone Headwaters	10070001	Large Spot Only	>1% and <=10%	42.67
Yellowstone Headwaters	10070001	Large Spot Only	>25%	15.53
Yellowstone Headwaters	10070001	Large Spot Only	Not Tested - Suspected Unaltered	289.11
Yellowstone Headwaters	10070001	Large Spot Only	Not Tested - Suspected Hybridized	164.96
Upper Yellowstone	10070002	Large Spot Only	Unaltered (< 1%)	197.91
Upper Yellowstone	10070002	Large Spot Only	>1% and <=10%	119.93
Upper Yellowstone	10070002	Large Spot Only	>10% and <=25%	7.01
Upper Yellowstone	10070002	Large Spot Only	>25%	4.53
Upper Yellowstone	10070002	Large Spot Only	Not Tested - Suspected Unaltered	34.8
Upper Yellowstone	10070002	Large Spot Only	Not Tested - Suspected Hybridized	71.6
Upper Yellowstone	10070002	Large Spot Only	Co-existence	124.46
Shields	10070003	Large Spot Only	Unaltered (< 1%)	213.65
Shields	10070003	Large Spot Only	>1% and <=10%	95.09
Shields	10070003	Large Spot Only	Not Tested - Suspected Unaltered	130.81
Shields	10070003	Large Spot Only	Not Tested - Suspected Hybridized	13.13
Stillwater	10070005	Large Spot Only	Unaltered (< 1%)	15.12
Stillwater	10070005	Large Spot Only	Not Tested - Suspected Unaltered	16.39
Stillwater	10070005	Large Spot Only	Not Tested - Suspected Hybridized	71.89
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	Not Tested - Suspected Hybridized	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	Unaltered (< 1%)	17.49
Clarks Fork Yellowstone	10070006	Large Spot Only	Not Tested - Suspected Unaltered	47.48
Clarks Fork Yellowstone	10070006	Large Spot Only	Not Tested - Suspected Hybridized	16.06
Pryor	10070008	Large Spot Only	Unaltered (< 1%)	6.57
Pryor	10070008	Large Spot Only	>10% and <=25%	17.57
Pryor	10070008	Large Spot Only	Not Tested - Suspected Hybridized	2.64

Name	HUC8	Spotting	Genetics	Acres	Count of Lakes
Yellowstone Headwaters	10070001	Large Spot Only	Unaltered (< 1%)	84553.56	2
Yellowstone Headwaters	10070001	Large Spot Only	Not Tested - Suspected Unaltered	265.5	2
Stillwater	10070005	Large Spot Only	Unaltered (< 1%)	104.3	2
Stillwater	10070005	Large Spot Only	Not Tested - Suspected Unaltered	527.98	21
Stillwater	10070005	Large Spot Only	Not Tested - Suspected Hybridized	15.25	1
Clarks Fork Yellowstone	10070006	Large Spot Only	Not Tested - Suspected Unaltered	50.8	4

Name	HUC8	Spotting	Population Density	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	0 to 50 fish	6.78
Yellowstone Headwaters	10070001	Fine Spot Only	Unknown	10.37
Yellowstone Headwaters	10070001	Large Spot Only	1001 to 2000 fish	81.61
Yellowstone Headwaters	10070001	Large Spot Only	401 to 1000 fish	174.27
Yellowstone Headwaters	10070001	Large Spot Only	151 to 400 fish	280.19
Yellowstone Headwaters	10070001	Large Spot Only	50 to 150 fish	152.71
Yellowstone Headwaters	10070001	Large Spot Only	0 to 50 fish	136.86
Yellowstone Headwaters	10070001	Large Spot Only	Unknown	88.9
Upper Yellowstone	10070002	Large Spot Only	401 to 1000 fish	36.96
Upper Yellowstone	10070002	Large Spot Only	151 to 400 fish	149.39
Upper Yellowstone	10070002	Large Spot Only	50 to 150 fish	106.44
Upper Yellowstone	10070002	Large Spot Only	0 to 50 fish	39.45
Upper Yellowstone	10070002	Large Spot Only	Unknown	228
Shields	10070003	Large Spot Only	401 to 1000 fish	12.73
Shields	10070003	Large Spot Only	151 to 400 fish	40.66
Shields	10070003	Large Spot Only	50 to 150 fish	88.16
Shields	10070003	Large Spot Only	0 to 50 fish	192.74
Shields	10070003	Large Spot Only	Unknown	118.39
Stillwater	10070005	Large Spot Only	401 to 1000 fish	32.92
Stillwater	10070005	Large Spot Only	151 to 400 fish	45.24
Stillwater	10070005	Large Spot Only	50 to 150 fish	19.52
Stillwater	10070005	Large Spot Only	0 to 50 fish	5.72

Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	401 to 1000 fish	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	401 to 1000 fish	27.03
Clarks Fork Yellowstone	10070006	Large Spot Only	151 to 400 fish	0.94
Clarks Fork Yellowstone	10070006	Large Spot Only	50 to 150 fish	53.06
Pryor	10070008	Large Spot Only	50 to 150 fish	17.57
Pryor	10070008	Large Spot Only	0 to 50 fish	2.64
Pryor	10070008	Large Spot Only	Unknown	6.57

Name	HUC8	Spotting	Habitat	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	Excellent	6.78
Yellowstone Headwaters	10070001	Fine Spot Only	Good	10.37
Yellowstone Headwaters	10070001	Large Spot Only	Excellent	317.81
Yellowstone Headwaters	10070001	Large Spot Only	Good	411.05
Yellowstone Headwaters	10070001	Large Spot Only	Fair	91.3
Yellowstone Headwaters	10070001	Large Spot Only	Poor	38.69
Yellowstone Headwaters	10070001	Large Spot Only	Unknown	55.69
Upper Yellowstone	10070002	Large Spot Only	Excellent	117.99
Upper Yellowstone	10070002	Large Spot Only	Good	243.6
Upper Yellowstone	10070002	Large Spot Only	Fair	59.2
Upper Yellowstone	10070002	Large Spot Only	Poor	3.16
Upper Yellowstone	10070002	Large Spot Only	Unknown	136.29
Shields	10070003	Large Spot Only	Good	155.75
Shields	10070003	Large Spot Only	Fair	105.16
Shields	10070003	Large Spot Only	Poor	4.52
Shields	10070003	Large Spot Only	Unknown	187.25
Stillwater	10070005	Large Spot Only	Excellent	4.43
Stillwater	10070005	Large Spot Only	Good	82.15
Stillwater	10070005	Large Spot Only	Fair	16.82
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	Good	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	Excellent	20.16
Clarks Fork Yellowstone	10070006	Large Spot Only	Good	35.43
Clarks Fork	10070006	Large Spot Only	Fair	25.44

Yellowstone				
Pryor	10070008	Large Spot Only	Fair	6.57
Pryor	10070008	Large Spot Only	Unknown	20.21
Name	HUC8	Spotting	Width	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	15 to 25 feet	6.78
Yellowstone Headwaters	10070001	Fine Spot Only	5 to 15 feet	10.37
Yellowstone Headwaters	10070001	Large Spot Only	> 50 feet	194.98
Yellowstone Headwaters	10070001	Large Spot Only	25 to 50 feet	202.06
Yellowstone Headwaters	10070001	Large Spot Only	15 to 25 feet	149.13
Yellowstone Headwaters	10070001	Large Spot Only	5 to 15 feet	276.82
Yellowstone Headwaters	10070001	Large Spot Only	< 5 feet	24.83
Yellowstone Headwaters	10070001	Large Spot Only	Unknown	66.72
Upper Yellowstone	10070002	Large Spot Only	> 50 feet	120.38
Upper Yellowstone	10070002	Large Spot Only	25 to 50 feet	31.99
Upper Yellowstone	10070002	Large Spot Only	15 to 25 feet	130.46
Upper Yellowstone	10070002	Large Spot Only	5 to 15 feet	213.93
Upper Yellowstone	10070002	Large Spot Only	< 5 feet	42.35
Upper Yellowstone	10070002	Large Spot Only	Unknown	21.13
Shields	10070003	Large Spot Only	25 to 50 feet	12.77
Shields	10070003	Large Spot Only	15 to 25 feet	88.59
Shields	10070003	Large Spot Only	5 to 15 feet	179.95
Shields	10070003	Large Spot Only	< 5 feet	58.1
Shields	10070003	Large Spot Only	Unknown	113.27
Stillwater	10070005	Large Spot Only	25 to 50 feet	32.92
Stillwater	10070005	Large Spot Only	15 to 25 feet	38.03
Stillwater	10070005	Large Spot Only	5 to 15 feet	26.73
Stillwater	10070005	Large Spot Only	< 5 feet	5.72
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	5 to 15 feet	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	15 to 25 feet	20.83
Clarks Fork Yellowstone	10070006	Large Spot Only	5 to 15 feet	47.48
Clarks Fork Yellowstone	10070006	Large Spot Only	< 5 feet	12.72
Pryor	10070008	Large Spot Only	5 to 15 feet	17.57
Pryor	10070008	Large Spot Only	< 5 feet	9.21

Name	HUC8	Spotting	Non-Natives	Stream Mile
Yellowstone Headwaters	10070001	Fine Spot Only	Non-Natives are not Present	17.15
Yellowstone Headwaters	10070001	Large Spot Only	Non-Natives are not Present	601.02
Yellowstone Headwaters	10070001	Large Spot Only	Non-Natives are Present	313.52
Upper Yellowstone	10070002	Large Spot Only	Non-Natives are not Present	196.64
Upper Yellowstone	10070002	Large Spot Only	Non-Natives are Present	363.6
Shields	10070003	Large Spot Only	Non-Natives are not Present	175.91
Shields	10070003	Large Spot Only	Non-Natives are Present	276.77
Stillwater	10070005	Large Spot Only	Non-Natives are not Present	28.38
Stillwater	10070005	Large Spot Only	Non-Natives are Present	75.02
Clarks Fork Yellowstone	10070006	Both Large and Fine Spot	Non-Natives are not Present	15.5
Clarks Fork Yellowstone	10070006	Large Spot Only	Non-Natives are not Present	38.17
Clarks Fork Yellowstone	10070006	Large Spot Only	Non-Natives are Present	42.86
Pryor	10070008	Large Spot Only	Non-Natives are not Present	9.21
Pryor	10070008	Large Spot Only	Non-Natives are Present	17.57

Name	HUC8	Ownership	Wilderness	Stream Mile
Yellowstone Headwaters	10070001	National Park Service	No	673.56
Yellowstone Headwaters	10070001	National Park Service	Yes	0.06
Yellowstone Headwaters	10070001	Private	No	9.42
Yellowstone Headwaters	10070001	Private	Yes	0.14
Yellowstone Headwaters	10070001	U.S. Forest Service	No	13.89
Yellowstone Headwaters	10070001	U.S. Forest Service	Yes	203.76
Yellowstone Headwaters	10070001	Water	No	30.74
Yellowstone Headwaters	10070001	Water	Yes	0.12

Upper Yellowstone	10070002	Bureau of Land Management	No	1.08
Upper Yellowstone	10070002	National Park Service	No	2.83
Upper Yellowstone	10070002	Private	No	230.22
Upper Yellowstone	10070002	Private	Yes	0.02
Upper Yellowstone	10070002	State	No	4.09
Upper Yellowstone	10070002	U.S. Forest Service	No	116.17
Upper Yellowstone	10070002	U.S. Forest Service	Yes	99.13
Upper Yellowstone	10070002	Water	No	106.54
Upper Yellowstone	10070002	Water	Yes	0.16
Shields	10070003	Private	No	349.29
Shields	10070003	State	No	9.28
Shields	10070003	U.S. Forest Service	No	93.79
Shields	10070003	Water	No	0.32
Stillwater	10070005	Bureau of Land Management	No	0.21
Stillwater	10070005	Private	No	7.62
Stillwater	10070005	U.S. Forest Service	No	23.67
Stillwater	10070005	U.S. Forest Service	Yes	68.36
Stillwater	10070005	Water	No	0.66
Stillwater	10070005	Water	Yes	2.88
Clarks Fork Yellowstone	10070006	Private	No	8.52
Clarks Fork Yellowstone	10070006	State	No	1.44
Clarks Fork Yellowstone	10070006	U.S. Forest Service	No	25.88
Clarks Fork Yellowstone	10070006	U.S. Forest Service	Yes	57.82
Clarks Fork Yellowstone	10070006	Water	No	2.12
Clarks Fork Yellowstone	10070006	Water	Yes	0.75
Pryor	10070008	Bureau of Indian Affairs	No	10.96
Pryor	10070008	Private	No	15.82

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Stream Habitat Segments	Acres	Count of Lakes
10070001cp001	2	Strongly Networked	17.71	2		
10070001cp002	1	Strongly Networked	30.2	6		
10070001cp003	1	Non-network	11.84	1		
10070001cp004	1	Non-network	13.68	1		
10070001cp005	2	Non-network	17.02	1		
10070001cp006	2	Strongly Networked	134.08	25		
10070001cp007	1	Strongly Networked	125.19	13		
10070001cp008	1	Strongly Networked	484.49	51	84707.49	3
10070001cp009	1	Non-network	2.54	1		
10070001cp010	1	Non-network	2.19	1		
10070001cp011	2	Non-network	3.67	1		
10070001cp012	1	Non-network	4.93	1		
10070001cp013	1	Non-network	0.75	2		
10070001cp014	1	Non-network	16.76	2		
10070001cp015	1	Non-network	5.45	1		

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070001cp001	Moderate Disease Risk < 10 km	Hybridizing species are sympatric	Yes
10070001cp002	Limited Disease Risk	No Risk of Hybridization	Yes
10070001cp003	Limited Disease Risk	No Risk of Hybridization	Yes
10070001cp004	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070001cp005	Moderate Disease Risk < 10 km	Hybridizing species are sympatric	Yes
10070001cp006	Significant Disease Risk (sympatric)	Hybridizing species are sympatric	Yes
10070001cp007	Significant Disease Risk (sympatric)	Hybridizing species < 10 km	No
10070001cp008	Population is Infected	Hybridizing species < 10 km	Yes
10070001cp009	Limited Disease Risk	No Risk of Hybridization	Yes
10070001cp010	Limited Disease Risk	No Risk of Hybridization	Yes
10070001cp011	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
10070001cp012	Population is Infected	Hybridizing species > 10 km	Yes
10070001cp013	Population is Infected	Hybridizing species > 10 km	Yes
10070001cp014	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
10070001cp015	Moderate Disease Risk < 10 km	Hybridizing species > 10 km	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070001cp001				Local	
10070001cp002				Local	
10070001cp003				Local	
10070001cp004				Local	
10070001cp005				Local	
10070001cp006			Lg. river		
10070001cp007				Local	
10070001cp008	Lake out.	Lake trib.	Lg. river	Local	
10070001cp009				Local	
10070001cp010				Local	
10070001cp011				Local	
10070001cp012				Local	
10070001cp013				Local	
10070001cp014				Local	
10070001cp015				Local	

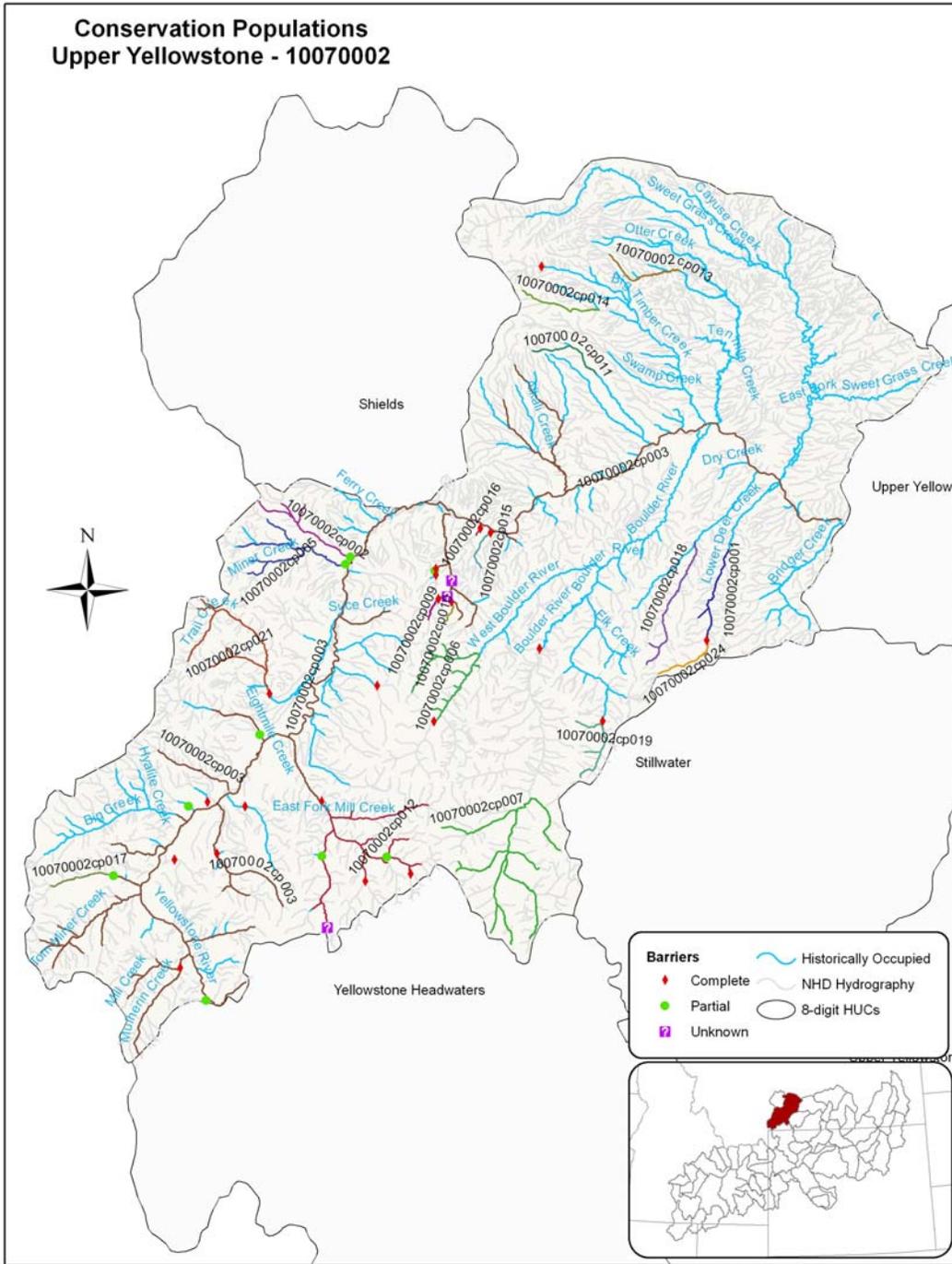
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070001cp001	17.71	28.47	14.13	22.71	2					
10070001cp002	30.2	48.57			6					
10070001cp003	11.84	19.07			1					
10070001cp004	13.68	22.02			1					
10070001cp005	17.02	27.41	17.02	27.41	1					
10070001cp006	134.08	215.82	110.12	177.23	25					
10070001cp007	125.19	201.48			13					
10070001cp008	484.49	779.7	109.95	177	51	84707.49	34279.9	3	178.51	1
10070001cp009	2.54	4.09			1					
10070001cp010	2.19	3.53			1					
10070001cp011	3.67	5.91			1					
10070001cp012	4.93	7.93	4.93	7.93	1					
10070001cp013	0.75	1.22	0.26	0.42	2					
10070001cp014	16.76	27			2					
10070001cp015	5.45	8.78			1					

Conservation Population ID:	Non-natives
10070001cp001	Other, RBT
10070001cp002	None
10070001cp003	None
10070001cp004	None
10070001cp005	BRK, RBT, TRT
10070001cp006	BRK, RBT
10070001cp007	None
10070001cp008	Other
10070001cp009	None
10070001cp010	None
10070001cp011	None
10070001cp012	TRT
10070001cp013	TRT
10070001cp014	None
10070001cp015	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070001cp001			17.7		
10070001cp002			23.39		6.78
10070001cp003	11.85				
10070001cp004			13.68		
10070001cp005			17.02		
10070001cp006	41.89	18.56	69.99		3.7
10070001cp007	35.52		68.02		21.66
10070001cp008	208.17	66.2	147.82	38.72	23.56
10070001cp009			2.54		
10070001cp010			2.19		
10070001cp011	3.68				
10070001cp012	4.93				
10070001cp013	0.76				
10070001cp014			16.78		
10070001cp015			5.45		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070001cp001	Large Spot Only	17.695	22157.9	3	1	3	1	3	2
10070001cp002	Large Spot Only	30.173	11302.2	1	1	2	1	4	2
10070001cp003	Large Spot Only	11.848	1184.8	1	4	3	2	2	2
10070001cp004	Large Spot Only	13.677	3761.3	2	4	3	1	2	2
10070001cp005	Large Spot Only	17.023	25534.3	3	4	3	1	2	2
10070001cp006	Large Spot Only	134.14	94480.9	4	1	1	1	4	2
10070001cp007	Large Spot Only	125.2	70816	4	1	1	1	4	2
10070001cp008	Both Large and Fine Spot	484.466	97337.4	5	1	1	1	4	2
10070001cp009	Large Spot Only	2.541	254.1	1	4	4	3	2	3
10070001cp010	Large Spot Only	2.189	218.9	1	4	4	3	2	3
10070001cp011	Large Spot Only	3.678	367.8	3	4	4	3	2	3
10070001cp012	Large Spot Only	4.928	1355.2	5	4	4	2	3	3
10070001cp013	Large Spot Only	0.76	444.8	5	4	4	3	3	4
10070001cp014	Both Large and Fine Spot	16.775	2764.6	3	4	3	1	3	2
10070001cp015	Large Spot Only	5.453	0	3	4	4	4	3	4

**Conservation Populations
Upper Yellowstone - 10070002**



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Stream Habitat Segments	Acres	Count of Lakes
10070002cp001	Core Conservation Population	Moderately Networked	11.25	2		
10070002cp002	Other	Moderately Networked	15.09	4		
10070002cp003	Known or Probable Unique Life History	Strongly Networked	385.11	58		
10070002cp005	Core Conservation Population	Moderately Networked	26.02	3		
10070002cp006	Known or Probable Unique Life History	Moderately Networked	24.29	2		
10070002cp007	Other	Strongly Networked	54.58	9		
10070002cp009	Core Conservation Population	Non-network	2.24	1		
10070002cp010	Core Conservation Population	Non-network	2.14	1		
10070002cp011	Core Conservation Population	Non-network	7.62	1		
10070002cp012	Core Conservation Population	Moderately Networked	43.37	12		
10070002cp013	Core Conservation Population	Non-network	9.4	1		
10070002cp014	Core Conservation Population	Non-network	8.16	1		
10070002cp015	Core Conservation Population	Non-network	3.97	1		
10070002cp016	Core Conservation Population	Non-network	0.68	1		
10070002cp017	Core Conservation Population	Non-network	6.39	1		
10070002cp018	Core Conservation Population	Non-network	14.92	1		
10070002cp019	Core Conservation Population	Moderately Networked	14.48	1		
10070002cp021	Other	Weakly Networked	28.02	5		
10070002cp024	Core Conservation Population	Weakly Networked	6.32	1		

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070002cp001	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070002cp002	Limited Disease Risk	No Risk of Hybridization	No
10070002cp003	Significant Disease Risk (sympatric)	Hybridizing species are sympatric	Yes
10070002cp005	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
10070002cp006	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070002cp007	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	No
10070002cp009	Limited Disease Risk	No Risk of Hybridization	Yes
10070002cp010	Limited Disease Risk	No Risk of Hybridization	Yes
10070002cp011	Limited Disease Risk	No Risk of Hybridization	No
10070002cp012	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070002cp013	Limited Disease Risk	No Risk of Hybridization	No
10070002cp014	Limited Disease Risk	No Risk of Hybridization	No
10070002cp015	Limited Disease Risk	No Risk of Hybridization	Yes
10070002cp016	Limited Disease Risk	Hybridizing species < 10 km	Yes
10070002cp017	Limited Disease Risk	No Risk of Hybridization	No
10070002cp018	Limited Disease Risk	No Risk of Hybridization	No
10070002cp019	Limited Disease Risk	No Risk of Hybridization	Yes
10070002cp021	Limited Disease Risk	Hybridizing species < 10 km	Yes
10070002cp024	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070002cp001				Local	
10070002cp002				Local	
10070002cp003			Lg. river	Local	
10070002cp005				Local	
10070002cp006				Local	
10070002cp007				Local	
10070002cp009				Local	
10070002cp010				Local	
10070002cp011				Local	
10070002cp012				Local	
10070002cp013				Local	
10070002cp014				Local	
10070002cp015				Local	
10070002cp016				Local	

10070002cp017				Local	
10070002cp018				Local	
10070002cp019				Local	
10070002cp021				Local	
10070002cp024				Local	

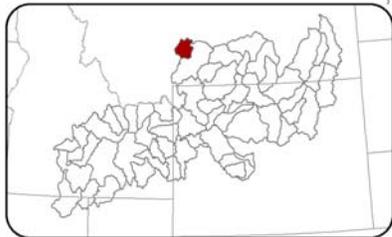
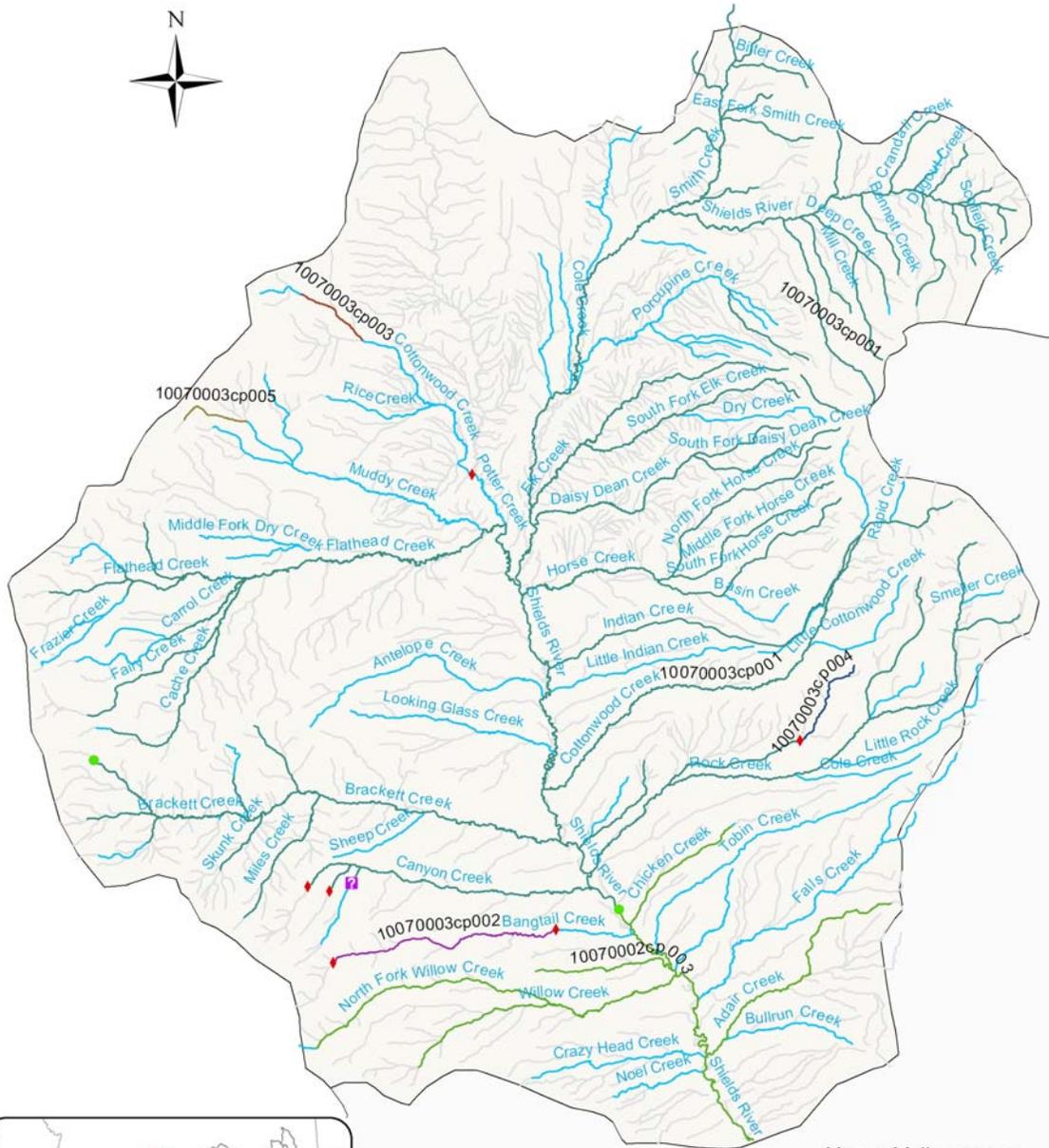
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070002cp001	11.25	18.1	9.94	16	2					
10070002cp002	15.09	24.27	7.49	12.04	4					
10070002cp003	385.11	619.98	281.3	452.87	58					
10070002cp005	26.02	41.88			3					
10070002cp006	24.29	39.06	24.29	39.06	2					
10070002cp007	54.58	87.81	30.22	48.6	9					
10070002cp009	2.24	3.62	2.24	3.62	1					
10070002cp010	2.14	3.44			1					
10070002cp011	7.62	12.26			1					
10070002cp012	43.37	69.86	33.66	54.23	12					
10070002cp013	9.4	15.16			1					
10070002cp014	8.16	13.13			1					
10070002cp015	3.97	6.39			1					
10070002cp016	0.68	1.09	0.68	1.09	1					
10070002cp017	6.39	10.28			1					
10070002cp018	14.92	23.99	14.92	23.99	1					
10070002cp019	14.48	23.31			1					
10070002cp021	28.02	45.09	21.27	34.23	5					
10070002cp024	6.32	10.18			1					

Conservation Population ID:	Non-natives
10070002cp001	BRN
10070002cp002	BRN, RBT
10070002cp003	BRK, BRN, CUT, Other, RBT
10070002cp005	Unknown
10070002cp006	BRN, RBT
10070002cp007	BRK, BRN, RBT
10070002cp009	BRN, RBT
10070002cp010	Unknown
10070002cp011	Unknown
10070002cp012	BRK, RBT
10070002cp013	None
10070002cp014	None
10070002cp015	None
10070002cp016	RBT
10070002cp017	None
10070002cp018	BRK, BRN
10070002cp019	None
10070002cp021	BRN, RBT
10070002cp024	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070002cp001		1.31	9.94		
10070002cp002					15.08
10070002cp003	47.59	55.34	195.38		86.9
10070002cp005					26.03
10070002cp006	11.57		12.72		
10070002cp007	24.86	3.5	19.58		6.6
10070002cp009					2.25
10070002cp010		2.14			
10070002cp011					7.62
10070002cp012	15.98		22.83		4.57
10070002cp013					9.4
10070002cp014	8.16				
10070002cp015					3.97
10070002cp016					0.68
10070002cp017	6.39				
10070002cp018	14.9				
10070002cp019			14.48		
10070002cp021		23.86		3.17	1.01
10070002cp024	6.32				

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070002cp001	Large Spot Only	11.251	2864.7	2	2	3	1	3	2
10070002cp002	Large Spot Only	15.08	0	1	2	3	4	2	3
10070002cp003	Large Spot Only	385.207	52398.1	4	1	1	1	4	2
10070002cp005	Large Spot Only	26.028	0	3	2	2	4	3	3
10070002cp006	Large Spot Only	24.284	4653.7	2	2	2	1	3	2
10070002cp007	Large Spot Only	54.547	13667.2	2	1	1	1	4	2
10070002cp009	Large Spot Only	2.254	0	1	4	4	4	2	3
10070002cp010	Large Spot Only	2.138	0	1	4	4	4	2	3
10070002cp011	Large Spot Only	7.623	0	1	4	3	4	2	3
10070002cp012	Large Spot Only	43.379	9542.6	2	2	2	1	4	2
10070002cp013	Large Spot Only	9.4	0	1	4	3	4	2	3
10070002cp014	Large Spot Only	8.16	0	1	4	3	4	2	3
10070002cp015	Large Spot Only	3.972	99.3	1	4	4	3	2	3
10070002cp016	Large Spot Only	0.677	0	1	4	4	4	2	3
10070002cp017	Large Spot Only	6.387	638.7	1	4	3	2	2	2
10070002cp018	Large Spot Only	14.903	372.6	1	4	3	3	2	2
10070002cp019	Large Spot Only	14.483	10862	1	2	3	1	2	1
10070002cp021	Large Spot Only	28.029	89.5	1	3	2	3	2	2
10070002cp024	Large Spot Only	6.323	0	2	3	3	4	2	3

Conservation Populations Shields - 10070003



Upper Yellowstone

Barriers		Historically Occupied
♦	Complete	
●	Partial	
□	Unknown	

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10070003cp001	Known or Probable Unique Life History	Strongly Networked	381.24	68		
10070003cp002	Core Conservation Population	Non-network	8.57	1		
10070003cp003	Core Conservation Population	Non-network	2.68	1		
10070003cp004	Other	Non-network	3.71	1		
10070003cp005	Core Conservation Population	Non-network	2.44	1		

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070003cp001	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070003cp002	Limited Disease Risk	No Risk of Hybridization	Yes
10070003cp003	Limited Disease Risk	Hybridizing species > 10 km	No
10070003cp004	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
10070003cp005	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No

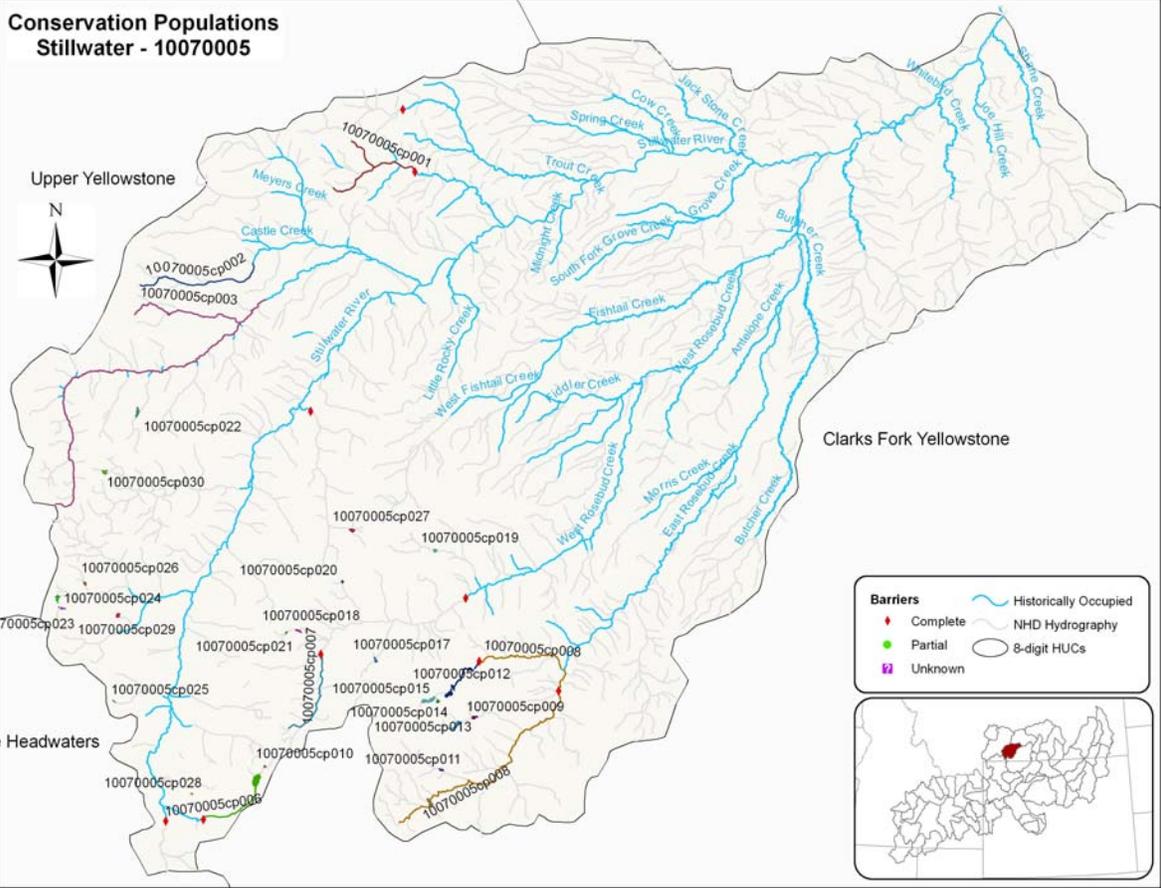
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070003cp001			Lg. river	Local	
10070003cp002				Local	
10070003cp003				Local	
10070003cp004					Unknown
10070003cp005				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070003cp001	381.24	613.42	249.53	401.56	68				10070003cp001	381.24
10070003cp002	8.57	13.79	8.57	13.79	1				10070003cp002	8.57
10070003cp003	2.68	4.31			1				10070003cp003	2.68
10070003cp004	3.71	5.97			1				10070003cp004	3.71
10070003cp005	2.44	3.92			1				10070003cp005	2.44

Conservation Population ID:	Non-natives
10070003cp001	BRK, BRN, RBT
10070003cp002	BRK
10070003cp003	None
10070003cp004	Unknown
10070003cp005	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070003cp001		84.89	135.06	4.51	156.72
10070003cp002			8.57		
10070003cp003			2.68		
10070003cp004					3.71
10070003cp005		2.44			

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070003cp001	Large Spot Only	381.173	31979.4	2	1	1	1	4	2
10070003cp002	Large Spot Only	8.566	856.6	1	4	3	2	2	2
10070003cp003	Large Spot Only	2.676	66.9	1	4	4	3	2	3
10070003cp004	Large Spot Only	3.708	0	3	4	4	4	2	3
10070003cp005	Large Spot Only	2.436	60.9	2	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10070005cp001	Core Conservation Population	Non-network	6.27	1		
10070005cp002	Core Conservation Population	Moderately Networked	6.1	1		
10070005cp003	Core Conservation Population	Non-network	24.11	2		
10070005cp006	Core Conservation Population	Moderately Networked	3.13	1	96.81	1
10070005cp007	Core Conservation Population	Moderately Networked	4.43	1		
10070005cp008	Core Conservation Population	Moderately Networked	17	3	38.3	1
10070005cp009	Core Conservation Population	Moderately Networked			1	0.09
10070005cp010	Core Conservation Population	Non-network			1	0.03
10070005cp011	Core Conservation Population	Non-network			1	0.06
10070005cp012	Core Conservation Population	Non-network	1.43	1	90.56	2
10070005cp013	Core Conservation Population	Non-network			1	0.2
10070005cp014	Core Conservation Population	Non-network			1	0.06
10070005cp015	Core Conservation Population	Non-network			1	0.26
10070005cp017	Core Conservation Population	Non-network			1	0.08
10070005cp018	Core Conservation Population	Non-network			1	0.07
10070005cp019	Core Conservation Population	Non-network			1	0.06
10070005cp020	Core Conservation Population	Non-network			1	0.04
10070005cp021	Core Conservation Population	Non-network			1	0.03
10070005cp022	Core Conservation Population	Non-network			1	0.15
10070005cp023	Core Conservation Population	Non-network			1	0.06
10070005cp024	Core Conservation Population	Non-network			1	0.12
10070005cp025	Core Conservation Population	Non-network			1	0.02
10070005cp026	Core Conservation Population	Non-network			1	0.06
10070005cp027	Core Conservation Population	Non-network			1	0.09
10070005cp028	Core Conservation Population	Non-network			1	0.03

10070005cp029	Core Conservation Population	Non-network			1	0.09
10070005cp030	Core Conservation Population	Non-network			1	0.11

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070005cp001	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
10070005cp002	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp003	Limited Disease Risk	Hybridizing species < 10 km	No
10070005cp006	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10070005cp007	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070005cp008	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp009	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp010	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10070005cp011	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp012	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070005cp013	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp014	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070005cp015	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp017	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp018	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp019	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp020	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp021	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp022	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp023	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp024	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp025	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp026	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp027	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp028	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10070005cp029	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10070005cp030	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070005cp001				Local	
10070005cp002				Local	
10070005cp003				Local	
10070005cp006	Lake out.	Lake trib.		Local	
10070005cp007	Lake out.	Lake trib.		Local	
10070005cp008	Lake out.	Lake trib.		Local	
10070005cp009	Lake out.	Lake trib.			
10070005cp010	Lake out.	Lake trib.			
10070005cp011					Unknown
10070005cp012					Unknown
10070005cp013					Unknown
10070005cp014					Unknown
10070005cp015					Unknown
10070005cp017					Unknown
10070005cp018					Unknown
10070005cp019					Unknown
10070005cp020					Unknown
10070005cp021					Unknown
10070005cp022					Unknown
10070005cp023					Unknown
10070005cp024					Unknown
10070005cp025					Unknown
10070005cp026					Unknown
10070005cp027					Unknown
10070005cp028					Unknown
10070005cp029					Unknown
10070005cp030					Unknown

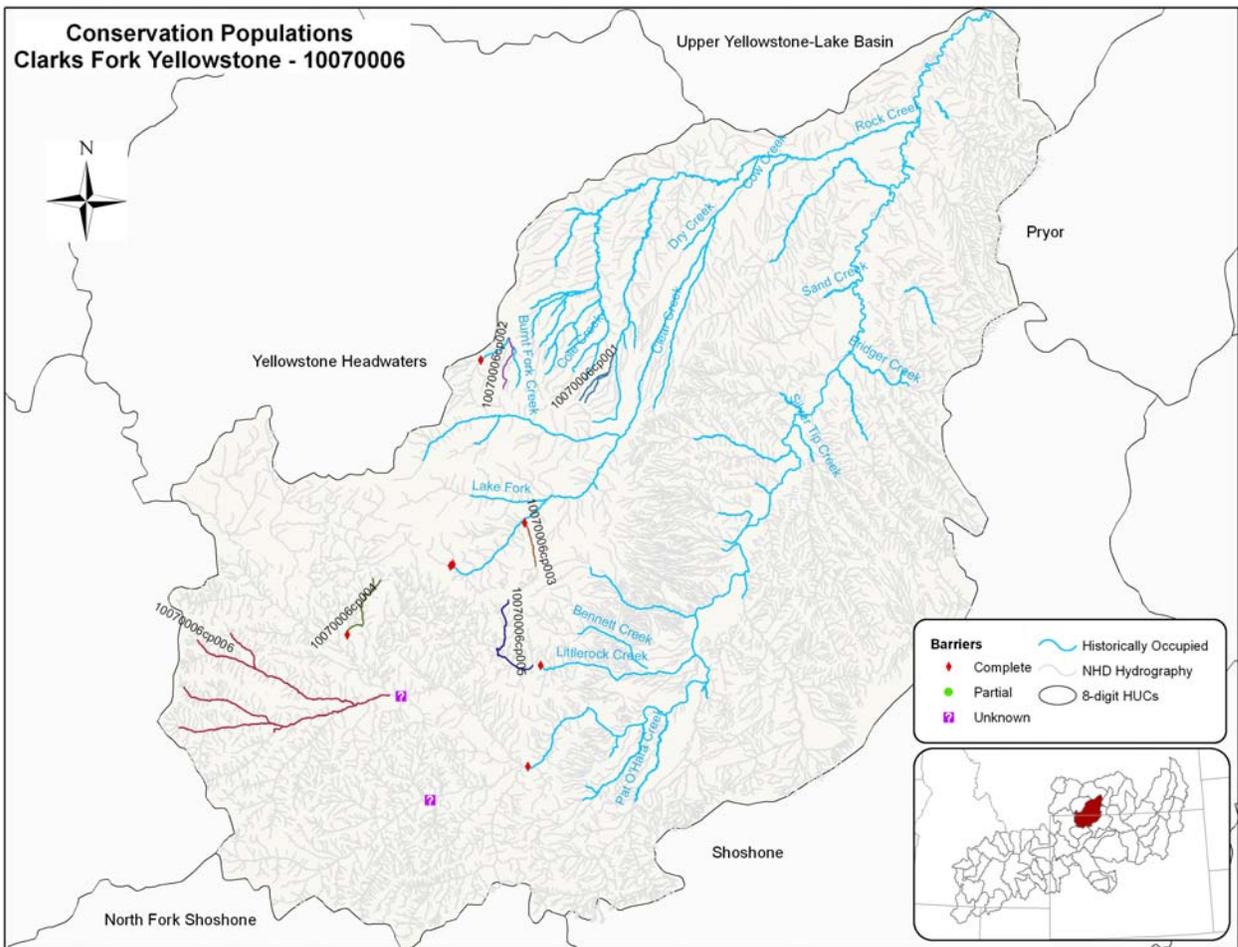
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070005 cp001	6.27	10.09			1					
10070005 cp002	6.1	9.8			1					
10070005 cp003	24.11	38.81	18.39	29.6	2					
10070005 cp006	3.13	5.06	3.13	5.06	1	96.81	39.18	1		
10070005 cp007	4.43	7.12			1					
10070005 cp008	17	27.42	12.57	20.29	3	38.3	15.5	1		
10070005 cp009						22.05	8.92	1		
10070005 cp010						7.49	3.03	1		
10070005 cp011						14.69	5.95	1		
10070005 cp012	1.43	2.3			1	90.56	36.65	2		
10070005 cp013						50.14	20.29	1		
10070005 cp014						14.59	5.91	1		
10070005 cp015						64.77	26.21	1		
10070005 cp017						19.7	7.97	1		
10070005 cp018						17.23	6.97	1		
10070005 cp019						15.6	6.31	1		
10070005 cp020						8.99	3.64	1		
10070005						7.36	2.98	1		

cp021										
10070005 cp022						35.94	14.54	1		
10070005 cp023						15.25	6.17	1	15.25	1
10070005 cp024						29.59	11.97	1		
10070005 cp025						5.81	2.35	1		
10070005 cp026						13.85	5.61	1		
10070005 cp027						22.25	9.01	1		
10070005 cp028						7.43	3.01	1		
10070005 cp029						21.63	8.75	1		
10070005 cp030						27.5	11.13	1		

Conservation Population ID:	Non-natives
10070005cp001	None
10070005cp002	None
10070005cp003	BRK, RBT
10070005cp006	BRK
10070005cp007	None
10070005cp008	BRK, Other, RBT, TRT
10070005cp009	None
10070005cp010	None
10070005cp011	None
10070005cp012	None
10070005cp013	None
10070005cp014	None
10070005cp015	None
10070005cp017	None
10070005cp018	None
10070005cp019	None
10070005cp020	None
10070005cp021	None
10070005cp022	None
10070005cp023	TRT
10070005cp024	None
10070005cp025	None
10070005cp026	None
10070005cp027	None
10070005cp028	None
10070005cp029	None
10070005cp030	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070005cp001			6.27		
10070005cp002			6.09		
10070005cp003			24.12		
10070005cp006			3.13		
10070005cp007	4.44				
10070005cp008		9.95	7.1		
10070005cp012		1.43			

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070005cp001	Large Spot Only	6.271	1724.5	2	4	3	2	2	2
10070005cp002	Large Spot Only	6.091	609.1	2	2	3	2	2	2
10070005cp003	Large Spot Only	24.122	5203.6	1	4	2	1	2	1
10070005cp006	Large Spot Only	3.13	313	2	2	4	3	2	2
10070005cp007	Large Spot Only	4.436	443.6	2	2	4	3	2	2
10070005cp008	Large Spot Only	17.047	6533.8	2	2	3	1	3	2
10070005cp012	Large Spot Only	1.432	143.2	2	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10070006cp001	Known or Probable Unique Life History	Non-network	8.19	1		
10070006cp002	Core Conservation Population	Weakly Networked	4.53	1		
10070006cp003	Core Conservation Population	Non-network	3.62	1		
10070006cp004	Core Conservation Population	Non-network	11.04	1		
10070006cp005	Core Conservation Population	Non-network	9.31	1		
10070006cp006	Core Conservation Population	Strongly Networked	47.27	6		

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070006cp001	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10070006cp002	Limited Disease Risk	No Risk of Hybridization	No
10070006cp003	Limited Disease Risk	No Risk of Hybridization	Yes
10070006cp004	Limited Disease Risk	No Risk of Hybridization	Yes
10070006cp005	Limited Disease Risk	No Risk of Hybridization	No
10070006cp006	Limited Disease Risk	No Risk of Hybridization	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070006cp001				Local	
10070006cp002				Local	
10070006cp003				Local	
10070006cp004				Local	
10070006cp005		Lake trib.			
10070006cp006				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070006 cp001	8.19	13.19	8.19	13.19	1					
10070006 cp002	4.53	7.3	4.53	7.3	1					
10070006 cp003	3.62	5.83			1					
10070006 cp004	11.04	17.75			1					
10070006 cp005	9.31	15	9.31	15	1					
10070006 cp006	47.27	76.02	10.85	17.44	6					

Conservation Population ID:	Non-natives
10070006cp001	BRK
10070006cp002	BRK
10070006cp003	None
10070006cp004	None
10070006cp005	BRK
10070006cp006	RBT, YSF

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070006cp001		8.2			
10070006cp002			4.53		
10070006cp003		3.62			
10070006cp004		11.03			
10070006cp005	9.32				
10070006cp006	10.83		36.4		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070006cp001	Large Spot Only	8.196	819.6	2	4	3	2	2	2
10070006cp002	Large Spot Only	4.527	452.7	1	3	4	3	2	3
10070006cp003	Large Spot Only	3.621	362.1	1	4	4	3	2	3
10070006cp004	Large Spot Only	11.033	1103.3	1	4	3	2	2	2
10070006cp005	Large Spot Only	9.318	931.8	1	4	3	2	2	2
10070006cp006	Both Large and Fine Spot	47.226	32506.9	1	1	2	1	4	2

Conservation Population ID		Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10070008cp001	Core Conservation Population	Non-network	6.57	1		

Conservation Population ID:	Non-native
10070008cp001	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10070008cp001		6.57			

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10070008cp001	Limited Disease Risk	Hybridizing species > 10 km	Yes

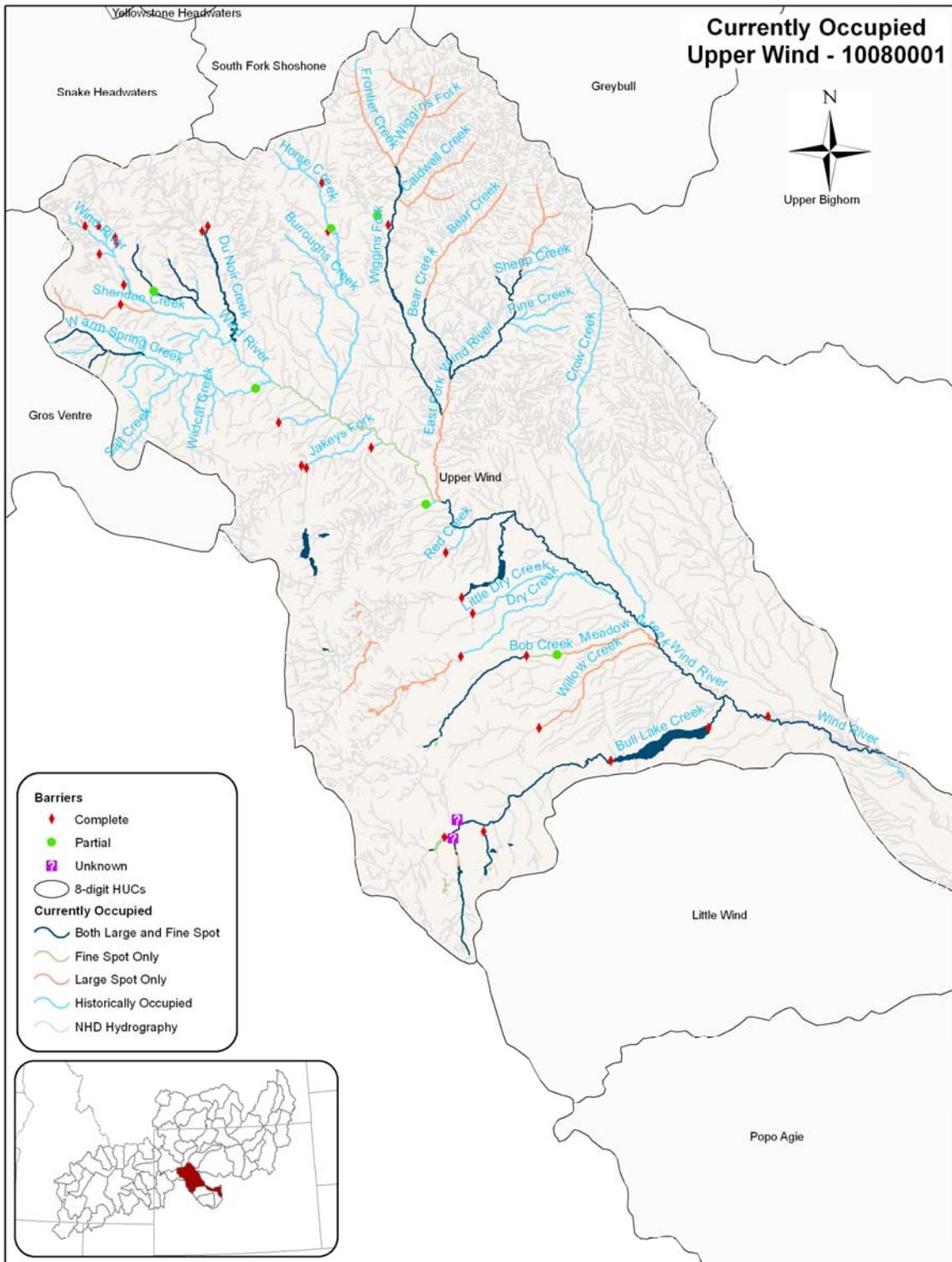
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10070008cp001				Local	

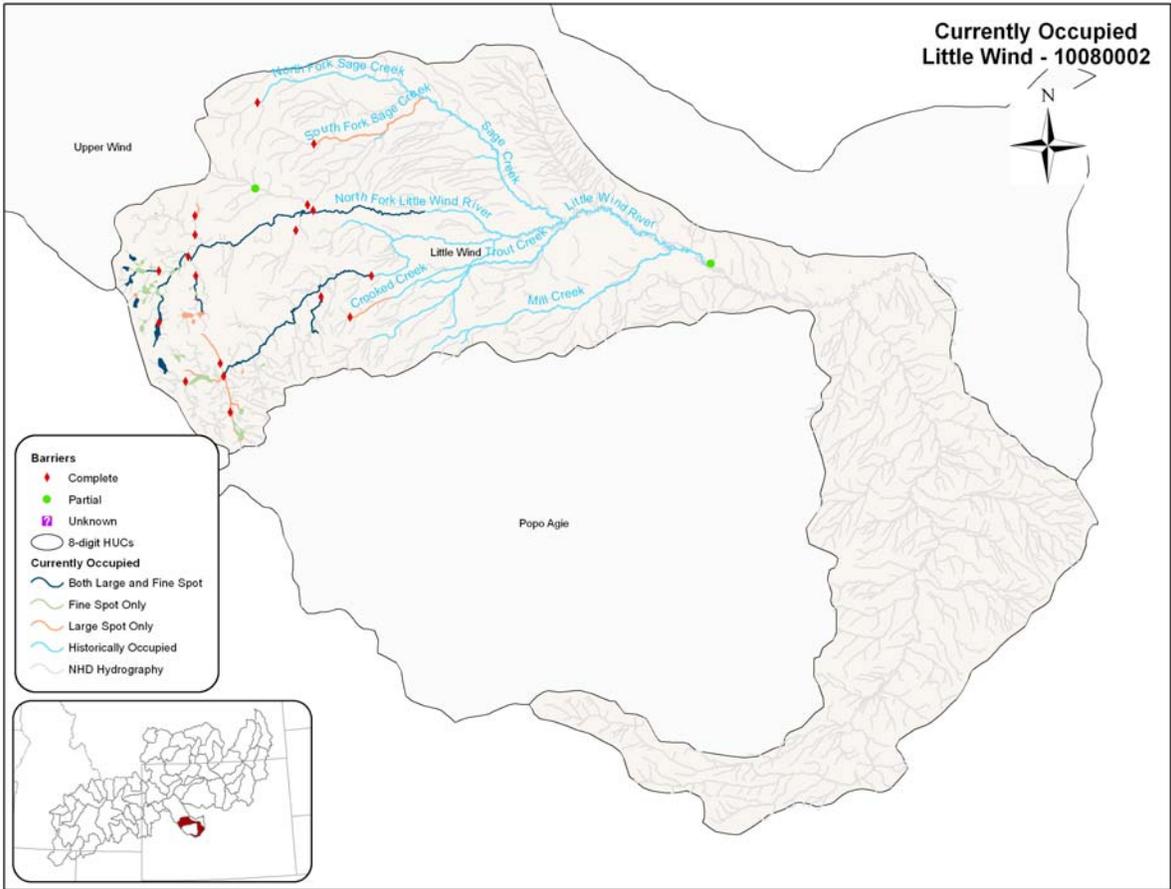
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10070008cp001	6.57	10.57			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10070008cp001	Large Spot Only	6.57	0	1	4	3	4	2	3

Bighorn Geographical Management Unit

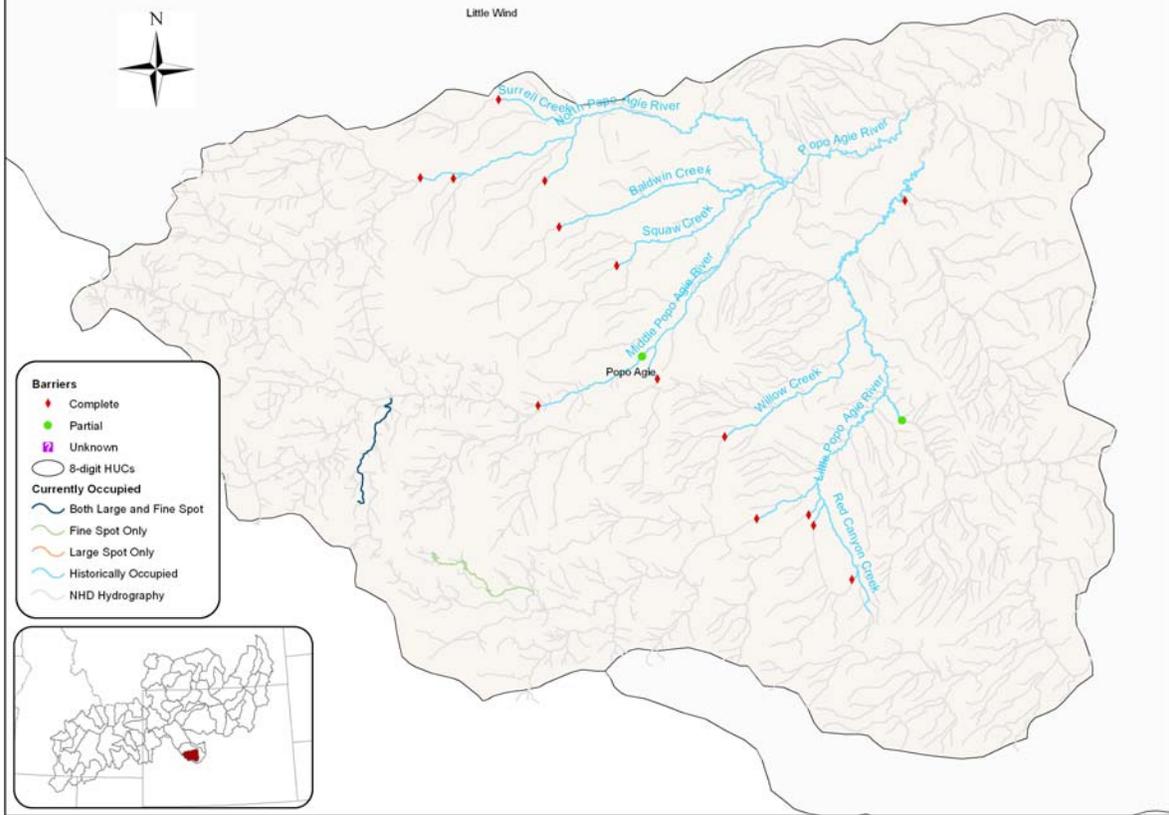
The Lower Yellowstone GMU contains 13 4th level HUCs. The upper most watershed encompasses the headwaters of the Wind River and contains both historical and currently occupied habitat. The remaining watersheds are part of the Bighorn River drainage. The upper Tongue is included in this GMU for convenience.

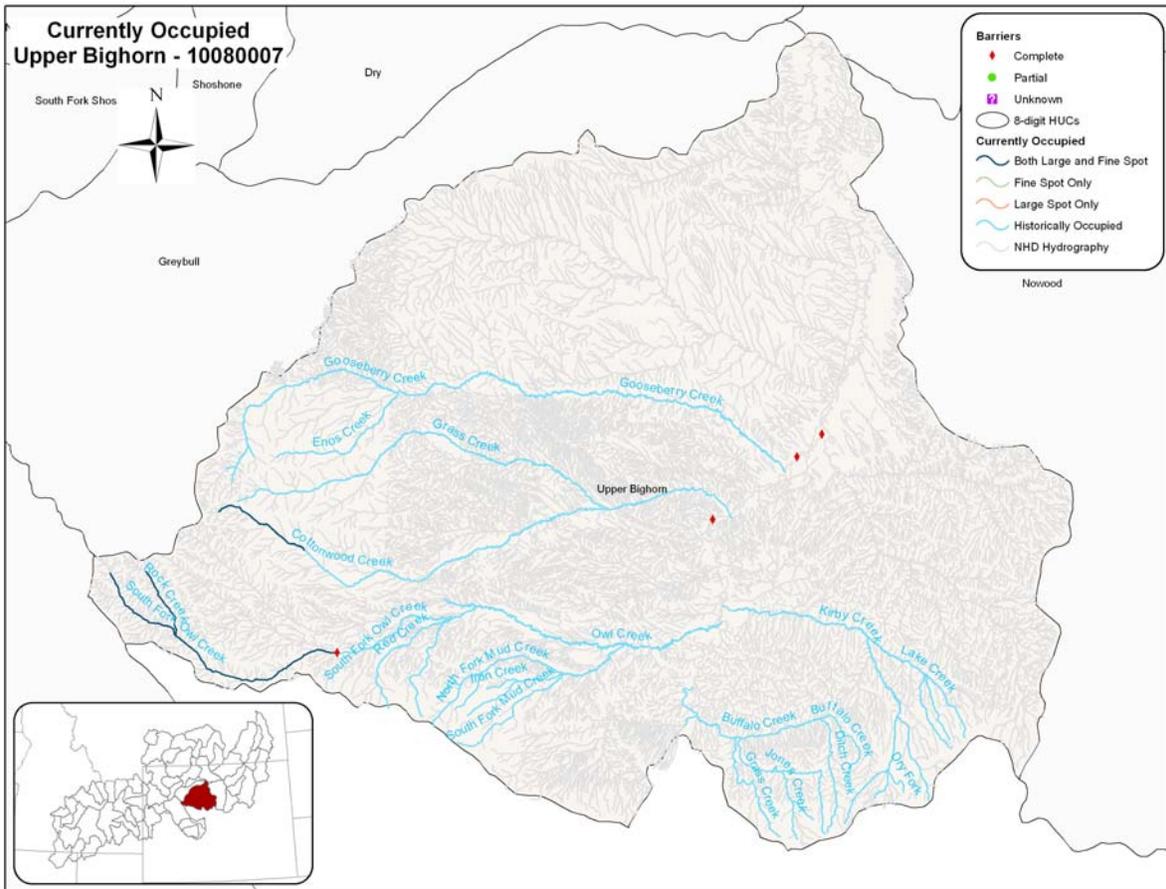


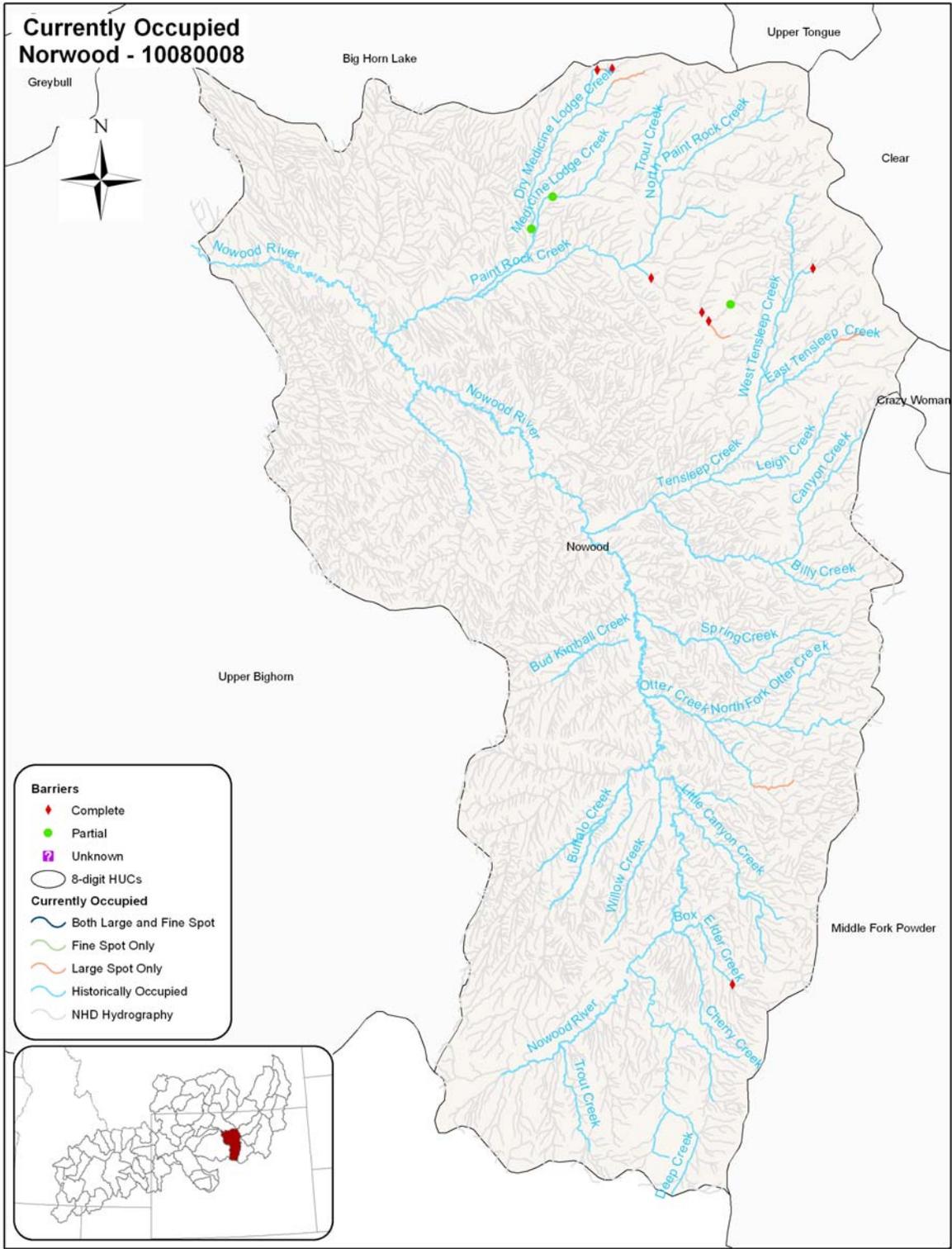


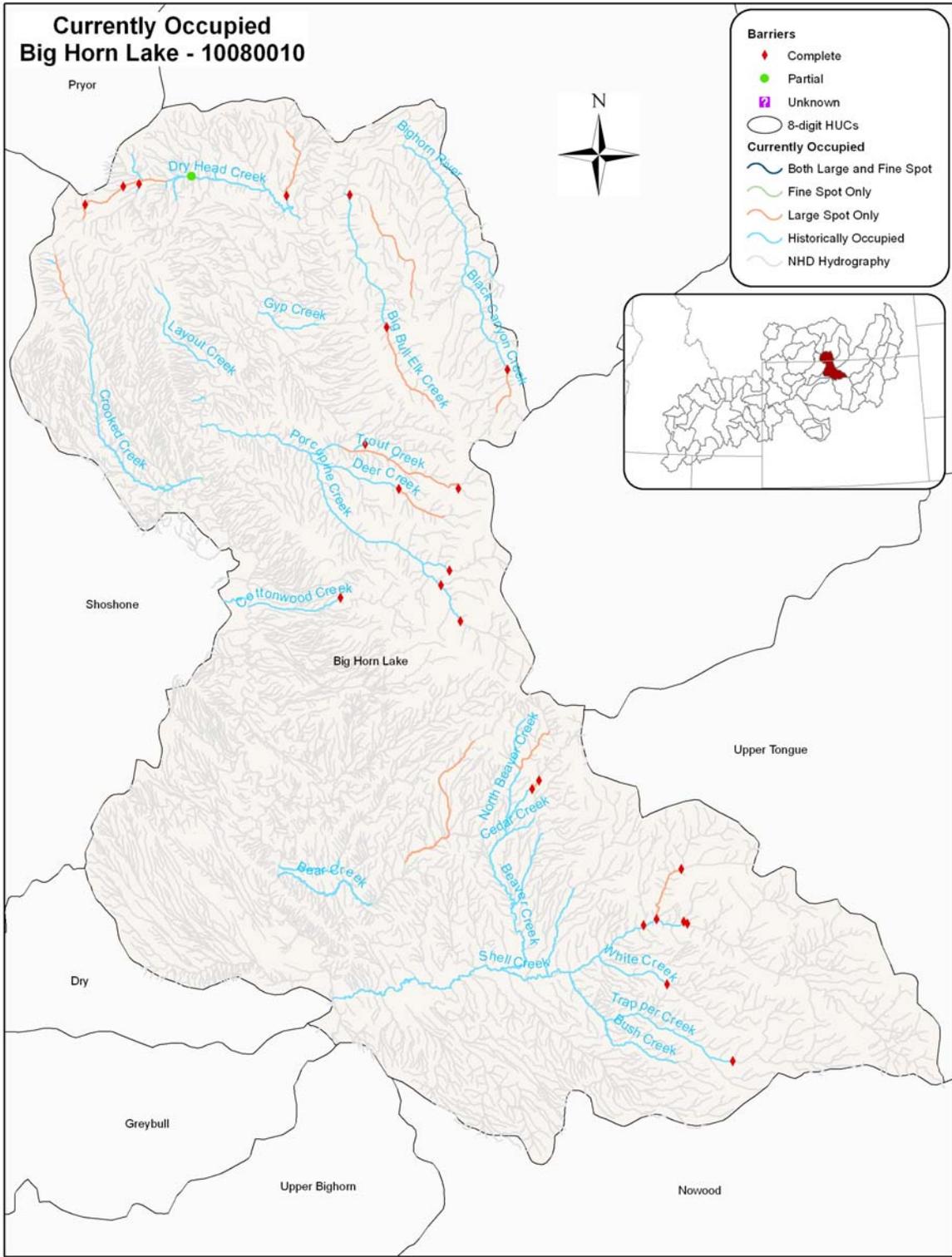
Currently Occupied Popo Agie - 10080003

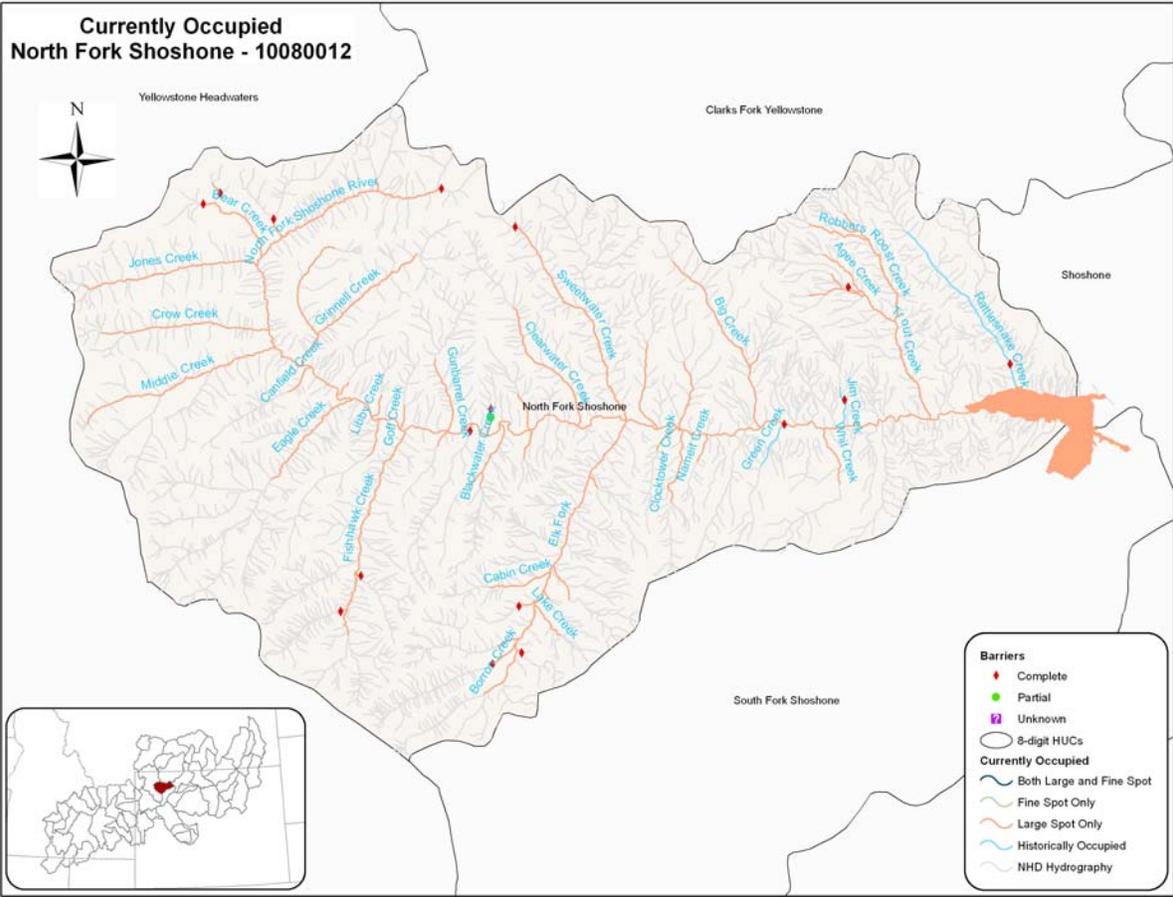
Upper Wind

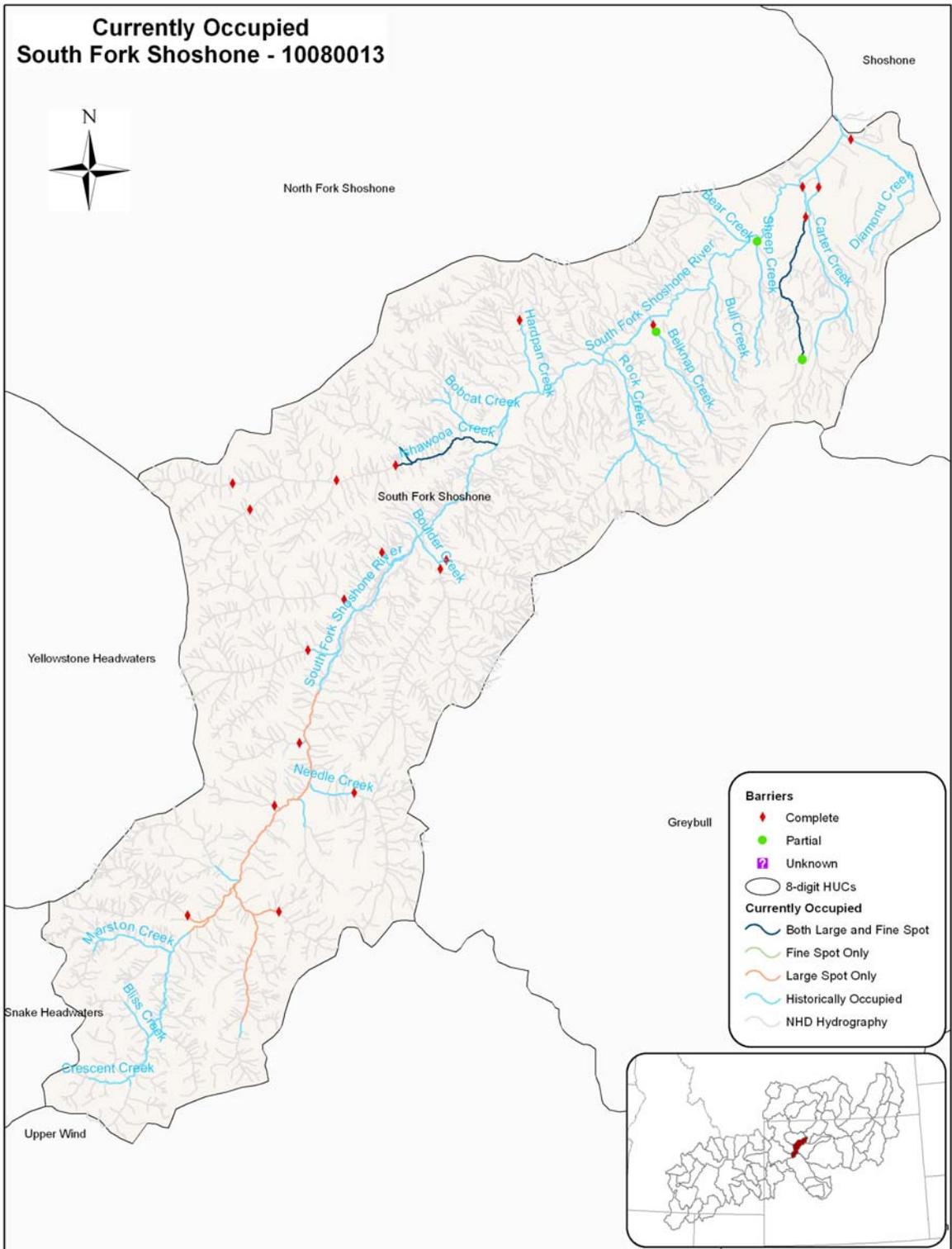


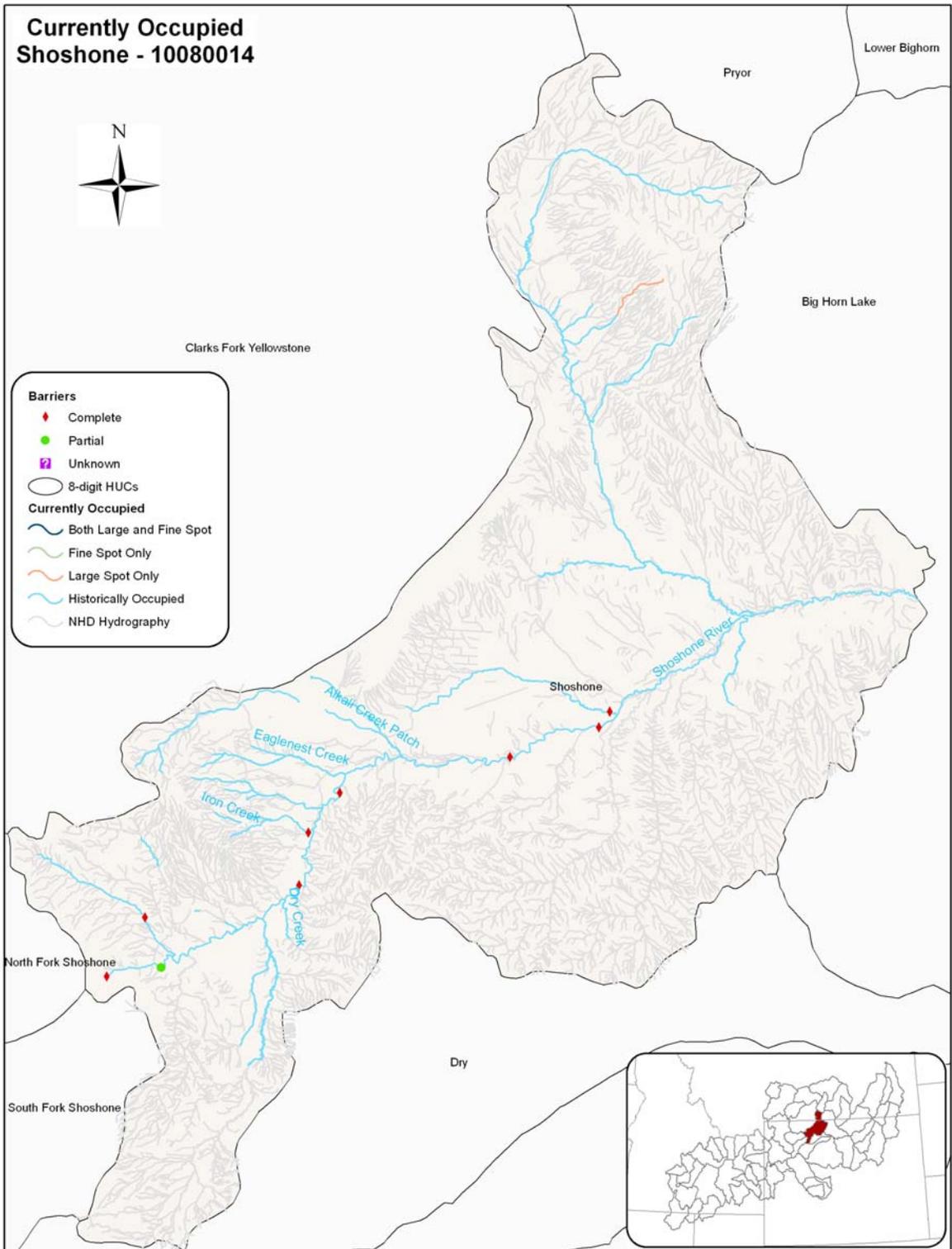




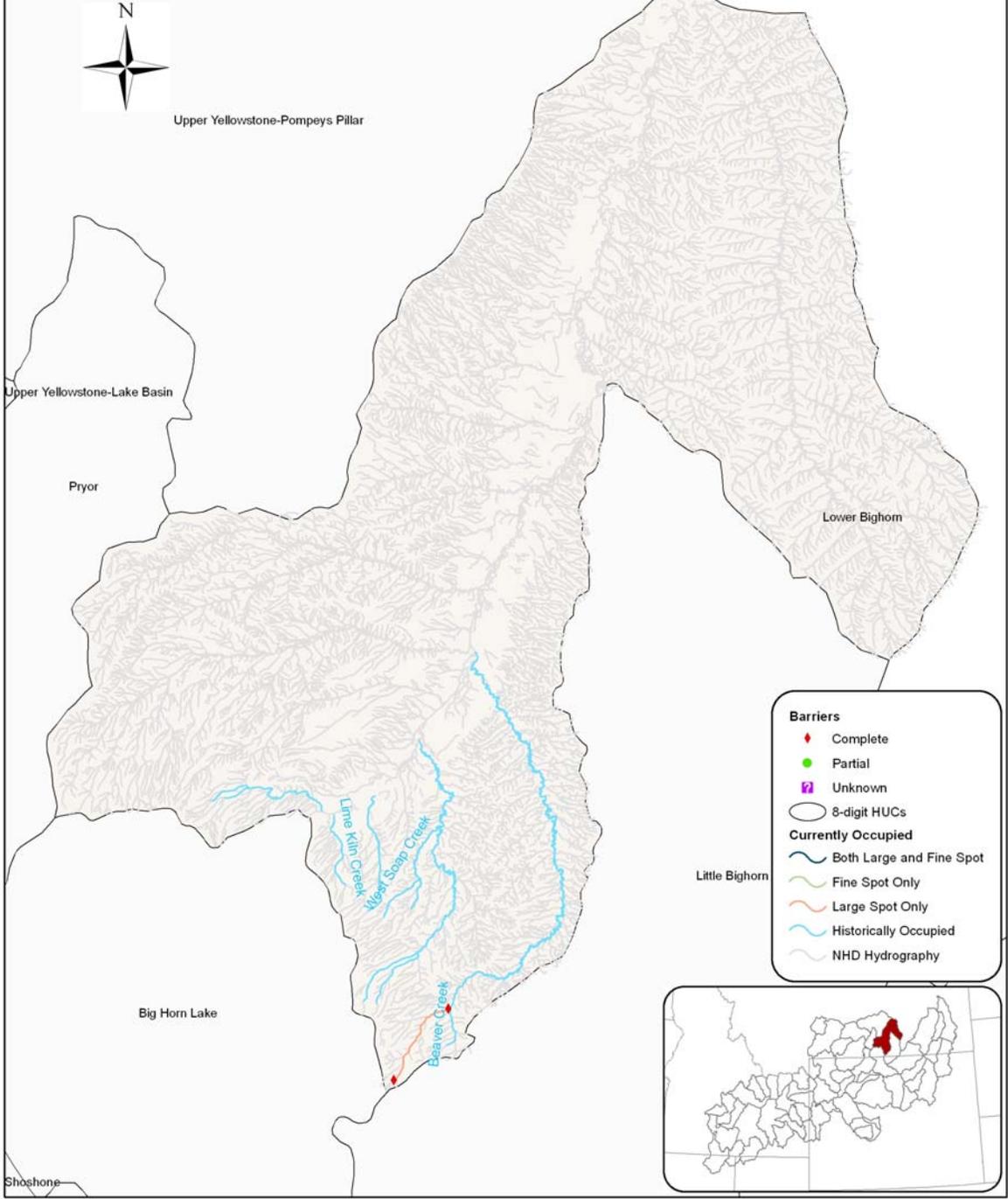


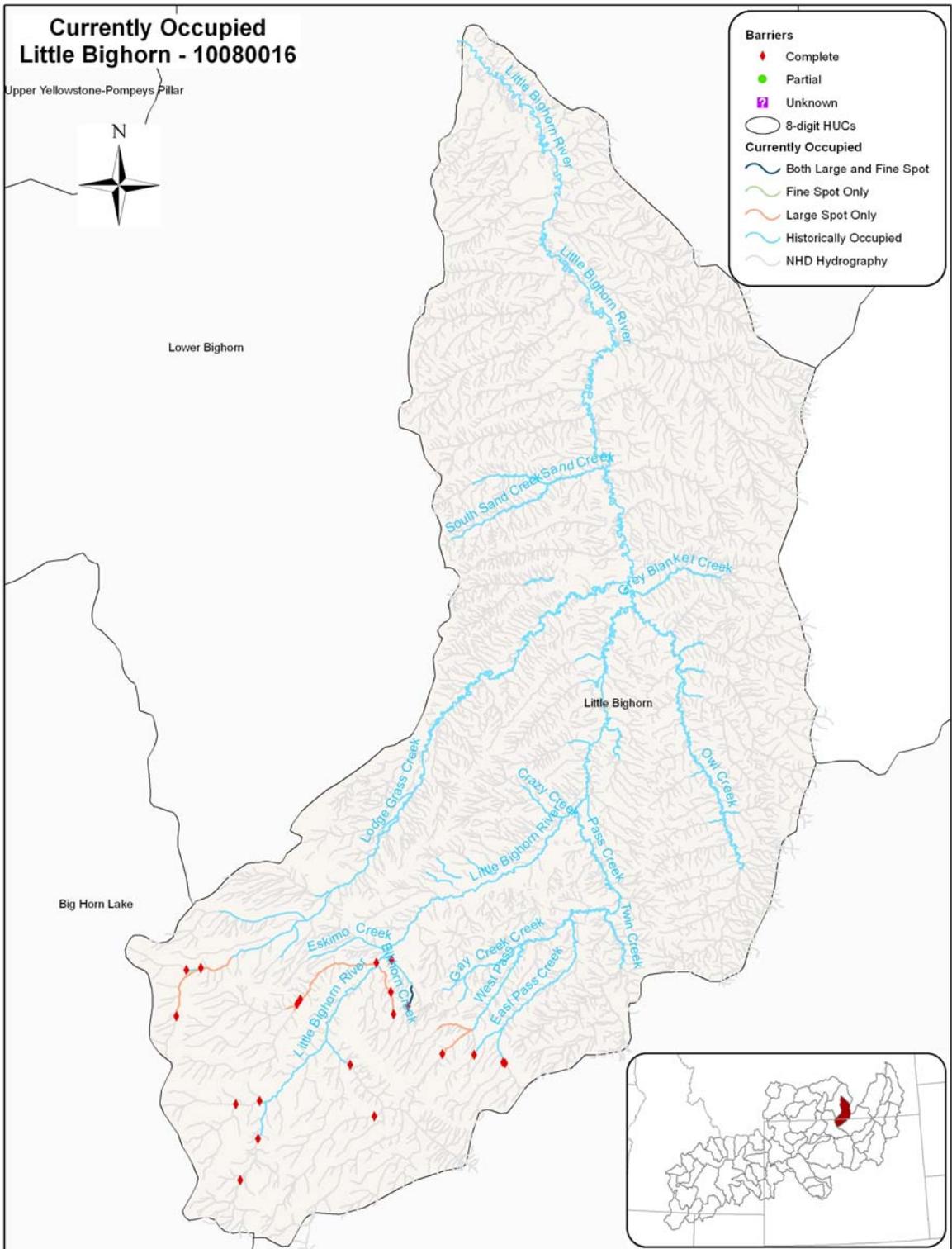


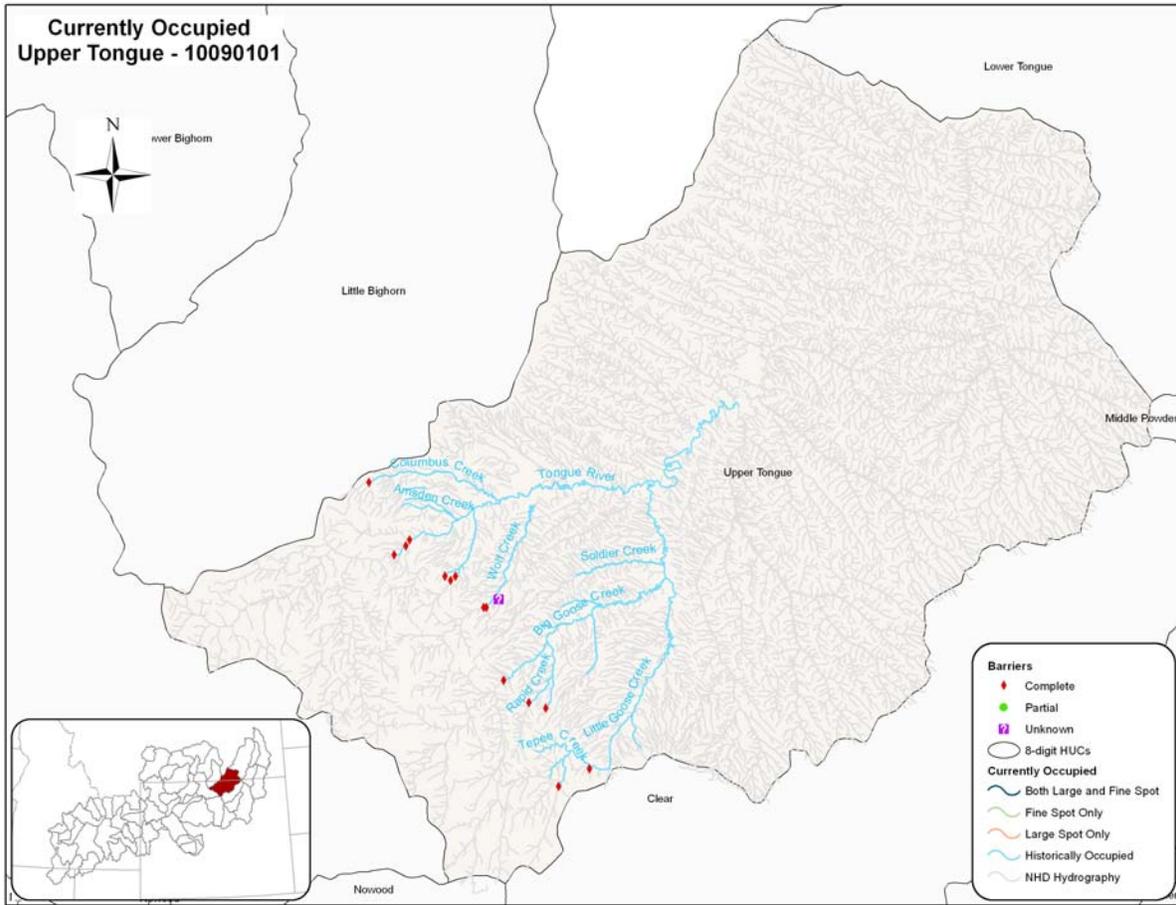




**Currently Occupied
Lower Bighorn - 10080015**







**Lower Yellowstone – Bighorn GMU
Historic**

Name	ID #	Historical Miles	Historically Occupied Miles	Historical Lakes	Lake Acres
Upper Wind	10080001	548.89			
Little Wind	10080002	178.68			
Popo Agie	10080003	129.8			
Upper Bighorn	10080007	629.5			
Nowood	10080008	555.45			
Greybull	10080009	311.53			
Big Horn Lake	10080010	277.76			
North Fork Shoshone	10080012	270.78			
South Fork Shoshone	10080013	183			
Shoshone	10080014	319.91			
Lower Bighorn	10080015	172.48			
Little Bighorn	10080016	422.48			
Upper Tongue	10090101	223.56			

**Current Distribution
Lower Yellowstone - Bighorn GMU**

Name	ID #	Spotting Pattern	Currently Occupied Miles	Currently Occupied KM
Upper Wind	10080001	Both Large and Fine Spot	198.02	318.49
Upper Wind	10080001	Fine Spot Only	24.33	39.2
Upper Wind	10080001	Large Spot Only	123	198.04
Little Wind	10080002	Both Large and Fine Spot	46.98	75.55
Little Wind	10080002	Fine Spot Only	0.31	0.5
Little Wind	10080002	Large Spot Only	23.29	37.49
Popo Agie	10080003	Both Large and Fine Spot	5.67	9.1
Popo Agie	10080003	Fine Spot Only	4.42	7.13
Upper Bighorn	10080007	Both Large and Fine Spot	44.22	71.13
Nowood	10080008	Large Spot Only	11.22	18.09
Greybull	10080009	Both Large and Fine Spot	142.13	228.7
Greybull	10080009	Large Spot Only	89.09	143.38
Big Horn Lake	10080010	Large Spot Only	64.49	103.81
North Fork Shoshone	10080012	Large Spot Only	253.3	407.73
South Fork Shoshone	10080013	Both Large and Fine Spot	14.06	22.69
South Fork Shoshone	10080013	Large Spot Only	23.56	37.97
Shoshone	10080014	Large Spot Only	4.14	6.66
Lower Bighorn	10080015	Large Spot Only	7.04	11.33
Little Bighorn	10080016	Both Large and Fine Spot	1.25	2.01

Little Bighorn	10080016	Large Spot Only	20.04	32.26
Upper Tongue	10090101	Large Spot Only	0.57	0.92

Name	HUC8	Spotting Pattern	Count of Lakes	Lake Acres
Upper Wind	10080001	Both Large and Fine Spot	11	4457.53
Upper Wind	10080001	Fine Spot Only	21	343.67
Upper Wind	10080001	Large Spot Only Both Large and Fine	26	388.12
Little Wind	10080002	Spot	8	584.4
Little Wind	10080002	Fine Spot Only	26	1010.97
Little Wind	10080002	Large Spot Only	9	252.33
Popo Agie	10080003	Fine Spot Only	3	62.53
Nowood	10080008	Large Spot Only	1	5.55
North Fork Shoshone	10080012	Large Spot Only	2	6526.44

Name	HUC8	Spotting	Origin	Life History	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	Restored - human restoration to start population	Combination	48.4
Upper Wind	10080001	Both Large and Fine Spot	Restored - human restoration to start population	Migratory	121.14
Upper Wind	10080001	Both Large and Fine Spot	Restored - human restoration to start population	Non migratory	17.21
Upper Wind	10080001	Both Large and Fine Spot	Unknown	Non migratory	11.27
Upper Wind	10080001	Fine Spot Only	Restored - human restoration to start population	Combination	2.38
Upper Wind	10080001	Fine Spot Only	Restored - human restoration to start population	Migratory	21.95
Upper Wind	10080001	Large Spot Only	Aboriginal - naturally occurring population	Migratory	61.55
Upper Wind	10080001	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	0.64
Upper Wind	10080001	Large Spot Only	Restored - human restoration to start population	Combination	13.79
Upper Wind	10080001	Large Spot Only	Restored - human restoration to start population	Migratory	47.02
Little Wind	10080002	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	8.6
Little Wind	10080002	Both Large and Fine Spot	Restored - human restoration to start population	Combination	38.38
Little Wind	10080002	Fine Spot Only	Restored - human restoration to start population	Combination	0.31
Little Wind	10080002	Large Spot Only	Aboriginal - naturally occurring population	Combination	2.95
Little Wind	10080002	Large Spot Only	Restored - human restoration to start population	Combination	8.29
Little Wind	10080002	Large Spot Only	Restored - human restoration to start population	Migratory	11.11
Little Wind	10080002	Large Spot Only	Restored - human restoration to start population	Non migratory	0.94
Popo Agie	10080003	Both Large and Fine Spot	Restored - human restoration to start population	Migratory	5.67
Popo Agie	10080003	Fine Spot Only	Restored - human restoration to start population	Combination	4.42

Upper Bighorn	10080007	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	44.22
Nowood	10080008	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	1.03
Nowood	10080008	Large Spot Only	Restored - human restoration to start population	Non migratory	7.74
Nowood	10080008	Large Spot Only	Unknown	Non migratory	2.45
Greybull	10080009	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	31.14
Greybull	10080009	Both Large and Fine Spot	Aboriginal - naturally occurring population	Migratory	94.98
Greybull	10080009	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	16.01
Greybull	10080009	Large Spot Only	Aboriginal - naturally occurring population	Migratory	74.65
Greybull	10080009	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	13.41
Greybull	10080009	Large Spot Only	Aboriginal - naturally occurring population	Unknown	1.03
Big Horn Lake	10080010	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	18.75
Big Horn Lake	10080010	Large Spot Only	Restored - human restoration to start population	Non migratory	45.74
North Fork Shoshone	10080012	Large Spot Only	Aboriginal - naturally occurring population	Combination	251.4
North Fork Shoshone	10080012	Large Spot Only	Aboriginal - naturally occurring population	Migratory	1.41
North Fork Shoshone	10080012	Large Spot Only	Restored - human restoration to start population	Migratory	0.49
South Fork Shoshone	10080013	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	14.06
South Fork Shoshone	10080013	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	23.56
Shoshone	10080014	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	4.14
Lower Bighorn	10080015	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	7.04
Little Bighorn	10080016	Both Large and Fine Spot	Unknown	Non migratory	1.25
Little Bighorn	10080016	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	13.27

Little Bighorn	10080016	Large Spot Only	Restored - human restoration to start population	Non migratory	6.77
Upper Tongue	10090101	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	0.57

Name	HUC8	Spotting	Origin	Life History	Acres	Count of Lakes
Upper Wind	10080001	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	2942.13	1
Upper Wind	10080001	Both Large and Fine Spot	Restored - human restoration to start population	Combination	778.22	7
Upper Wind	10080001	Both Large and Fine Spot	Restored - human restoration to start population	Non migratory	737.18	3
Upper Wind	10080001	Fine Spot Only	Restored - human restoration to start population	Combination	343.67	21
Upper Wind	10080001	Large Spot Only	Restored - human restoration to start population	Combination	384.18	25
Upper Wind	10080001	Large Spot Only	Unknown	Non migratory	3.94	1
Little Wind	10080002	Both Large and Fine Spot	Restored - human restoration to start population	Combination	584.4	8
Little Wind	10080002	Fine Spot Only	Restored - human restoration to start population	Combination	1000.75	24
Little Wind	10080002	Fine Spot Only	Restored - human restoration to start population	Non migratory	10.22	2
Little Wind	10080002	Large Spot Only	Restored - human restoration to start population	Combination	252.33	9
Popo Agie	10080003	Fine Spot Only	Restored - human restoration to start population	Combination	62.53	3
Nowood	10080008	Large Spot Only	Restored - human restoration to start population	Non migratory	5.55	1
North Fork Shoshone	10080012	Large Spot Only	Aboriginal - naturally occurring population	Migratory	6517.66	1
North Fork Shoshone	10080012	Large Spot Only	Restored - human restoration to start population	Migratory	8.78	1

Name	HUC8	Spotting	Stocking	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	No Record	32.19
Upper Wind	10080001	Both Large and Fine Spot	Non-Native Stocking	165.83
Upper Wind	10080001	Fine Spot Only	No Record	1.88
Upper Wind	10080001	Fine Spot Only	Non-Native Stocking	22.45
Upper Wind	10080001	Large Spot Only	No Record	46.06
Upper Wind	10080001	Large Spot Only	Non-Native Stocking	76.94
Little Wind	10080002	Both Large and Fine Spot	No Record	3.93
Little Wind	10080002	Both Large and Fine Spot	Non-Native Stocking	42.85
Little Wind	10080002	Both Large and Fine Spot	YCT Stocking only	0.2
Little Wind	10080002	Fine Spot Only	No Record	0.31
Little Wind	10080002	Large Spot Only	No Record	11.24
Little Wind	10080002	Large Spot Only	Non-Native Stocking	11.11
Little Wind	10080002	Large Spot Only	YCT Stocking only	0.94
Popo Agie	10080003	Both Large and Fine Spot	No Record	5.67
Popo Agie	10080003	Fine Spot Only	Non-Native Stocking	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	Non-Native Stocking	44.22
Nowood	10080008	Large Spot Only	No Record	3.48
Nowood	10080008	Large Spot Only	Non-Native Stocking	2.63
Nowood	10080008	Large Spot Only	YCT Stocking only	5.11
Greybull	10080009	Both Large and Fine Spot	No Record	9.22
Greybull	10080009	Both Large and Fine Spot	Non-Native Stocking	71.16
Greybull	10080009	Both Large and Fine Spot	YCT Stocking only	61.75
Greybull	10080009	Large Spot Only	No Record	62.36
Greybull	10080009	Large Spot Only	Non-Native Stocking	26.73
Big Horn Lake	10080010	Large Spot Only	No Record	23.84
Big Horn Lake	10080010	Large Spot Only	Non-Native Stocking	3.52
Big Horn Lake	10080010	Large Spot Only	YCT Stocking only	37.13
North Fork Shoshone	10080012	Large Spot Only	No Record	80.16
North Fork Shoshone	10080012	Large Spot Only	Non-Native Stocking	173.14
South Fork Shoshone	10080013	Both Large and Fine Spot	No Record	0.94

South Fork Shoshone	10080013	Both Large and Fine Spot	Non-Native Stocking	5.43
South Fork Shoshone	10080013	Both Large and Fine Spot	YCT Stocking only	7.69
South Fork Shoshone	10080013	Large Spot Only	No Record	23.56
Shoshone	10080014	Large Spot Only	Non-Native Stocking	4.14
Lower Bighorn	10080015	Large Spot Only	No Record	7.04
Little Bighorn	10080016	Both Large and Fine Spot	No Record	1.25
Little Bighorn	10080016	Large Spot Only	No Record	5.4
Little Bighorn	10080016	Large Spot Only	Non-Native Stocking	12.53
Little Bighorn	10080016	Large Spot Only	YCT Stocking only	2.11
Upper Tongue	10090101	Large Spot Only	Non-Native Stocking	0.57

Name	HUC8	Spotting	Stocking	Acres
Upper Wind	10080001	Both Large and Fine Spot	No Record	340.84
Upper Wind	10080001	Both Large and Fine Spot	Non-Native Stocking	4056.53
Upper Wind	10080001	Both Large and Fine Spot	YCT Stocking only	60.16
Upper Wind	10080001	Fine Spot Only	No Record	35.93
Upper Wind	10080001	Fine Spot Only	Non-Native Stocking	231.57
Upper Wind	10080001	Fine Spot Only	YCT Stocking only	76.17
Upper Wind	10080001	Large Spot Only	No Record	236.48
Upper Wind	10080001	Large Spot Only	Non-Native Stocking	77.48
Upper Wind	10080001	Large Spot Only	YCT Stocking only	74.16
Little Wind	10080002	Both Large and Fine Spot	Non-Native Stocking	199.81
Little Wind	10080002	Both Large and Fine Spot	YCT Stocking only	384.59
Little Wind	10080002	Fine Spot Only	No Record	250.82
Little Wind	10080002	Fine Spot Only	Non-Native Stocking	424.48
Little Wind	10080002	Fine Spot Only	YCT Stocking only	335.67
Little Wind	10080002	Large Spot Only	Non-Native Stocking	167.42
Little Wind	10080002	Large Spot Only	YCT Stocking only	84.91
Popo Agie	10080003	Fine Spot Only	Non-Native Stocking	62.53

Nowood	10080008	Large Spot Only	Non-Native Stocking	5.55
North Fork Shoshone	10080012	Large Spot Only	No Record	8.78
North Fork Shoshone	10080012	Large Spot Only	Non-Native Stocking	6517.66

Name	HUC8	Spotting	Genetics	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	Not Tested - Suspected Unaltered	25.61
Upper Wind	10080001	Both Large and Fine Spot	Not Tested - Suspected Hybridized	172.41
Upper Wind	10080001	Fine Spot Only	Not Tested - Suspected Hybridized	24.33
Upper Wind	10080001	Large Spot Only	Unaltered (< 1%)	60.42
Upper Wind	10080001	Large Spot Only	Not Tested - Suspected Unaltered	15.88
Upper Wind	10080001	Large Spot Only	Not Tested - Suspected Hybridized	46.7
Little Wind	10080002	Both Large and Fine Spot	Not Tested - Suspected Unaltered	35.87
Little Wind	10080002	Both Large and Fine Spot	Not Tested - Suspected Hybridized	11.11
Little Wind	10080002	Fine Spot Only	Not Tested - Suspected Unaltered	0.31
Little Wind	10080002	Large Spot Only	Not Tested - Suspected Unaltered	23.29
Popo Agie	10080003	Both Large and Fine Spot	Not Tested - Suspected Hybridized	5.67
Popo Agie	10080003	Fine Spot Only	Not Tested - Suspected Hybridized	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	Not Tested - Suspected Hybridized	44.22
Nowood	10080008	Large Spot Only	Not Tested - Suspected Unaltered	11.22
Greybull	10080009	Both Large and Fine Spot	Unaltered (< 1%)	14.74
Greybull	10080009	Both Large and Fine Spot	Not Tested - Suspected Unaltered	127.39
Greybull	10080009	Large Spot Only	Unaltered (< 1%)	55.98
Greybull	10080009	Large Spot Only	Not Tested - Suspected Unaltered	33.11
Big Horn Lake	10080010	Large Spot Only	Unaltered (< 1%)	26.77
Big Horn Lake	10080010	Large Spot Only	>1% and <=10%	16.96
Big Horn Lake	10080010	Large Spot Only	Not Tested - Suspected Unaltered	16.94
Big Horn Lake	10080010	Large Spot Only	Not Tested - Suspected Hybridized	3.82
North Fork Shoshone	10080012	Large Spot Only	Unaltered (< 1%)	18.84
North Fork Shoshone	10080012	Large Spot Only	>10% and <=25%	8.38
North Fork Shoshone	10080012	Large Spot Only	>25%	32.38
North Fork Shoshone	10080012	Large Spot Only	Not Tested - Suspected Hybridized	182.4
North Fork Shoshone	10080012	Large Spot Only	Co-existence	11.3
South Fork Shoshone	10080013	Both Large and Fine Spot	Unaltered (< 1%)	7.69
South Fork Shoshone	10080013	Both Large and Fine Spot	>10% and <=25%	6.37
South Fork Shoshone	10080013	Large Spot Only	Unaltered (< 1%)	23.56
Shoshone	10080014	Large Spot Only	Unaltered (< 1%)	4.14

Lower Bighorn	10080015	Large Spot Only	Unaltered (< 1%)	7.04
Little Bighorn	10080016	Both Large and Fine Spot	Unaltered (< 1%)	1.25
Little Bighorn	10080016	Large Spot Only	Unaltered (< 1%)	12.3
Little Bighorn	10080016	Large Spot Only	Not Tested - Suspected Hybridized	7.74
Upper Tongue	10090101	Large Spot Only	Unaltered (< 1%)	0.57

Name	HUC8	Spotting	Genetics	Acres	Count of Lakes
Upper Wind	10080001	Both Large and Fine Spot	Not Tested - Suspected Unaltered	20.16	1
Upper Wind	10080001	Both Large and Fine Spot	Not Tested - Suspected Hybridized	4437.37	10
Upper Wind	10080001	Fine Spot Only	Not Tested - Suspected Unaltered	157.74	19
Upper Wind	10080001	Fine Spot Only	Not Tested - Suspected Hybridized	185.93	2
Upper Wind	10080001	Large Spot Only	>25%	51.38	1
Upper Wind	10080001	Large Spot Only	Not Tested - Suspected Unaltered	121.63	8
Upper Wind	10080001	Large Spot Only	Not Tested - Suspected Hybridized	215.11	17
Little Wind	10080002	Both Large and Fine Spot	Not Tested - Suspected Unaltered	584.4	8
Little Wind	10080002	Fine Spot Only	Not Tested - Suspected Unaltered	921.46	25
Little Wind	10080002	Fine Spot Only	Not Tested - Suspected Hybridized	89.51	1
Little Wind	10080002	Large Spot Only	Not Tested - Suspected Unaltered	252.33	9
Popo Agie	10080003	Fine Spot Only	Not Tested - Suspected Hybridized	62.53	3
Nowood	10080008	Large Spot Only	Not Tested - Suspected Unaltered	5.55	1
North Fork Shoshone	10080012	Large Spot Only	Unaltered (< 1%)	8.78	1
North Fork Shoshone	10080012	Large Spot Only	Not Tested - Suspected Hybridized	6517.66	1

Name	HUC8	Spotting	Population Density	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	151 to 400 fish	37.74
Upper Wind	10080001	Both Large and Fine Spot	50 to 150 fish	41.49
Upper Wind	10080001	Both Large and Fine Spot	0 to 50 fish	117.37
Upper Wind	10080001	Both Large and Fine Spot	Unknown	1.42

Upper Wind	10080001	Fine Spot Only	0 to 50 fish	24.33
Upper Wind	10080001	Large Spot Only	151 to 400 fish	23.05
Upper Wind	10080001	Large Spot Only	50 to 150 fish	48.52
Upper Wind	10080001	Large Spot Only	0 to 50 fish	51.43
Little Wind	10080002	Both Large and Fine Spot	50 to 150 fish	45.61
Little Wind	10080002	Both Large and Fine Spot	0 to 50 fish	1.37
Little Wind	10080002	Fine Spot Only	Unknown	0.31
Little Wind	10080002	Large Spot Only	0 to 50 fish	23.29
Popo Agie	10080003	Both Large and Fine Spot	0 to 50 fish	5.67
Popo Agie	10080003	Fine Spot Only	0 to 50 fish	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	50 to 150 fish	10.55
Upper Bighorn	10080007	Both Large and Fine Spot	0 to 50 fish	33.67
Nowood	10080008	Large Spot Only	151 to 400 fish	1.03
Nowood	10080008	Large Spot Only	50 to 150 fish	5.11
Nowood	10080008	Large Spot Only	0 to 50 fish	5.08
Greybull	10080009	Both Large and Fine Spot	151 to 400 fish	50.95
Greybull	10080009	Both Large and Fine Spot	50 to 150 fish	31.1
Greybull	10080009	Both Large and Fine Spot	0 to 50 fish	60.08
Greybull	10080009	Large Spot Only	151 to 400 fish	28.06
Greybull	10080009	Large Spot Only	50 to 150 fish	40.19
Greybull	10080009	Large Spot Only	0 to 50 fish	16.46
Greybull	10080009	Large Spot Only	Unknown	4.38
Big Horn Lake	10080010	Large Spot Only	401 to 1000 fish	0.75
Big Horn Lake	10080010	Large Spot Only	151 to 400 fish	28.91
Big Horn Lake	10080010	Large Spot Only	50 to 150 fish	17.89
Big Horn Lake	10080010	Large Spot Only	0 to 50 fish	16.94
North Fork Shoshone	10080012	Large Spot Only	50 to 150 fish	69.35
North Fork Shoshone	10080012	Large Spot Only	0 to 50 fish	183.95
South Fork Shoshone	10080013	Both Large and Fine Spot	151 to 400 fish	7.69
South Fork Shoshone	10080013	Both Large and Fine Spot	50 to 150 fish	6.37
South Fork Shoshone	10080013	Large Spot Only	401 to 1000 fish	14.27
South Fork Shoshone	10080013	Large Spot Only	151 to 400 fish	7
South Fork Shoshone	10080013	Large Spot Only	50 to 150 fish	2.29
Shoshone	10080014	Large Spot Only	0 to 50 fish	4.14
Lower Bighorn	10080015	Large Spot Only	50 to 150 fish	7.04
Little Bighorn	10080016	Both Large and Fine Spot	151 to 400 fish	1.25
Little Bighorn	10080016	Large Spot Only	151 to 400 fish	7.87
Little Bighorn	10080016	Large Spot Only	50 to 150 fish	3.55

Little Bighorn	10080016	Large Spot Only	0 to 50 fish	2.74
Little Bighorn	10080016	Large Spot Only	Unknown	5.88
Upper Tongue	10090101	Large Spot Only	50 to 150 fish	0.57

Name	HUC8	Spotting	Habitat	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	Excellent	39.15
Upper Wind	10080001	Both Large and Fine Spot	Good	32.59
Upper Wind	10080001	Both Large and Fine Spot	Fair	87.32
Upper Wind	10080001	Both Large and Fine Spot	Poor	38.96
Upper Wind	10080001	Fine Spot Only	Good	4.26
Upper Wind	10080001	Fine Spot Only	Fair	20.07
Upper Wind	10080001	Large Spot Only	Good	59
Upper Wind	10080001	Large Spot Only	Fair	59.85
Upper Wind	10080001	Large Spot Only	Poor	4.15
Little Wind	10080002	Both Large and Fine Spot	Excellent	15.12
Little Wind	10080002	Both Large and Fine Spot	Good	31.86
Little Wind	10080002	Fine Spot Only	Unknown	0.31
Little Wind	10080002	Large Spot Only	Good	7.3
Little Wind	10080002	Large Spot Only	Fair	11.11
Little Wind	10080002	Large Spot Only	Unknown	4.88
Popo Agie	10080003	Both Large and Fine Spot	Good	5.67
Popo Agie	10080003	Fine Spot Only	Good	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	Good	10.55
Upper Bighorn	10080007	Both Large and Fine Spot	Fair	33.67
Nowood	10080008	Large Spot Only	Good	5.82
Nowood	10080008	Large Spot Only	Fair	2.45
Nowood	10080008	Large Spot Only	Poor	2.95
Greybull	10080009	Both Large and Fine Spot	Good	45.02
Greybull	10080009	Both Large and Fine Spot	Fair	87.71
Greybull	10080009	Both Large and Fine Spot	Poor	9.4
Greybull	10080009	Large Spot Only	Good	57.61
Greybull	10080009	Large Spot Only	Fair	31.48
Big Horn Lake	10080010	Large Spot Only	Excellent	2.94
Big Horn Lake	10080010	Large Spot Only	Good	40.75
Big Horn Lake	10080010	Large Spot Only	Fair	20.8

North Fork Shoshone	10080012	Large Spot Only	Excellent	56.16
North Fork Shoshone	10080012	Large Spot Only	Good	197.14
South Fork Shoshone	10080013	Both Large and Fine Spot	Good	14.06
South Fork Shoshone	10080013	Large Spot Only	Good	23.56
Shoshone	10080014	Large Spot Only	Fair	4.14
Lower Bighorn	10080015	Large Spot Only	Fair	7.04
Little Bighorn	10080016	Both Large and Fine Spot	Good	1.25
Little Bighorn	10080016	Large Spot Only	Good	18.74
Little Bighorn	10080016	Large Spot Only	Fair	1.3
Upper Tongue	10090101	Large Spot Only	Poor	0.57

Name	HUC8	Spotting	Width	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	> 50 feet	90.22
Upper Wind	10080001	Both Large and Fine Spot	25 to 50 feet	63.55
Upper Wind	10080001	Both Large and Fine Spot	15 to 25 feet	26.04
Upper Wind	10080001	Both Large and Fine Spot	5 to 15 feet	18.21
Upper Wind	10080001	Fine Spot Only	> 50 feet	20.07
Upper Wind	10080001	Fine Spot Only	15 to 25 feet	2.38
Upper Wind	10080001	Fine Spot Only	5 to 15 feet	1.88
Upper Wind	10080001	Large Spot Only	> 50 feet	11.64
Upper Wind	10080001	Large Spot Only	25 to 50 feet	27.71
Upper Wind	10080001	Large Spot Only	15 to 25 feet	23.23
Upper Wind	10080001	Large Spot Only	5 to 15 feet	59.78
Upper Wind	10080001	Large Spot Only	< 5 feet	0.64
Little Wind	10080002	Both Large and Fine Spot	25 to 50 feet	23.72
Little Wind	10080002	Both Large and Fine Spot	15 to 25 feet	19.73
Little Wind	10080002	Both Large and Fine Spot	5 to 15 feet	3.53
Little Wind	10080002	Fine Spot Only	5 to 15 feet	0.31
Little Wind	10080002	Large Spot Only	5 to 15 feet	22.35
Little Wind	10080002	Large Spot Only	< 5 feet	0.94
Popo Agie	10080003	Both Large and Fine Spot	5 to 15 feet	5.67
Popo Agie	10080003	Fine Spot Only	5 to 15 feet	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	5 to 15 feet	44.22
Nowood	10080008	Large Spot Only	5 to 15 feet	9.3
Nowood	10080008	Large Spot Only	< 5 feet	1.92
Greybull	10080009	Both Large and Fine Spot	> 50 feet	61.59

Greybull	10080009	Both Large and Fine Spot	15 to 25 feet	28.88
Greybull	10080009	Both Large and Fine Spot	5 to 15 feet	47.11
Greybull	10080009	Both Large and Fine Spot	< 5 feet	4.55
Greybull	10080009	Large Spot Only	25 to 50 feet	33.99
Greybull	10080009	Large Spot Only	15 to 25 feet	29.44
Greybull	10080009	Large Spot Only	5 to 15 feet	25.66
Big Horn Lake	10080010	Large Spot Only	15 to 25 feet	16.72
Big Horn Lake	10080010	Large Spot Only	5 to 15 feet	47.77
North Fork Shoshone	10080012	Large Spot Only	> 50 feet	56.16
North Fork Shoshone	10080012	Large Spot Only	25 to 50 feet	89.12
North Fork Shoshone	10080012	Large Spot Only	15 to 25 feet	53.33
North Fork Shoshone	10080012	Large Spot Only	5 to 15 feet	54.2
North Fork Shoshone	10080012	Large Spot Only	< 5 feet	0.49
South Fork Shoshone	10080013	Both Large and Fine Spot	15 to 25 feet	5.43
South Fork Shoshone	10080013	Both Large and Fine Spot	5 to 15 feet	8.63
South Fork Shoshone	10080013	Large Spot Only	25 to 50 feet	15.38
South Fork Shoshone	10080013	Large Spot Only	15 to 25 feet	7
South Fork Shoshone	10080013	Large Spot Only	5 to 15 feet	1.18
Shoshone	10080014	Large Spot Only	5 to 15 feet	4.14
Lower Bighorn	10080015	Large Spot Only	Unknown	7.04
Little Bighorn	10080016	Both Large and Fine Spot	15 to 25 feet	1.25
Little Bighorn	10080016	Large Spot Only	15 to 25 feet	12.53
Little Bighorn	10080016	Large Spot Only	5 to 15 feet	7.51
Upper Tongue	10090101	Large Spot Only	15 to 25 feet	0.57

Name	HUC8	Spotting	Non-Natives	Stream Mile
Upper Wind	10080001	Both Large and Fine Spot	Non-Natives are not Present	165.81
Upper Wind	10080001	Both Large and Fine Spot	Non-Natives are Present	32.21
Upper Wind	10080001	Fine Spot Only	Non-Natives are not Present	21.95
Upper Wind	10080001	Fine Spot Only	Non-Natives are Present	2.38
Upper Wind	10080001	Large Spot Only	Non-Natives are not Present	54.13
Upper Wind	10080001	Large Spot Only	Non-Natives are Present	68.87
Little Wind	10080002	Both Large and Fine Spot	Non-Natives are not Present	28.01
Little Wind	10080002	Both Large and Fine Spot	Non-Natives are Present	18.97
Little Wind	10080002	Fine Spot Only	Non-Natives are not Present	0.31
Little Wind	10080002	Large Spot Only	Non-Natives are not Present	2.87
Little Wind	10080002	Large Spot Only	Non-Natives are Present	20.42
Popo Agie	10080003	Both Large and Fine Spot	Non-Natives are Present	5.67
Popo Agie	10080003	Fine Spot Only	Non-Natives are Present	4.42
Upper Bighorn	10080007	Both Large and Fine Spot	Non-Natives are not Present	33.67
Upper Bighorn	10080007	Both Large and Fine Spot	Non-Natives are Present	10.55
Nowood	10080008	Large Spot Only	Non-Natives are not Present	8.59
Nowood	10080008	Large Spot Only	Non-Natives are Present	2.63
Greybull	10080009	Both Large and Fine Spot	Non-Natives are not Present	142.13
Greybull	10080009	Large Spot Only	Non-Natives are not Present	43.38
Greybull	10080009	Large Spot Only	Non-Natives are Present	45.71
Big Horn Lake	10080010	Large Spot Only	Non-Natives are not Present	52.06
Big Horn Lake	10080010	Large Spot Only	Non-Natives are Present	12.43
North Fork Shoshone	10080012	Large Spot Only	Non-Natives are not Present	86.67
North Fork Shoshone	10080012	Large Spot Only	Non-Natives are Present	166.63
South Fork Shoshone	10080013	Both Large and Fine Spot	Non-Natives are not Present	14.06
South Fork Shoshone	10080013	Large Spot Only	Non-Natives are Present	23.56
Shoshone	10080014	Large Spot Only	Non-Natives are not Present	4.14
Lower Bighorn	10080015	Large Spot Only	Non-Natives are not Present	7.04
Little Bighorn	10080016	Both Large and Fine Spot	Non-Natives are Present	1.25
Little Bighorn	10080016	Large Spot Only	Non-Natives are not Present	11.63

			Present	
Little Bighorn	10080016	Large Spot Only	Non-Natives are Present	8.41
Upper Tongue	10090101	Large Spot Only	Non-Natives are Present	0.57

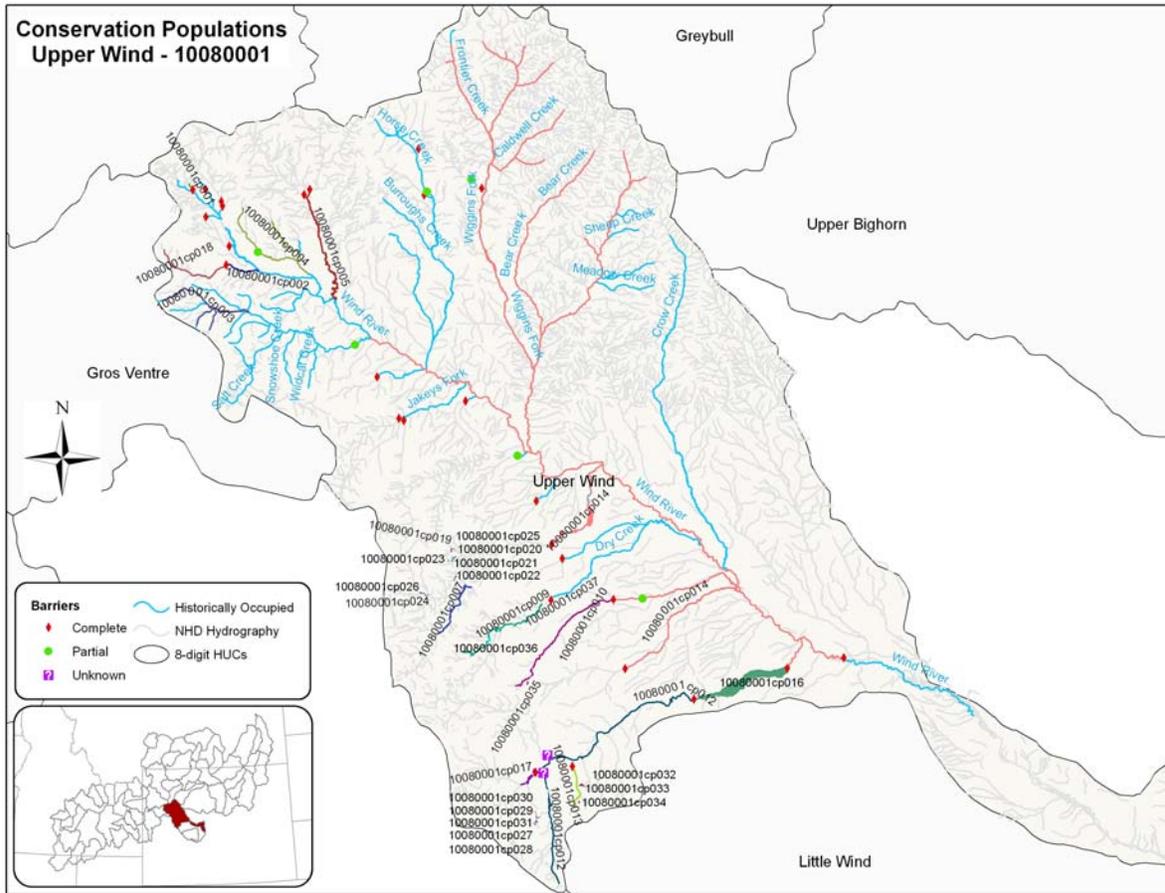
Name	HUC8	Ownership	Wilderness	Stream Mile
Upper Wind	10080001	Bureau of Indian Affairs	No	102.5
Upper Wind	10080001	Bureau of Indian Affairs	Yes	0.01
Upper Wind	10080001	Bureau of Land Management	No	2.21
Upper Wind	10080001	Private	No	44.69
Upper Wind	10080001	State	No	27.83
Upper Wind	10080001	U.S. Fish and Wildlife Service	No	0.52
Upper Wind	10080001	U.S. Forest Service	No	69.58
Upper Wind	10080001	U.S. Forest Service	Yes	58.8
Upper Wind	10080001	Water	No	39.17
Upper Wind	10080001	Water	Yes	0.04
Little Wind	10080002	Bureau of Indian Affairs	No	60.28
Little Wind	10080002	Bureau of Indian Affairs	Yes	0.01
Little Wind	10080002	Private	No	0.21
Little Wind	10080002	U.S. Forest Service	No	0.01
Little Wind	10080002	U.S. Forest Service	Yes	6.36
Little Wind	10080002	Water	No	3.68
Little Wind	10080002	Water	Yes	0.03
Popo Agie	10080003	U.S. Forest Service	No	1.88
Popo Agie	10080003	U.S. Forest Service	Yes	8.21
Upper Bighorn	10080007	Bureau of Indian Affairs	No	10.42
Upper Bighorn	10080007	Bureau of Indian Affairs	Yes	0.55
Upper Bighorn	10080007	Bureau of Land Management	No	12.57
Upper Bighorn	10080007	Private	No	13.48
Upper Bighorn	10080007	State	No	1.12
Upper Bighorn	10080007	U.S. Forest Service	No	3.1
Upper Bighorn	10080007	U.S. Forest Service	Yes	1.57
Upper Bighorn	10080007	Water	No	1.41
Nowood	10080008	Bureau of Land Management	No	0.83
Nowood	10080008	Private	No	2.64
Nowood	10080008	U.S. Forest Service	No	5.92
Nowood	10080008	U.S. Forest Service	Yes	1.83
Greybull	10080009	Bureau of Land Management	No	5.85
Greybull	10080009	Private	No	110.57
Greybull	10080009	Private	Yes	1.09
Greybull	10080009	State	No	33.82
Greybull	10080009	U.S. Forest Service	No	46.98
Greybull	10080009	U.S. Forest Service	Yes	32.91

Big Horn Lake	10080010	Bureau of Indian Affairs	No	25.58
Big Horn Lake	10080010	Bureau of Land Management	No	8.57
Big Horn Lake	10080010	Private	No	12.5
Big Horn Lake	10080010	State	No	1.12
Big Horn Lake	10080010	U.S. Forest Service	No	16.72
North Fork Shoshone	10080012	Bureau of Land Management	No	1.79
North Fork Shoshone	10080012	National Park Service	No	8.28
North Fork Shoshone	10080012	Private	No	22.53
North Fork Shoshone	10080012	State	No	0.81
North Fork Shoshone	10080012	U.S. Forest Service	No	107.01
North Fork Shoshone	10080012	U.S. Forest Service	Yes	112.47
North Fork Shoshone	10080012	Water	No	0.41
South Fork Shoshone	10080013	Private	No	8.48
South Fork Shoshone	10080013	U.S. Forest Service	No	3.52
South Fork Shoshone	10080013	U.S. Forest Service	Yes	25.62
Shoshone	10080014	Bureau of Land Management	No	0.18
Shoshone	10080014	Private	No	1.3
Shoshone	10080014	State	No	0.01
Shoshone	10080014	U.S. Forest Service	No	2.65
Lower Bighorn	10080015	Bureau of Indian Affairs	No	4.23
Lower Bighorn	10080015	Private	No	2.81
Little Bighorn	10080016	Bureau of Indian Affairs	No	0.05
Little Bighorn	10080016	Private	No	6.45
Little Bighorn	10080016	State	No	2.24
Little Bighorn	10080016	U.S. Forest Service	No	12.55
Upper Tongue	10090101	Bureau of Land Management	No	0.02
Upper Tongue	10090101	Private	No	0.55
Upper Wind	10080001	Bureau of Indian Affairs	No	102.5
Upper Wind	10080001	Bureau of Indian Affairs	Yes	0.01
Upper Wind	10080001	Bureau of Land Management	No	2.21
Upper Wind	10080001	Private	No	44.69
Upper Wind	10080001	State	No	27.83
Upper Wind	10080001	U.S. Fish and Wildlife Service	No	0.52
Upper Wind	10080001	U.S. Forest Service	No	69.58
Upper Wind	10080001	U.S. Forest Service	Yes	58.8
Upper Wind	10080001	Water	No	39.17
Upper Wind	10080001	Water	Yes	0.04
Little Wind	10080002	Bureau of Indian Affairs	No	60.28
Little Wind	10080002	Bureau of Indian Affairs	Yes	0.01
Little Wind	10080002	Private	No	0.21
Little Wind	10080002	U.S. Forest Service	No	0.01
Little Wind	10080002	U.S. Forest Service	Yes	6.36
Little Wind	10080002	Water	No	3.68

Little Wind	10080002	Water	Yes	0.03
Popo Agie	10080003	U.S. Forest Service	No	1.88
Popo Agie	10080003	U.S. Forest Service	Yes	8.21
Upper Bighorn	10080007	Bureau of Indian Affairs	No	10.42
Upper Bighorn	10080007	Bureau of Indian Affairs	Yes	0.55
Upper Bighorn	10080007	Bureau of Land Management	No	12.57
Upper Bighorn	10080007	Private	No	13.48
Upper Bighorn	10080007	State	No	1.12
Upper Bighorn	10080007	U.S. Forest Service	No	3.1
Upper Bighorn	10080007	U.S. Forest Service	Yes	1.57
Upper Bighorn	10080007	Water	No	1.41
Nowood	10080008	Bureau of Land Management	No	0.83
Nowood	10080008	Private	No	2.64
Nowood	10080008	U.S. Forest Service	No	5.92
Nowood	10080008	U.S. Forest Service	Yes	1.83
Greybull	10080009	Bureau of Land Management	No	5.85
Greybull	10080009	Private	No	110.57
Greybull	10080009	Private	Yes	1.09
Greybull	10080009	State	No	33.82
Greybull	10080009	U.S. Forest Service	No	46.98
Greybull	10080009	U.S. Forest Service	Yes	32.91
Big Horn Lake	10080010	Bureau of Indian Affairs	No	25.58
Big Horn Lake	10080010	Bureau of Land Management	No	8.57
Big Horn Lake	10080010	Private	No	12.5
Big Horn Lake	10080010	State	No	1.12
Big Horn Lake	10080010	U.S. Forest Service	No	16.72
North Fork Shoshone	10080012	Bureau of Land Management	No	1.79
North Fork Shoshone	10080012	National Park Service	No	8.28
North Fork Shoshone	10080012	Private	No	22.53
North Fork Shoshone	10080012	State	No	0.81
North Fork Shoshone	10080012	U.S. Forest Service	No	107.01
North Fork Shoshone	10080012	U.S. Forest Service	Yes	112.47
North Fork Shoshone	10080012	Water	No	0.41
South Fork Shoshone	10080013	Private	No	8.48
South Fork Shoshone	10080013	U.S. Forest Service	No	3.52
South Fork Shoshone	10080013	U.S. Forest Service	Yes	25.62
Shoshone	10080014	Bureau of Land Management	No	0.18
Shoshone	10080014	Private	No	1.3
Shoshone	10080014	State	No	0.01
Shoshone	10080014	U.S. Forest Service	No	2.65
Lower Bighorn	10080015	Bureau of Indian Affairs	No	4.23
Lower Bighorn	10080015	Private	No	2.81
Little Bighorn	10080016	Bureau of Indian Affairs	No	0.05

Little Bighorn	10080016	Private	No	6.45
Little Bighorn	10080016	Private	No	6.45
Little Bighorn	10080016	State	No	2.24
Little Bighorn	10080016	U.S. Forest Service	No	12.55
Upper Tongue	10090101	Bureau of Land Management	No	0.02

Lower Yellowstone –Bighorn GMU Conservation Populations



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080001cp001	Other	Non-network	0.64	1	0	0
10080001cp002	Other	Non-network	3.14	1	0	0
10080001cp003	Other	Weakly Networked	15.23	3	0	0
10080001cp004	Other	Weakly Networked	15.52	3	0	0
10080001cp005	Other	Non-network	17.21	1	0	0
10080001cp007	Other	Moderately Networked	6.74	1	0	0
10080001cp009	Other	Weakly Networked	7.05	1	211.62	15
10080001cp010	Other	Weakly Networked	10.59	1	59.98	11
10080001cp012	Other	Moderately Networked	28.56	2	67.82	2
10080001cp013	Other	Non-network	3.2	1	64.58	2
10080001cp014	Other	Strongly Networked	218.53	27	639.66	3
10080001cp016	Other	Non-network	0	0	2942.13	1
10080001cp017	Other	Non-network	0.3	1	173.46	1
10080001cp018	Other	Non-network	7.37	1	0	0
10080001cp019	Other	Non-network	0	0	26.32	1
10080001cp020	Other	Non-network	0	0	2.79	1
10080001cp021	Other	Non-network	0	0	38.5	1
10080001cp022	Other	Non-network	0	0	21.47	1
10080001cp023	Other	Non-network	0	0	5.83	1
10080001cp024	Other	Non-network	0	0	16.3	1
10080001cp025	Other	Non-network	0	0	1.95	1
10080001cp026	Other	Strongly Networked	0	0	20.16	1
10080001cp027	Other	Non-network	0	0	8.89	1
10080001cp028	Other	Non-network	0	0	14.76	1
10080001cp029	Other	Non-network	0	0	19.8	1
10080001cp030	Other	Non-network	0	0	10.55	1
10080001cp031	Other	Non-network	0	0	3.92	1
10080001cp032	Other	Non-network	0	0	16.8	1
10080001cp033	Other	Non-network	0	0	43.36	1
10080001cp034	Other	Non-network	0	0	12.47	1
10080001cp035	Other	Non-network	0	0	21.59	1
10080001cp036	Other	Non-network	0	0	0.09	1
10080001cp037	Other	Non-network	0	0	3.4	1

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080001cp001	Limited Disease Risk	No Risk of Hybridization	Yes
10080001cp002	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10080001cp003	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
10080001cp004	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10080001cp005	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10080001cp007	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
10080001cp009	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	No
10080001cp010	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080001cp012	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	Yes
10080001cp013	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	Yes
10080001cp014	Moderate Disease Risk < 10 km	Hybridizing species are sympatric	Yes
10080001cp016	Moderate Disease Risk < 10 km	Hybridizing species are sympatric	Yes
10080001cp017	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	Yes
10080001cp018	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
10080001cp019	Limited Disease Risk	No Risk of Hybridization	No
10080001cp020	Limited Disease Risk	No Risk of Hybridization	No
10080001cp021	Limited Disease Risk	No Risk of Hybridization	No
10080001cp022	Limited Disease Risk	No Risk of Hybridization	No
10080001cp023	Limited Disease Risk	No Risk of Hybridization	No
10080001cp024	Limited Disease Risk	No Risk of Hybridization	No
10080001cp025	Limited Disease Risk	No Risk of Hybridization	No
10080001cp026	Limited Disease Risk	No Risk of Hybridization	No
10080001cp027	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp028	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp029	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp030	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp031	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp032	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp033	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp034	Limited Disease Risk	Hybridizing species are sympatric	No
10080001cp035	Limited Disease Risk	No Risk of Hybridization	No
10080001cp036	Limited Disease Risk	Hybridizing species are sympatric	Yes

10080001cp037	Limited Disease Risk	Hybridizing species are sympatric	No
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Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080001cp001				Local	
10080001cp002				Local	
10080001cp003	Lake out.			Local	
10080001cp004	Lake out.			Local	
10080001cp005				Local	
10080001cp007	Lake out.	Lake trib.		Local	
10080001cp009	Lake out.	Lake trib.		Local	
10080001cp010	Lake out.	Lake trib.		Local	
10080001cp012	Lake out.	Lake trib.		Local	
10080001cp013	Lake out.	Lake trib.		Local	
10080001cp014	Lake out.	Lake trib.	Lg. river	Local	
10080001cp016		Lake trib.			
10080001cp017		Lake trib.			
10080001cp018				Local	
10080001cp019					Unknown
10080001cp020					Unknown
10080001cp021					Unknown
10080001cp022					Unknown
10080001cp023					Unknown
10080001cp024					Unknown
10080001cp025					Unknown
10080001cp026					Unknown
10080001cp027					Unknown
10080001cp028					Unknown
10080001cp029					Unknown
10080001cp030					Unknown
10080001cp031					Unknown
10080001cp032					Unknown
10080001cp033					Unknown
10080001cp034					Unknown
10080001cp035					Unknown
10080001cp036					Unknown
10080001cp037					Unknown

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080001cp001	0.64	1.02			1					
10080001cp002	3.14	5.06	3.14	5.06	1					
10080001cp003	15.23	24.49			3					
10080001cp004	15.52	25	5.04	8.11	3					
10080001cp005	17.21	27.71			1					
10080001cp007	6.74	10.85	6.74	10.85	1					
10080001cp009	7.05	11.39			1	211.62	85.65	15		
10080001cp010	10.59	17.05			1	59.98	24.26	11		
10080001cp012	28.56	45.88			2	67.82	27.44	2		
10080001cp013	3.2	5.13			1	64.58	26.14	2		
10080001cp014	218.53	351.72	81.17	130.65	27	639.66	258.86	3		
10080001cp016						2942.13	1190.64	1		
10080001cp017	0.3	0.48			1	173.46	70.2	1		
10080001cp018	7.37	11.88	7.37	11.88	1					
10080001cp019						26.32	10.65	1		
10080001cp020						2.79	1.13	1		
10080001cp021						38.5	15.58	1		
10080001cp022						21.47	8.69	1		
10080001cp023						5.83	2.36	1		
10080001cp024						16.3	6.6	1		
10080001cp025						1.95	0.79	1		
10080001cp026						20.16	8.16	1		
10080001cp027						8.89	3.6	1		
10080001cp028						14.76	5.97	1		
10080001cp029						19.8	8.01	1		
10080001cp030						10.55	4.27	1		
10080001cp031						3.92	1.59	1		
10080001cp032						16.8	6.8	1		
10080001cp033						43.36	17.55	1		
10080001cp034						12.47	5.04	1		

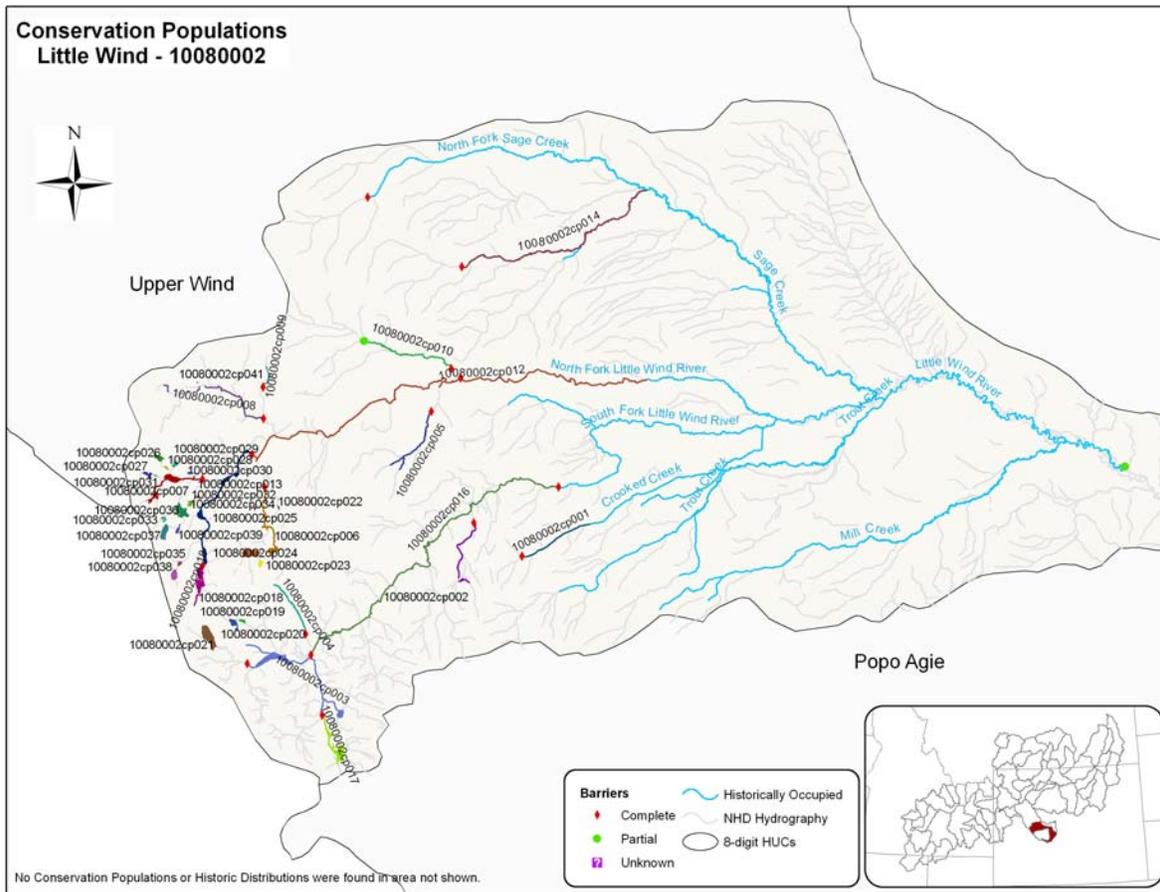
10080001cp035						21.59	8.74	1		
10080001cp036						0.09	0.04	1		
10080001cp037						3.4	1.38	1		

Conservation Population ID:	Non-native
10080001cp001	None
10080001cp002	BRK, RBT
10080001cp003	BRK, RBT, YSF
10080001cp004	BRK, YSF
10080001cp005	BRK, BRN, CUT, RBT, YSF
10080001cp007	BRK
10080001cp009	BRK, RBT, TRT, YSL
10080001cp010	BRK, YSF, YSL
10080001cp012	BRK, BRN, RBT, YSF, YSL
10080001cp013	RBT, YSF, YSL
10080001cp014	BRK, BRN, LAK, RBT, YSF
10080001cp016	BRK, CUT, LAK, RBT, YSF
10080001cp017	TRT, YSF
10080001cp018	BRK
10080001cp019	YSL
10080001cp020	BRK, YSL
10080001cp021	BRK, YSL
10080001cp022	YSL
10080001cp023	YSL
10080001cp024	YSF
10080001cp025	YSF
10080001cp026	YSF, YSL
10080001cp027	YSF
10080001cp028	YSF
10080001cp029	YSF
10080001cp030	YSF
10080001cp031	YSF
10080001cp032	YSF, YSL
10080001cp033	YSF, YSL
10080001cp034	RBT, YSF
10080001cp035	BRK, LAK, YSF
10080001cp036	BRK, YSL
10080001cp037	BRK, RBT, YSL

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080001cp001			0.64		
10080001cp002			3.14		
10080001cp003			15.22		
10080001cp004			5.04	10.49	
10080001cp005				17.2	
10080001cp007			6.75		
10080001cp009			7.07		
10080001cp010	10.6				

10080001cp012	28.54				
10080001cp013			3.18		
10080001cp014		167.27	47.17	4.17	
10080001cp017			0.3		
10080001cp018			7.38		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080001cp001	Large Spot Only	0.639	63.9	1	4	4	3	2	3
10080001cp002	Large Spot Only	3.138	78.4	2	4	4	3	2	3
10080001cp003	Both Large and Fine Spot	15.222	380.6	2	3	3	3	2	2
10080001cp004	Both Large and Fine Spot	15.526	1611.9	2	3	3	2	2	2
10080001cp005	Both Large and Fine Spot	17.201	430	2	4	3	3	2	2
10080001cp007	Large Spot Only	6.746	168.6	2	2	3	3	2	2
10080001cp009	Large Spot Only	7.066	706.6	2	3	3	2	2	2
10080001cp010	Both Large and Fine Spot	10.6	2915	2	3	3	1	2	2
10080001cp012	Both Large and Fine Spot	28.54	1459.8	2	2	2	2	3	2
10080001cp013	Both Large and Fine Spot	3.183	79.6	2	4	4	3	2	3
10080001cp014	Both Large and Fine Spot	218.6	21621.7	3	1	1	1	4	2
10080001cp017	Both Large and Fine Spot	0.301	7.5	2	4	4	4	2	3
10080001cp018	Large Spot Only	7.377	737.7	2	4	3	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080002cp001	Other	Non-Network	2.95	1	0	0
10080002cp002	Other	Moderately Networked	3.01	1	114.72	3
10080002cp003	Other	Moderately Networked	5.7	2	245.56	2
10080002cp004	Other	Non-Network	1.93	1	17.3	2
10080002cp005	Other	Non-Network	3.52	1	0	0
10080002cp006	Other	Weakly Networked	2.28	1	93.38	3
10080002cp007	Other	Weakly Networked	1.37	1	143.64	3
10080002cp008	Other	Weakly Networked	3.9	1	128.14	5
10080002cp009	Other	Non-Network	0.94	1	0	0
10080002cp010	Other	Non-Network	4.71	1	0	0
10080002cp012	Other	Weakly	19.83	3	0	0

		Networked				
10080002cp013	Other	Moderately Networked	3.93	1	177.12	4
10080002cp014	Other	Non-Network	11.11	1	0	0
10080002cp016	Other	Non-Network	15.96	1	0	0
10080002cp017	Other	Non-Network	0.97	1	155.78	2
10080002cp018	Other	Non-Network	0.6	2	143.27	1
10080002cp019	Other	Non-Network	0	0	16.81	1
10080002cp020	Other	Non-Network	0	0	49.82	1
10080002cp021	Other	Non-Network	0	0	174.41	1
10080002cp022	Other	Non-Network	0	0	4.96	1
10080002cp023	Other	Non-Network	0	0	23.64	1
10080002cp024	Other	Non-Network	0	0	107.49	1
10080002cp025	Other	Non-Network	0	0	6.82	1
10080002cp026	Other	Non-Network	0	0	44.58	1
10080002cp027	Other	Non-Network	0	0	30.88	1
10080002cp028	Other	Non-Network	0	0	9.22	1
10080002cp029	Other	Non-Network	0	0	23.16	1
10080002cp030	Other	Non-Network	0	0	10.5	1
10080002cp031	Other	Non-Network	0	0	4.69	1
10080002cp032	Other	Non-Network	0	0	9.39	1
10080002cp033	Other	Non-Network	0	0	18.41	1
10080002cp034	Other	Non-Network	0	0	24.61	1
10080002cp035	Other	Non-Network	0	0	16.17	1
10080002cp036	Other	Non-Network	0	0	109.11	1
10080002cp037	Other	Non-Network	0	0	76.34	1
10080002cp038	Other	Non-Network	0	0	52.7	1
10080002cp039	Other	Non-Network	0	0	18.53	1
10080002cp040	Other	Non-Network	0	0	16.49	1
10080002cp041	Other	Non-Network	0	0	3.73	1
10080002cp042	Other	Non-Network	0	0	16.24	1

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080002cp001	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080002cp002	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080002cp003	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080002cp004	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp005	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp006	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp007	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp008	Limited Disease Risk	Hybridizing species < 10 km	Yes
10080002cp009	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp010	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp012	Limited Disease Risk	Hybridizing species < 10 km	No
10080002cp013	Limited Disease Risk	Hybridizing species > 10 km	Yes
10080002cp014	Limited Disease Risk	No Risk of Hybridization	No
10080002cp016	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
10080002cp017	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
10080002cp018	Limited Disease Risk	Hybridizing species > 10 km	Yes
10080002cp019	Limited Disease Risk	No Risk of Hybridization	No
10080002cp020	Limited Disease Risk	No Risk of Hybridization	No
10080002cp021	Limited Disease Risk	No Risk of Hybridization	No
10080002cp022	Limited Disease Risk	No Risk of Hybridization	No
10080002cp023	Limited Disease Risk	No Risk of Hybridization	No
10080002cp024	Limited Disease Risk	No Risk of Hybridization	No
10080002cp025	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp026	Limited Disease Risk	No Risk of Hybridization	No
10080002cp027	Limited Disease Risk	No Risk of Hybridization	No
10080002cp028	Limited Disease Risk	No Risk of Hybridization	No
10080002cp029	Limited Disease Risk	No Risk of Hybridization	No
10080002cp030	Limited Disease Risk	No Risk of Hybridization	No
10080002cp031	Limited Disease Risk	No Risk of Hybridization	No
10080002cp032	Limited Disease Risk	No Risk of Hybridization	Yes
10080002cp033	Limited Disease Risk	No Risk of Hybridization	No
10080002cp034	Limited Disease Risk	No Risk of Hybridization	No
10080002cp035	Limited Disease Risk	No Risk of Hybridization	No
10080002cp036	Limited Disease Risk	No Risk of Hybridization	No
10080002cp037	Limited Disease Risk	No Risk of Hybridization	No
10080002cp038	Limited Disease Risk	No Risk of Hybridization	No
10080002cp039	Limited Disease Risk	No Risk of Hybridization	No
10080002cp040	Limited Disease Risk	No Risk of Hybridization	No
10080002cp041	Limited Disease Risk	Hybridizing species > 10 km	Yes
10080002cp042	Limited Disease Risk	Hybridizing species > 10 km	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080002cp001					Unknown
10080002cp002	Lake out.	Lake trib.			
10080002cp003	Lake out.	Lake trib.			
10080002cp004				Local	
10080002cp005				Local	
10080002cp006	Lake out.	Lake trib.			
10080002cp007	Lake out.	Lake trib.			
10080002cp008	Lake out.	Lake trib.			
10080002cp009				Local	
10080002cp010				Local	
10080002cp012				Local	
10080002cp013	Lake out.	Lake trib.			
10080002cp014				Local	
10080002cp016				Local	
10080002cp017	Lake out.	Lake trib.		Local	
10080002cp018	Lake out.	Lake trib.		Local	
10080002cp019					Unknown
10080002cp020					Unknown
10080002cp021					Unknown
10080002cp022					Unknown
10080002cp023					Unknown
10080002cp024					Unknown
10080002cp025					Unknown
10080002cp026					Unknown
10080002cp027					Unknown
10080002cp028					Unknown
10080002cp029					Unknown
10080002cp030					Unknown
10080002cp031					Unknown
10080002cp032					Unknown
10080002cp033					Unknown
10080002cp034					Unknown
10080002cp035					Unknown
10080002cp036					Unknown
10080002cp037					Unknown
10080002cp038					Unknown
10080002cp039					Unknown
10080002cp040					Unknown
10080002cp041					Unknown
10080002cp042					Unknown

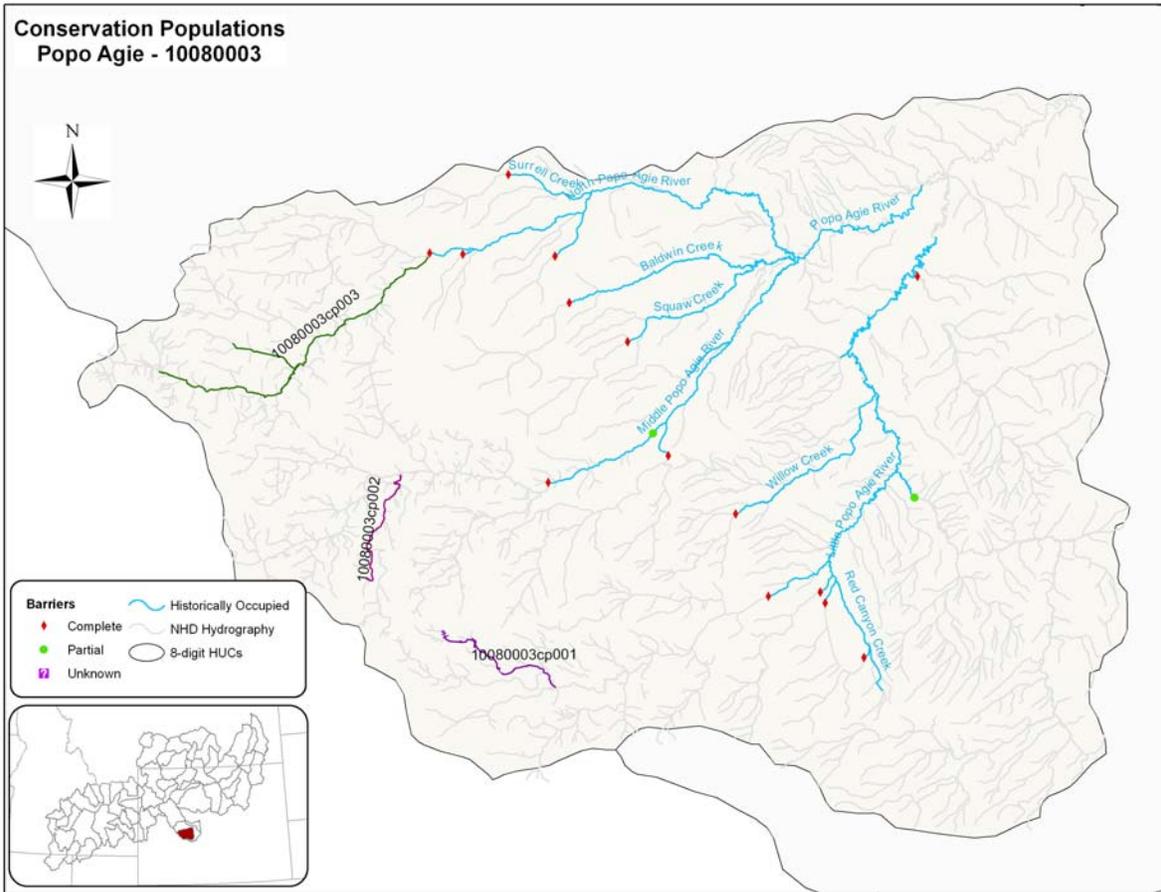
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080002cp001	2.95	4.75	2.95	4.75	1					
10080002cp002	3.01	4.81	3.01	4.81	1	114.72	46.42	3	11.3	1
10080002cp003	5.7	9.14	5.39	8.64	2	245.56	99.37	2		
10080002cp004	1.93	3.12			1	17.3	7	2		
10080002cp005	3.52	5.65			1					
10080002cp006	2.28	3.66			1	93.38	37.78	3		
10080002cp007	1.37	2.2			1	143.64	58.12	3		
10080002cp008	3.9	6.23			1	128.14	51.87	5		
10080002cp009	0.94	1.52			1					
10080002cp010	4.71	7.58			1					
10080002cp012	19.83	31.94			3					
10080002cp013	3.93	6.34			1	177.12	71.68	4		
10080002cp014	11.11	17.89	11.11	17.89	1					
10080002cp016	15.96	25.63	15.96	25.63	1					
10080002cp017	0.97	1.57	0.97	1.57	1	155.78	63.04	2		
10080002cp018	0.6	0.97			2	143.27	57.98	1		
10080002cp019						16.81	6.8	1		
10080002cp020						49.82	20.16	1		
10080002cp021						174.41	70.58	1		
10080002cp022						4.96	2.01	1		
10080002cp023						23.64	9.57	1		
10080002cp024						107.49	43.5	1		
10080002cp025						6.82	2.76	1		
10080002cp026						44.58	18.04	1		
10080002cp027						30.88	12.5	1		
10080002cp028						9.22	3.73	1		
10080002cp029						23.16	9.37	1		
10080002cp030						10.5	4.25	1		
10080002cp031						4.69	1.9	1		
10080002cp032						9.39	3.8	1		

10080002cp033						18.41	7.45	1		
10080002cp034						24.61	9.96	1		
10080002cp035						16.17	6.54	1		
10080002cp036						109.11	44.16	1		
10080002cp037						76.34	30.89	1		
10080002cp038						52.7	21.33	1		
10080002cp039						18.53	7.5	1		
10080002cp040						16.49	6.67	1		
10080002cp041						3.73	1.51	1		
10080002cp042						16.24	6.57	1		

Conservation Population ID:	Non-native
10080002cp001	BRK
10080002cp002	BRK, LAK
10080002cp003	BRK, BRN, YSF
10080002cp004	None
10080002cp005	BRK, YSL
10080002cp006	BRK, YSF, YSL
10080002cp007	BRK, YSF, YSL
10080002cp008	BRK, RBT, YSF, YSL
10080002cp009	YSL
10080002cp010	BRK, YSF
10080002cp012	BRK, RBT, YSF, YSL
10080002cp013	BRK, YSF, YSL
10080002cp014	BRK
10080002cp016	BRK
10080002cp017	BRK, BRN
10080002cp018	BRK, YSF, YSL
10080002cp019	YSF
10080002cp020	YSF
10080002cp021	YSF, YSL
10080002cp022	None
10080002cp023	YSL
10080002cp024	BRK, YSL
10080002cp025	YSF
10080002cp026	YSF, YSL
10080002cp027	YSF, YSL
10080002cp028	BRK, YSF
10080002cp029	BRK, YSF
10080002cp030	BRK, YSF
10080002cp031	YSF
10080002cp032	YSF
10080002cp033	YSL
10080002cp034	BRK, YSF
10080002cp035	YSF
10080002cp036	BRK, LAK, YSF
10080002cp037	YSF, YSL
10080002cp038	YSF
10080002cp039	YSF
10080002cp040	None
10080002cp041	YSL
10080002cp042	RBT, YSF

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080002cp001					2.95
10080002cp002			2.99		
10080002cp003			5.37		0.31
10080002cp004					1.93
10080002cp005			3.51		
10080002cp006			2.27		
10080002cp007			1.37		
10080002cp008			3.88		
10080002cp009			0.94		
10080002cp010			4.71		
10080002cp012	11.13		8.72		
10080002cp013	3.93				
10080002cp014		11.11			
10080002cp016			15.95		
10080002cp017			0.98		
10080002cp018	0.08		0.53		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080002cp001	Large Spot Only	2.955	73.9	2	4	4	3	2	3
10080002cp002	Both Large and Fine Spot	2.992	299.2	2	2	4	3	2	2
10080002cp003	Both Large and Fine Spot	5.678	134.3	2	2	4	3	2	2
10080002cp004	Large Spot Only	1.931	48.3	1	4	4	4	2	3
10080002cp005	Large Spot Only	3.511	351.1	1	4	4	3	2	3
10080002cp006	Both Large and Fine Spot	2.266	226.6	1	3	4	3	2	3
10080002cp007	Both Large and Fine Spot	1.368	34.2	1	3	4	4	2	3
10080002cp008	Both Large and Fine Spot	3.879	97	1	3	4	3	2	3
10080002cp009	Large Spot Only	0.94	23.5	1	4	4	4	2	3
10080002cp010	Large Spot Only	4.708	470.8	1	4	4	3	2	3
10080002cp012	Both Large and Fine Spot	19.852	1985.2	1	3	3	2	2	2
10080002cp013	Both Large and Fine Spot	3.932	393.2	1	2	4	3	2	2
10080002cp014	Large Spot Only	11.11	277.8	1	4	3	3	3	3
10080002cp016	Both Large and Fine Spot	15.95	1595	2	4	3	2	3	3
10080002cp017	Large Spot Only	0.98	24.5	2	4	4	4	2	3
10080002cp018	Both Large and Fine Spot	0.606	60.6	1	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080003cp001	Other	Non-Network	5.29	2	62.53	3
10080003cp002	Other	Non-Network	5.67	1	0	0
10080003cp003	Other	Weakly Networked	17.79	3	21.13	1
10080003cp004	Other	Non-Network	0	0	23.74	1
10080003cp005	Other	Non-Network	0	0	10.8	1
10080003cp006	Other	Non-Network	0	0	34.98	1

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080003cp001	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10080003cp002	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10080003cp003	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080003cp004	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10080003cp005	Minimal Disease Risk > 10 km	No Risk of Hybridization	Yes
10080003cp006	Minimal Disease Risk > 10 km	No Risk of Hybridization	No

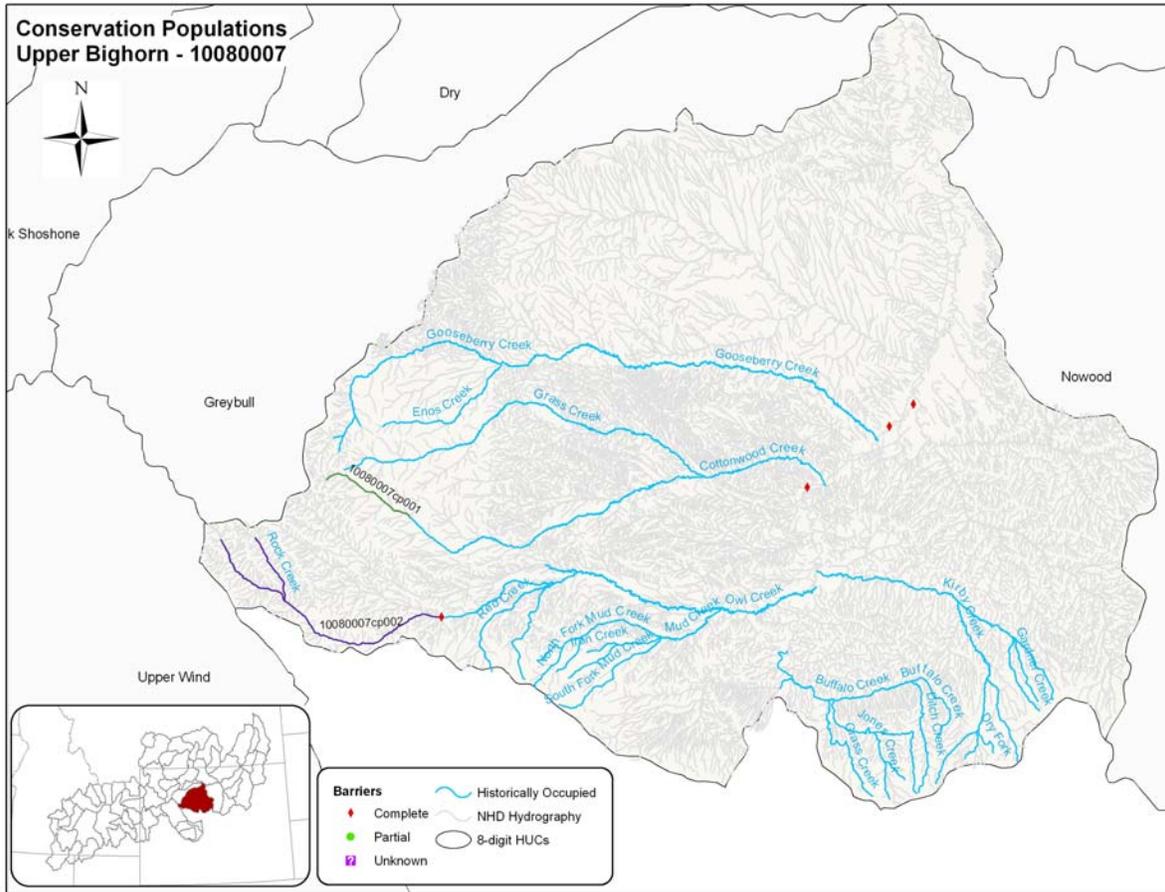
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080003cp001		Lake trib.			
10080003cp002				Local	
10080003cp003	Lake out.	Lake trib.			
10080003cp004					Unknown
10080003cp005					Unknown
10080003cp006					Unknown

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080003cp001	5.29	8.52	4.42	7.13	2	62.53	25.3	3	62.53	3
10080003cp002	5.67	9.1	5.67	9.1	1					
10080003cp003	17.79	28.62	17.79	28.62	3	21.13	8.55	1		
10080003cp004						23.74	9.61	1		
10080003cp005						10.8	4.37	1		
10080003cp006						34.98	14.16	1		

Conservation Population ID:	Non-native
10080003cp001	BRK
10080003cp002	BRK
10080003cp003	BRK
10080003cp004	YSF
10080003cp005	YSL
10080003cp006	YSL

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080003cp001			4.44		0.86
10080003cp002			5.65		
10080003cp003			17.79		

cplD	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080003cp001	Fine Spot Only	5.3	110.9	2	4	4	3	3	4
10080003cp002	Both Large and Fine Spot	5.655	141.4	2	4	4	3	3	4
10080003cp003	Large Spot Only	17.785	1254.2	2	3	3	2	3	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080007cp001	Core Conservation Population	Non-Network	10.55	1	0	0
10080007cp002	Core Conservation Population	Non-Network	33.67	2	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080007cp001	Limited Disease Risk	Hybridizing species < 10 km	No
10080007cp002	Limited Disease Risk	Hybridizing species are sympatric	Yes

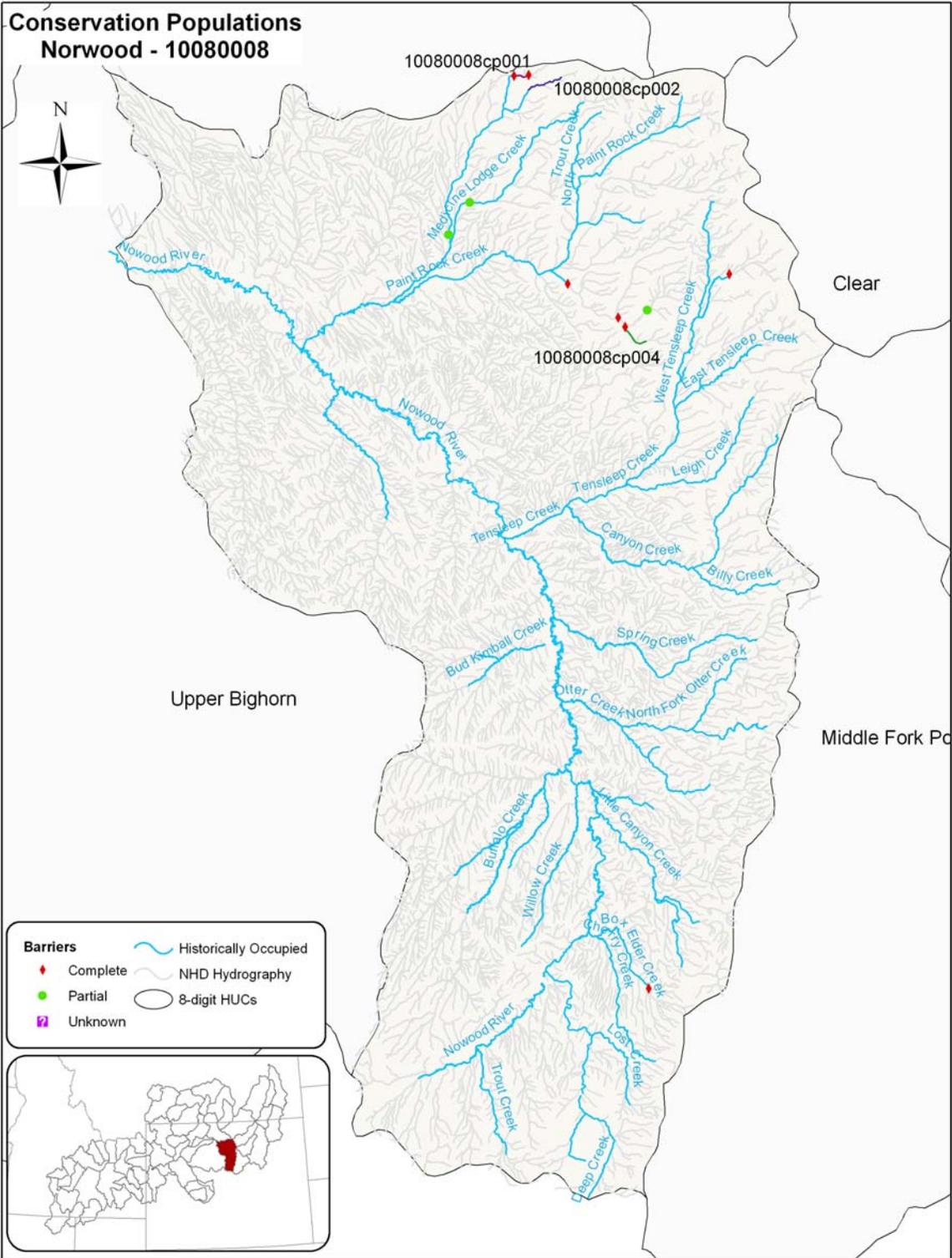
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080007cp001				Local	
10080007cp002				Local	

Conservation Population ID:	Non-native
10080007cp001	RBT
10080007cp002	BRK, RBT, YSF

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080007cp001			10.54		
10080007cp002		33.62			

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080007cp001	10.55	16.95	10.55	16.95	1					
10080007cp002	33.67	54.18			2					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080007cp001	Both Large and Fine Spot	10.544	1054.4	1	4	3	2	2	2
10080007cp002	Both Large and Fine Spot	33.622	840.5	1	4	2	2	3	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080008cp001	Core Conservation Population	Non-Network	1.03	1	0	0
10080008cp002	Core Conservation Population	Non-Network	2.45	1	0	0
10080008cp004	Other	Non-Network	1.92	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080008cp001	Limited Disease Risk	No Risk of Hybridization	Yes
10080008cp002	Limited Disease Risk	No Risk of Hybridization	No
10080008cp004	Limited Disease Risk	No Risk of Hybridization	Yes

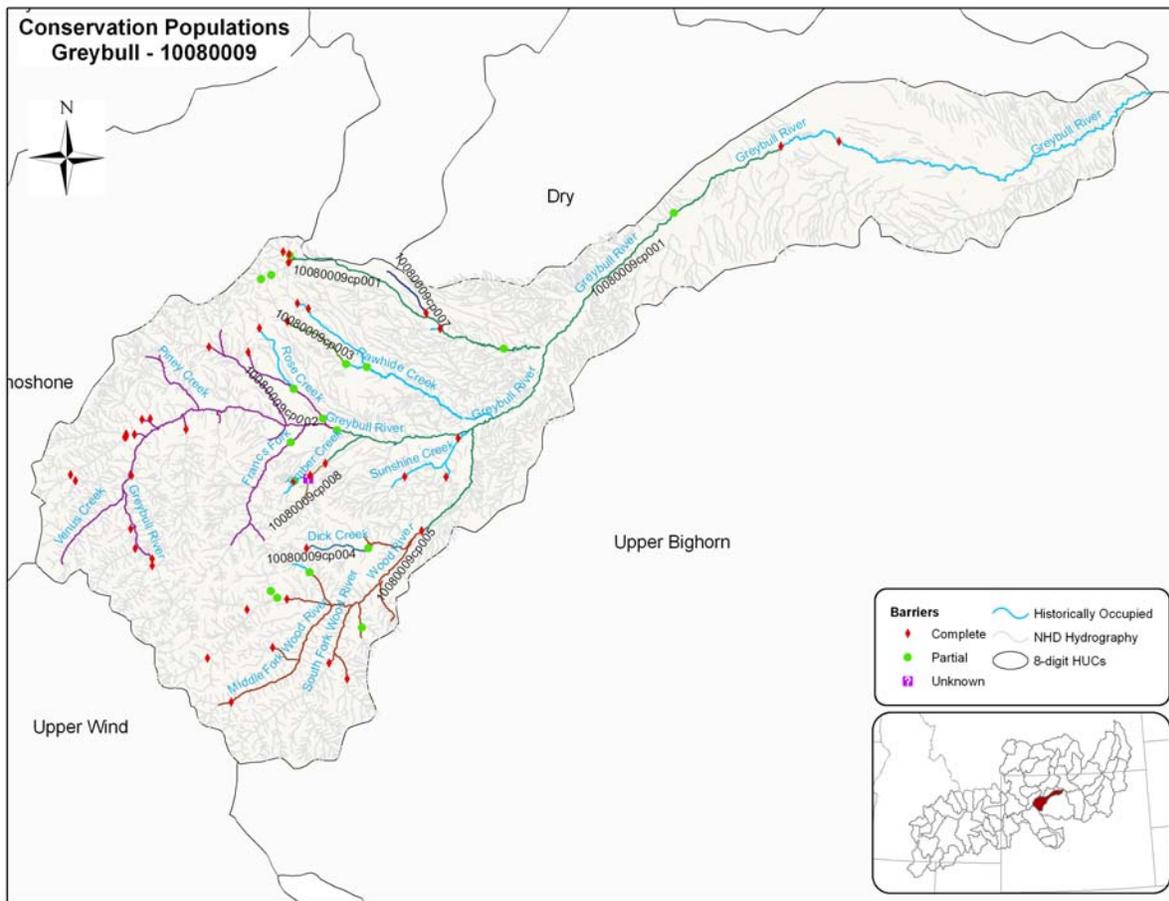
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080008cp001				Local	
10080008cp002				Local	
10080008cp004				Local	

Conservation Population ID:	Non-native
10080008cp001	None
10080008cp002	None
10080008cp004	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080008cp001				1.02	
10080008cp002		2.45			
10080008cp004				1.92	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080008cp001	1.03	1.63			1					
10080008cp002	2.45	3.94			1					
10080008cp004	1.92	3.08			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080008cp001	Large Spot Only	1.023	281.4	1	4	4	3	2	3
10080008cp002	Large Spot Only	2.446	61.2	1	4	4	3	2	3
10080008cp004	Large Spot Only	1.918	191.8	1	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080009cp001	Core Conservation Population	Moderately Networked	83.92	6	0	0
10080009cp002	Core Conservation Population	Strongly Networked	80.52	13	0	0
10080009cp003	Core Conservation Population	Non-Network	5.72	1	0	0
10080009cp004	Core Conservation Population	Non-Network	5.24	1	0	0
10080009cp005	Core Conservation Population	Strongly Networked	47.79	7	0	0
10080009cp007	Core Conservation Population	Non-Network	4.55	1	0	0
10080009cp008	Core Conservation Population	Non-Network	3.48	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080009cp001	Limited Disease Risk	Hybridizing species > 10 km	Yes
10080009cp002	Limited Disease Risk	No Risk of Hybridization	No
10080009cp003	Limited Disease Risk	No Risk of Hybridization	No
10080009cp004	Limited Disease Risk	No Risk of Hybridization	Yes
10080009cp005	Limited Disease Risk	No Risk of Hybridization	Yes
10080009cp007	Limited Disease Risk	No Risk of Hybridization	Yes
10080009cp008	Limited Disease Risk	Hybridizing species > 10 km	Yes

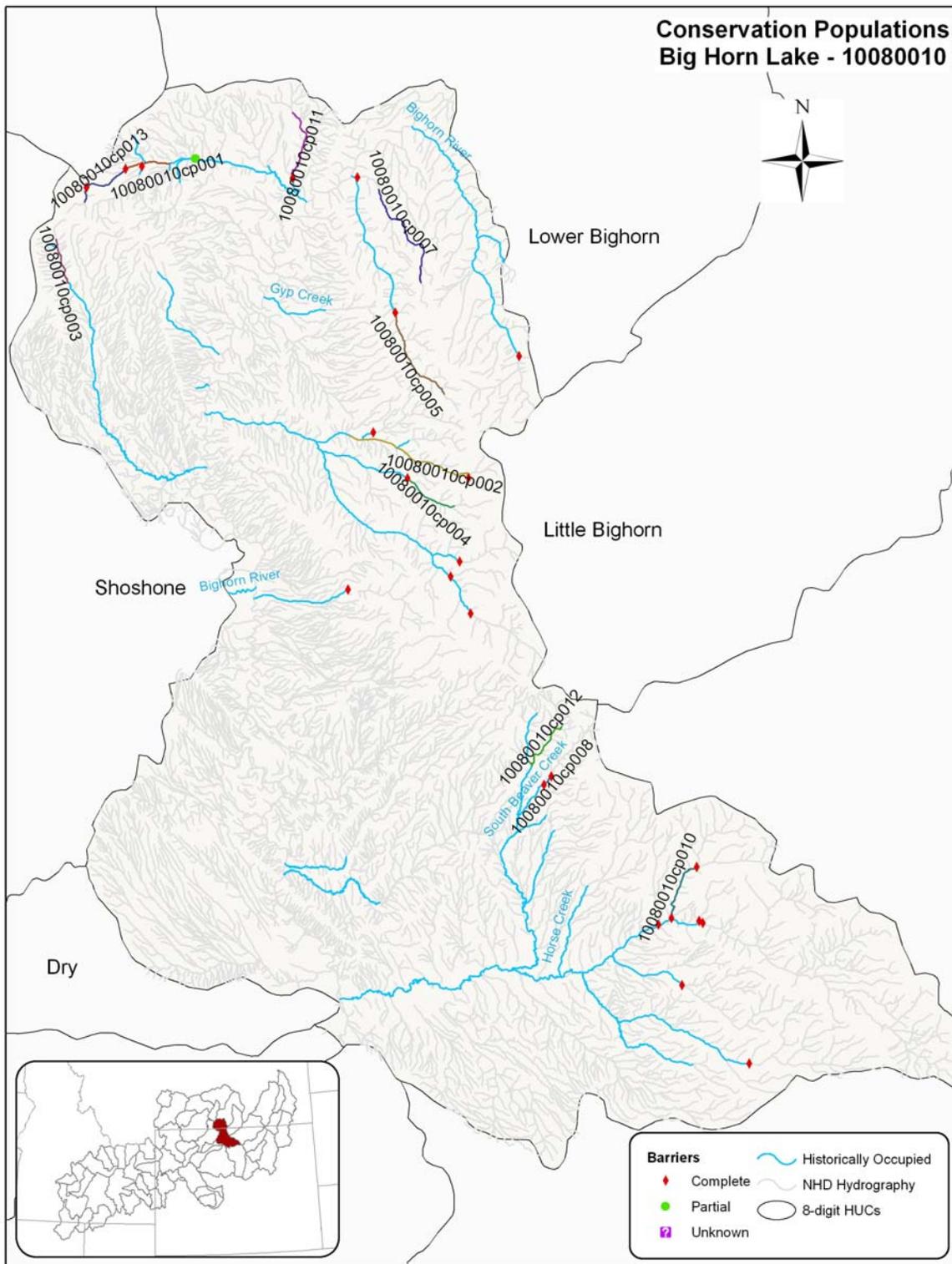
Conservation Population ID	Lake Out Spawning	Lake Trib S[awning	Large River Spawning	Local Dispersing Spawning	Unknown
10080009cp001			Lg river		
10080009cp002			Lg. river		
10080009cp003				Local	
10080009cp004				Local	
10080009cp005			Lg. river		
10080009cp007				Local	
10080009cp008				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080009cp001	83.92	135.23	9.74	15.69	6					
10080009cp002	80.52	129.43	8.95	14.38	13					
10080009cp003	5.72	9.2			1					
10080009cp004	5.24	8.42			1					
10080009cp005	47.79	76.85	27.02	43.45	7					
10080009cp007	4.55	7.34			1					
10080009cp008	3.48	5.61			1					

Conservation Population ID:	Non-native
10080009cp001	BRK, YSF
10080009cp002	BRK, YSF
10080009cp003	None
10080009cp004	BRK, YSF
10080009cp005	BRK, YSF
10080009cp007	YSF
10080009cp008	YSF

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080009cp001		61.02	22.99		
10080009cp002		27.83	52.61		
10080009cp003		5.71			
10080009cp004		5.25			
10080009cp005		15.92	27.02	4.85	
10080009cp007				4.56	
10080009cp008		3.49			

cplD	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080009cp001	Both Large and Fine Spot	84.011	8762.7	1	2	1	1	4	2
10080009cp002	Both Large and Fine Spot	80.442	14072.5	1	1	1	1	4	2
10080009cp003	Large Spot Only	5.711	571.1	1	4	4	2	2	2
10080009cp004	Both Large and Fine Spot	5.247	524.7	1	4	4	2	2	2
10080009cp005	Both Large and Fine Spot	47.784	5425.8	1	1	2	1	4	2
10080009cp007	Both Large and Fine Spot	4.557	455.7	1	4	4	3	2	3
10080009cp008	Both Large and Fine Spot	3.493	960.7	1	4	4	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080010cp001	Core Conservation Population	Non-Network	2.95	1	0	0
10080010cp002	Core Conservation Population	Non-Network	8.61	1	0	0
10080010cp003	Core Conservation Population	Non-Network	2.94	1	0	0
10080010cp004	Core Conservation Population	Non-Network	3.56	1	0	0
10080010cp005	Core Conservation Population	Non-Network	6.45	1	0	0
10080010cp007	Core Conservation Population	Non-Network	7.35	1	0	0
10080010cp008	Core Conservation Population	Moderately Networked	0.75	1	0	0
10080010cp010	Core Conservation Population	Non-Network	4.17	1	0	0
10080010cp011	Other	Non-Network	5.06	1	0	0
10080010cp012	Core Conservation Population	Weakly Networked	3.82	2	0	0
10080010cp013	Core Conservation Population	Non-Network	3.79	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080010cp001	Limited Disease Risk	No Risk of Hybridization	Yes
10080010cp002	Limited Disease Risk	Hybridizing species are sympatric	No
10080010cp003	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
10080010cp004	Limited Disease Risk	No Risk of Hybridization	Yes
10080010cp005	Limited Disease Risk	Hybridizing species < 10 km	Yes
10080010cp007	Limited Disease Risk	Hybridizing species < 10 km	No
10080010cp008	Limited Disease Risk	Hybridizing species < 10 km	Yes
10080010cp010	Limited Disease Risk	No Risk of Hybridization	Yes
10080010cp011	Limited Disease Risk	Hybridizing species < 10 km	Yes
10080010cp012	Limited Disease Risk	Hybridizing species are sympatric	No
10080010cp013	Limited Disease Risk	No Risk of Hybridization	Yes

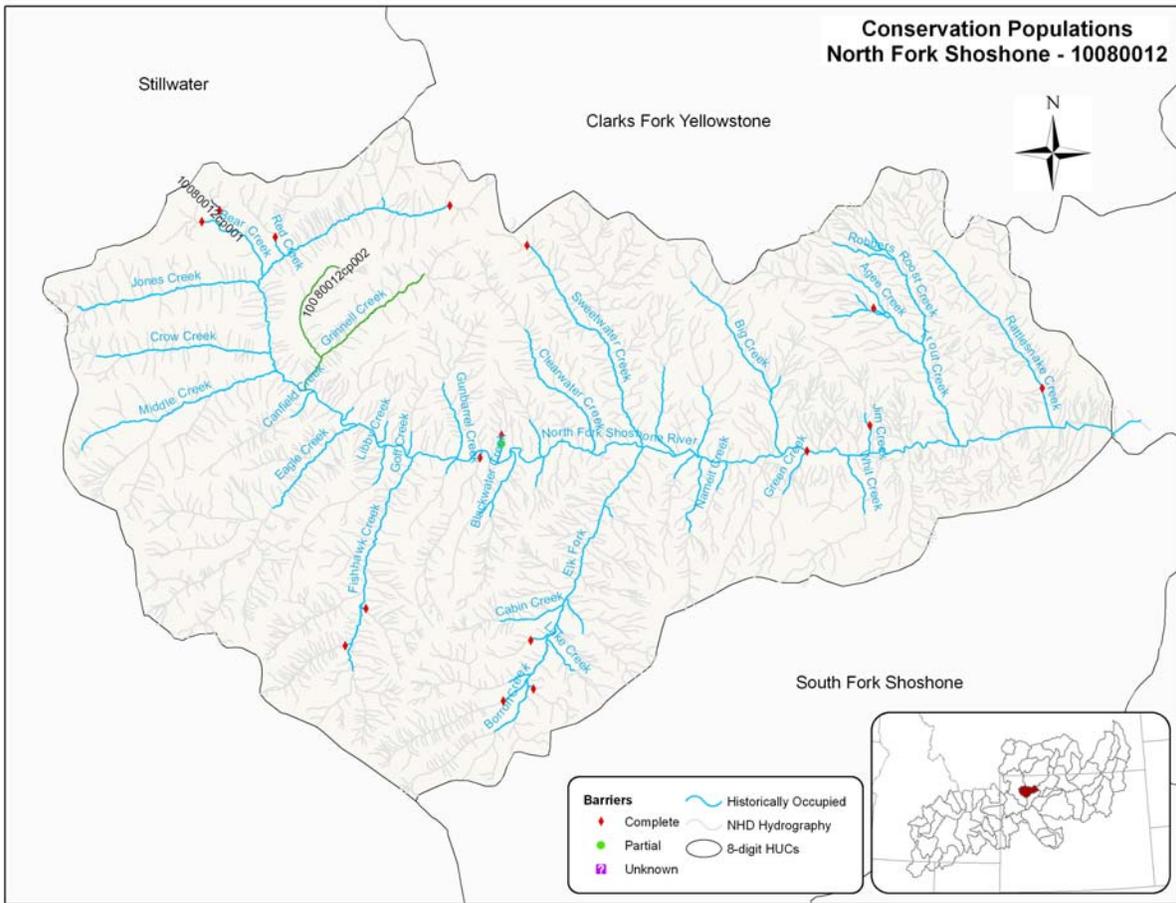
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080010cp001				Local	
10080010cp002				Local	
10080010cp003				Local	
10080010cp004				Local	
10080010cp005				Local	
10080010cp007				Local	
10080010cp008				Local	
10080010cp010				Local	
10080010cp011				Local	
10080010cp012				Local	
10080010cp013				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080010cp001	2.95	4.73			1					
10080010cp002	8.61	13.86	8.61	13.86	1					
10080010cp003	2.94	4.73			1					
10080010cp004	3.56	5.73			1					
10080010cp005	6.45	10.4			1					
10080010cp007	7.35	11.84			1					
10080010cp008	0.75	1.2			1					
10080010cp010	4.17	6.73			1					
10080010cp011	5.06	8.14			1					
10080010cp012	3.82	6.13	3.82	6.13	2					
10080010cp013	3.79	6.1			1					

Conservation Population ID:	Non-native
10080010cp001	None
10080010cp002	RBT
10080010cp003	None
10080010cp004	None
10080010cp005	None
10080010cp007	None
10080010cp008	None
10080010cp010	None
10080010cp011	None
10080010cp012	BRK, RBT, TRT
10080010cp013	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080010cp001			2.94		
10080010cp002			8.61		
10080010cp003	2.93				
10080010cp004		3.57			
10080010cp005			6.45		
10080010cp007			7.36		
10080010cp008			0.75		
10080010cp010			4.18		
10080010cp011		5.06			
10080010cp012		0.3	3.51		
10080010cp013			3.8		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080010cp001	Large Spot Only	2.939	808.1	1	4	4	2	2	2
10080010cp002	Large Spot Only	8.605	2366.4	1	4	3	1	2	2
10080010cp003	Large Spot Only	2.932	806.4	2	4	4	2	2	2
10080010cp004	Large Spot Only	3.569	356.9	1	4	4	3	2	3
10080010cp005	Large Spot Only	6.448	1773.2	1	4	3	2	2	2
10080010cp007	Large Spot Only	7.355	735.5	1	4	3	2	2	2
10080010cp008	Large Spot Only	0.749	561.7	1	2	4	2	2	2
10080010cp010	Large Spot Only	4.18	1149.6	1	4	4	2	2	2
10080010cp011	Large Spot Only	5.06	126.5	1	4	4	3	2	3
10080010cp012	Large Spot Only	3.808	380.8	1	3	4	3	2	3
10080010cp013	Large Spot Only	3.797	1044.2	1	4	4	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080012cp001	Core Conservation Population	Non-Network	0.49	1	8.78	1
10080012cp002	Known or Probable Unique Life History	Strongly Networked	13.9	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080012cp001	Limited Disease Risk	No Risk of Hybridization	Yes
10080012cp002	Limited Disease Risk	Hybridizing species are sympatric	No

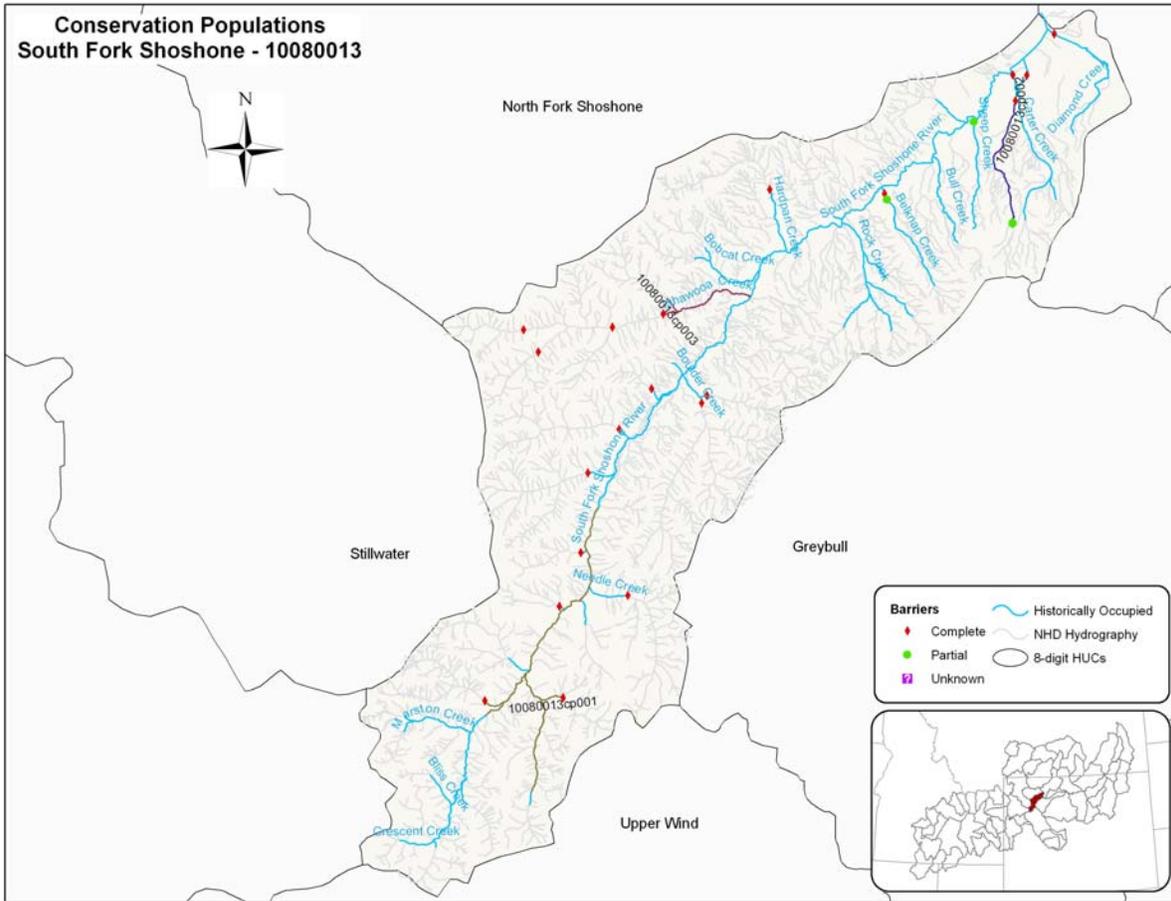
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080012cp001		Lake trib.			
10080012cp002				Local	

Conservation Population ID:	Non-native
10080012cp001	None
10080012cp002	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080012cp001			0.49		
10080012cp002			13.9		

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080012cp001	0.49	0.79			1	8.78	3.55	1		
10080012cp002	13.9	22.39	13.9	22.39	1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080012cp001	Large Spot Only	0.492	12.3	1	4	4	4	2	3
10080012cp002	Large Spot Only	13.899	347.5	1	1	3	3	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080013cp001	Core Conservation Population	Moderately Networked	23.56	4	0	0
10080013cp002	Core Conservation Population	Non-Network	7.69	1	0	0
10080013cp003	Other	Weakly Networked	6.37	2	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080013cp001	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
10080013cp002	Limited Disease Risk	Hybridizing species < 10 km	Yes
10080013cp003	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No

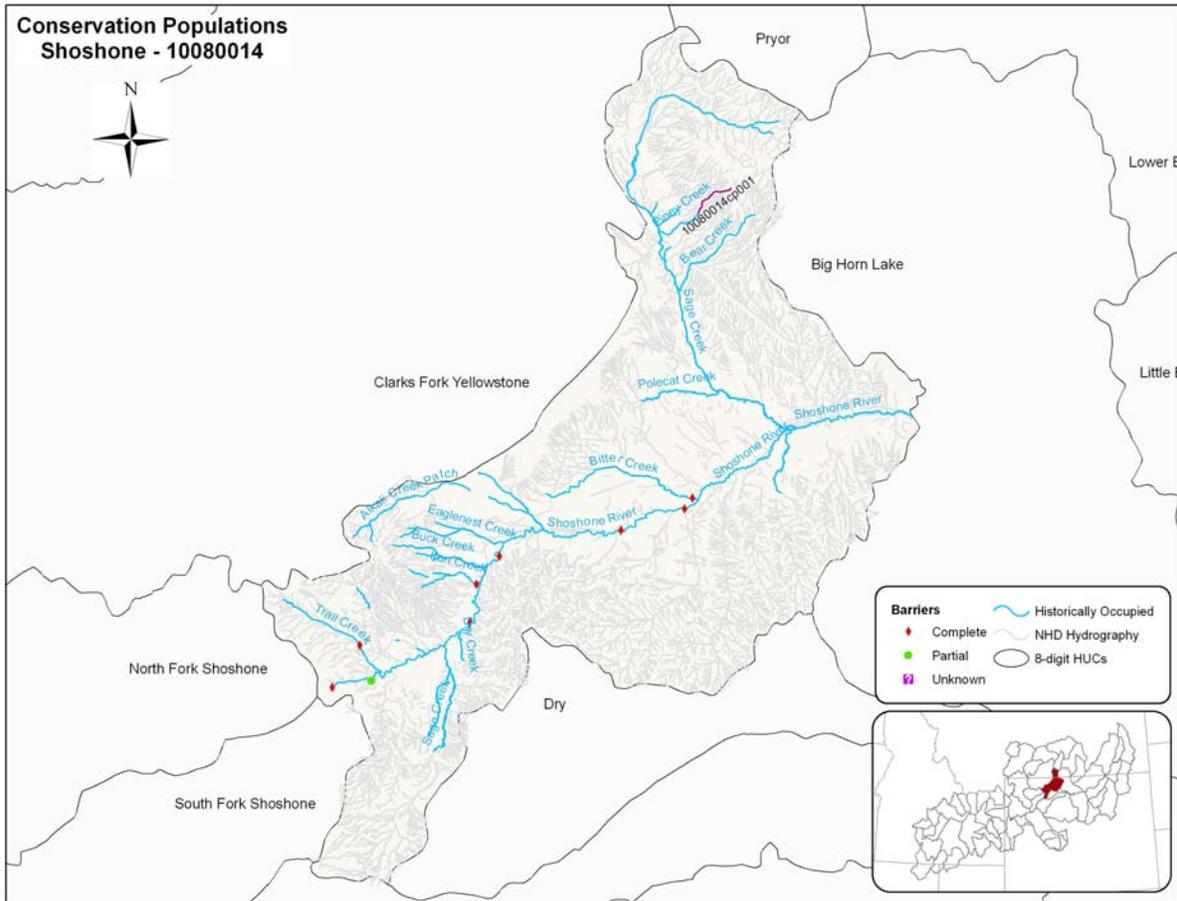
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080013cp001				Local	
10080013cp002				Local	
10080013cp003				Local	

Conservation Population ID:	Non-native
10080013cp001	BRK, BRN
10080013cp002	YSF
10080013cp003	BRK, BRN, RBT, YSF

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080013cp001			23.62		
10080013cp002			7.71		
10080013cp003			6.37		

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080013cp001	23.56	37.97	23.56	37.97	4					
10080013cp002	7.69	12.42			1					
10080013cp003	6.37	10.27			2					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080013cp001	Large Spot Only	23.625	12892.3	2	2	2	1	4	2
10080013cp002	Both Large and Fine Spot	7.708	2119.6	1	4	3	1	2	2
10080013cp003	Both Large and Fine Spot	6.372	637.2	2	3	3	2	3	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080014cp001	Core Conservation Population	Non-Network	4.14	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080014cp001	Limited Disease Risk	No Risk of Hybridization	No

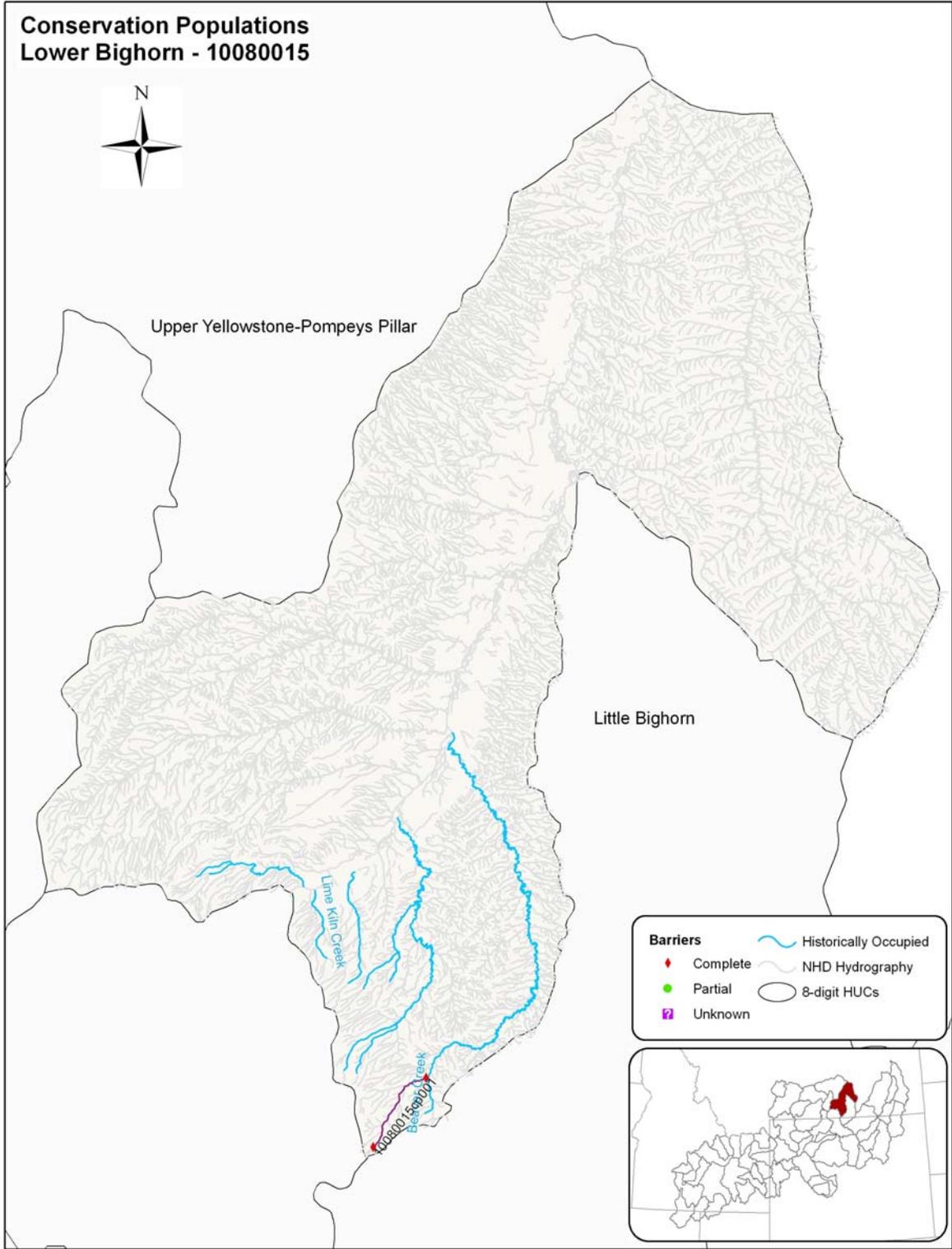
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080014cp001				Local	

Conservation Population ID:	Non-native
10080014cp001	None

	Habitat Condition in Miles of Stream				
Conservation Population ID	Excellent	Fair	Good	Poor	Unknown
10080014cp001		4.13			

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080014cp001	4.14	6.66			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080014cp001	Large Spot Only	4.127	103.2	1	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080015cp001	Core Conservation Population	Non-Network	7.04	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080015cp001	Limited Disease Risk	No Risk of Hybridization	Yes

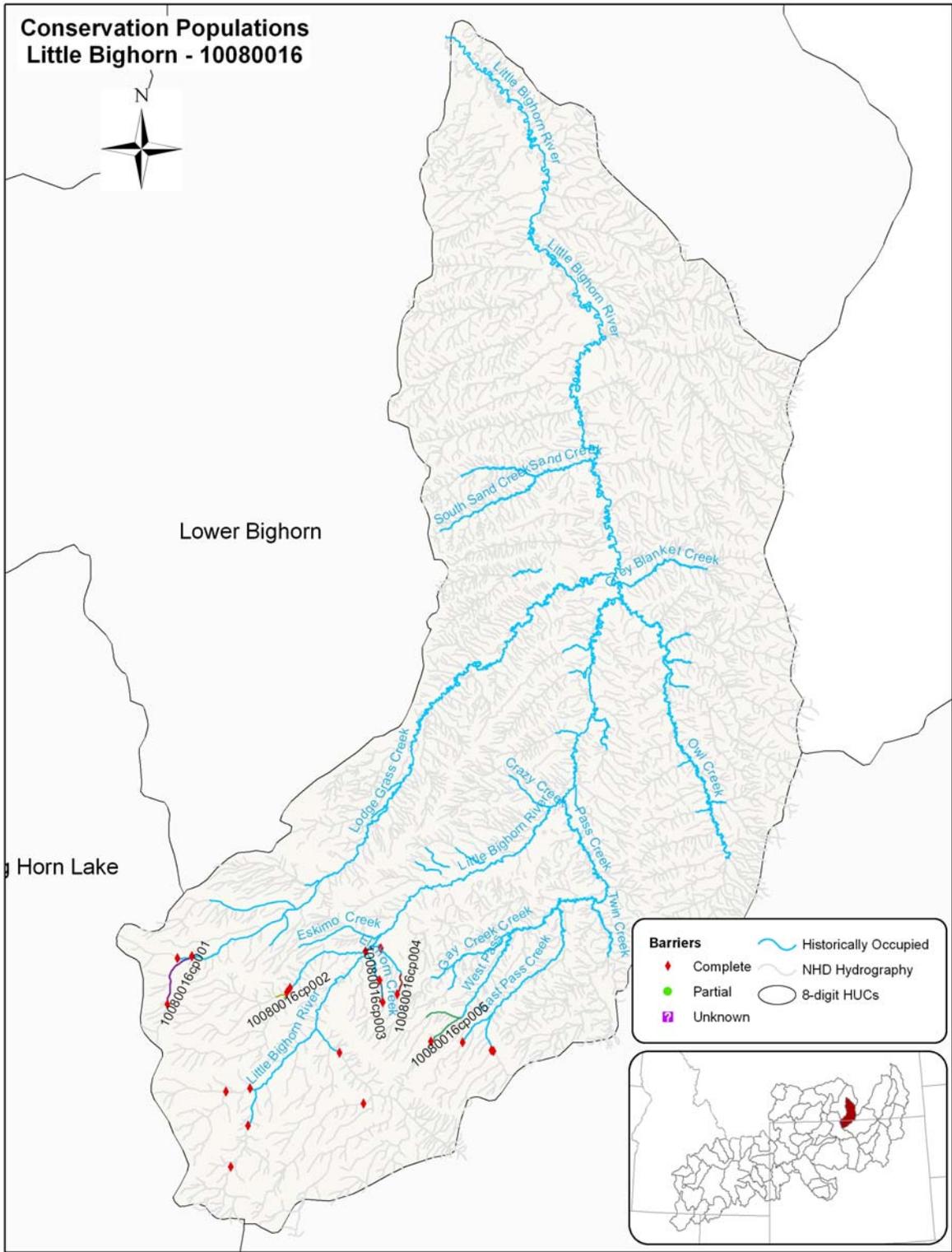
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080015cp001				Local	

Conservation Population ID:	Non-native
10080015cp001	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080015cp001		7.03			

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080015cp001	7.04	11.33			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080015cp001	Large Spot Only	7.034	703.4	1	4	3	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10080016cp001	Core Conservation Population	Non-Network	3.56	1	0	0
10080016cp002	Core Conservation Population	Non-Network	1.23	2	0	0
10080016cp003	Core Conservation Population	Non-Network	1.3	1	0	0
10080016cp004	Core Conservation Population	Non-Network	1.25	1	0	0
10080016cp005	Core Conservation Population	Non-Network	4.36	2	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10080016cp001	Limited Disease Risk	No Risk of Hybridization	Yes
10080016cp002	Limited Disease Risk	No Risk of Hybridization	Yes
10080016cp003	Limited Disease Risk	No Risk of Hybridization	Yes
10080016cp004	Limited Disease Risk	Hybridizing species < 10 km	No
10080016cp005	Limited Disease Risk	Hybridizing species < 10 km	No

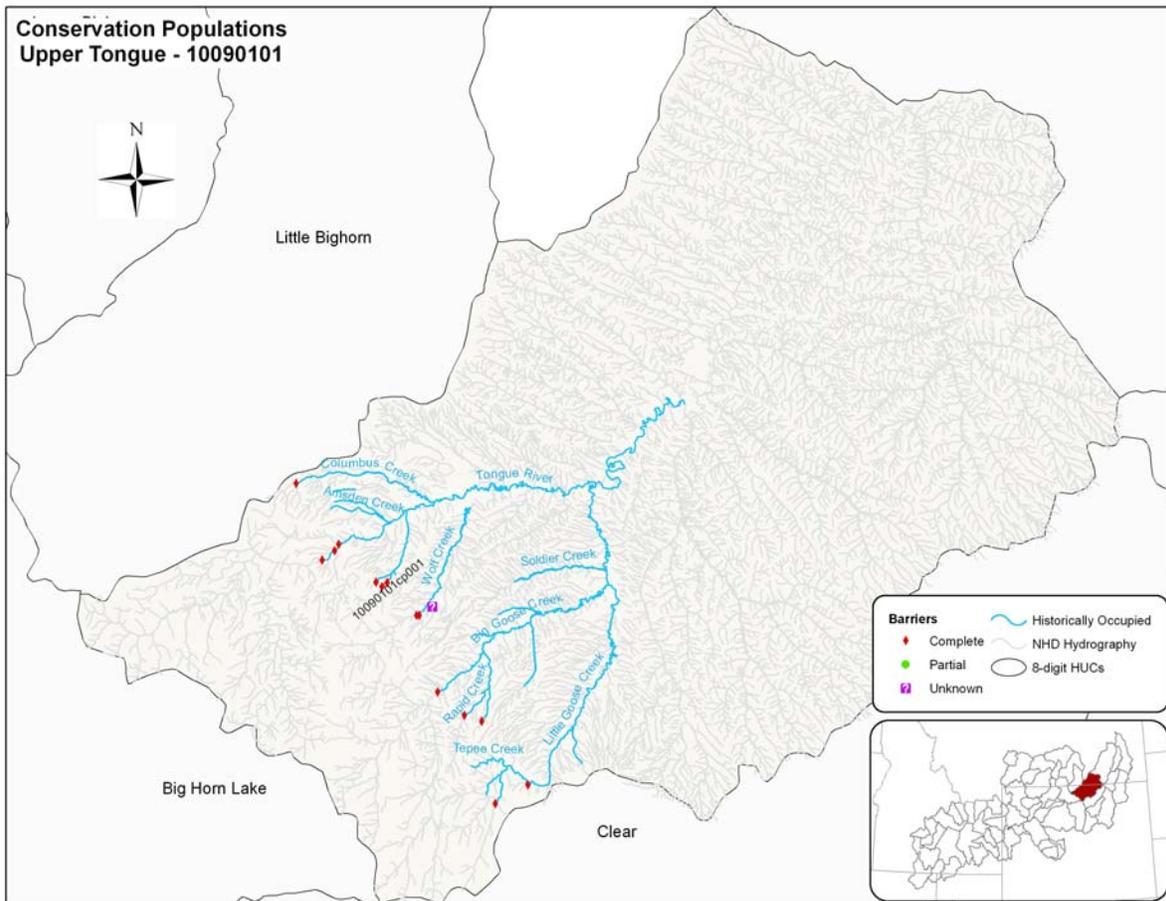
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10080016cp001				Local	
10080016cp002				Local	
10080016cp003				Local	
10080016cp004				Local	
10080016cp005				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10080016cp001	3.56	5.72			1					
10080016cp002	1.23	1.99			2					
10080016cp003	1.3	2.11			1					
10080016cp004	1.25	2.01	1.25	2.01	1					
10080016cp005	4.36	7.02	4.36	7.02	2					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10080016cp001	Large Spot Only	3.556	978	1	4	4	2	2	2
10080016cp002	Large Spot Only	1.235	22.4	1	4	4	4	2	3
10080016cp003	Large Spot Only	1.308	130.8	1	4	4	3	2	3
10080016cp004	Both Large and Fine Spot	1.247	342.8	1	4	4	3	2	3
10080016cp005	Large Spot Only	4.37	806.7	1	4	4	2	2	2

Conservation Population ID:	Non-native
10080016cp001	None
10080016cp002	None
10080016cp003	None
10080016cp004	BRK
10080016cp005	BRK, BRN

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10080016cp001			3.56		
10080016cp002			1.24		
10080016cp003		1.31			
10080016cp004			1.25		
10080016cp005			4.37		



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
10090101cp001	Core Conservation Population	Non-Network	0.57	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
10090101cp001	Limited Disease Risk	No Risk of Hybridization	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
10090101cp001				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
10090101cp001	0.57	0.92	0.57	0.92	1					

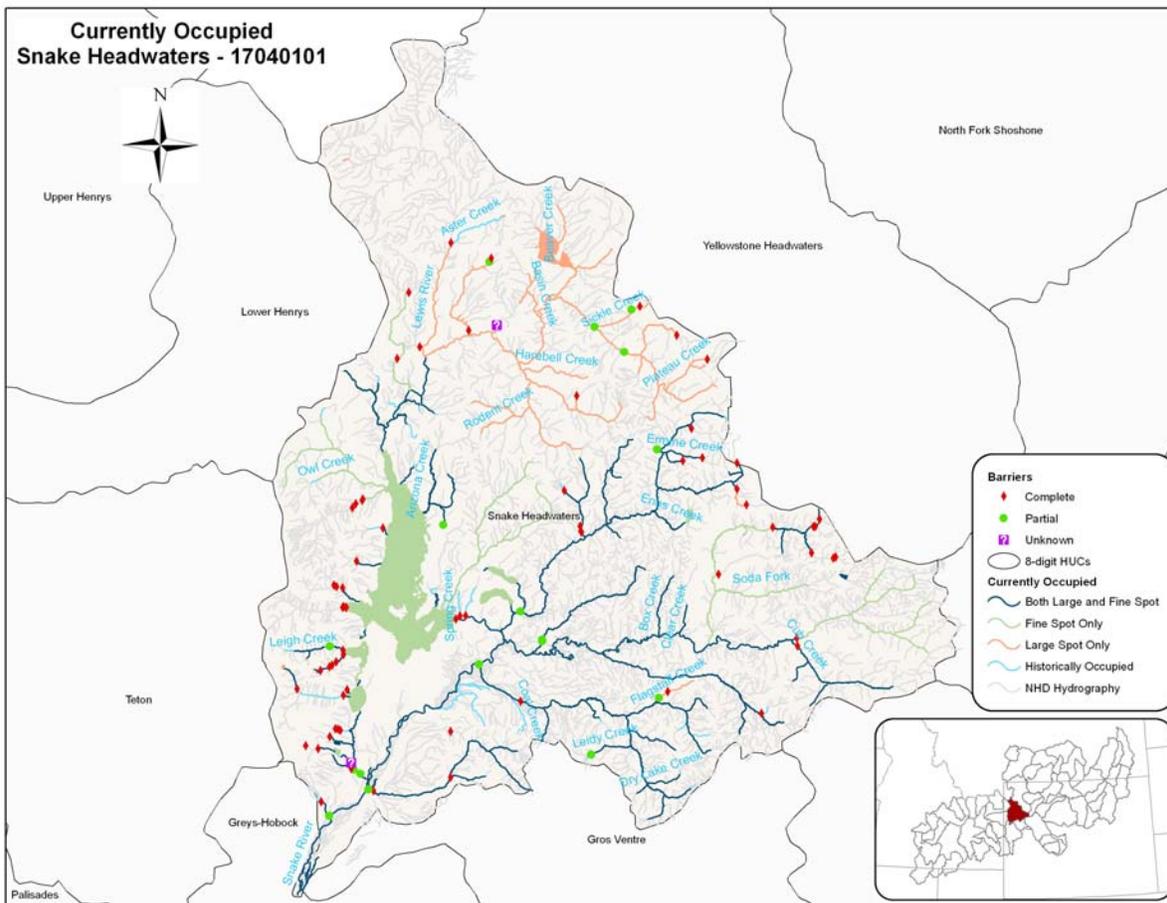
cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
10090101cp001	Large Spot Only	0.571	57.1	1	4	4	3	2	3

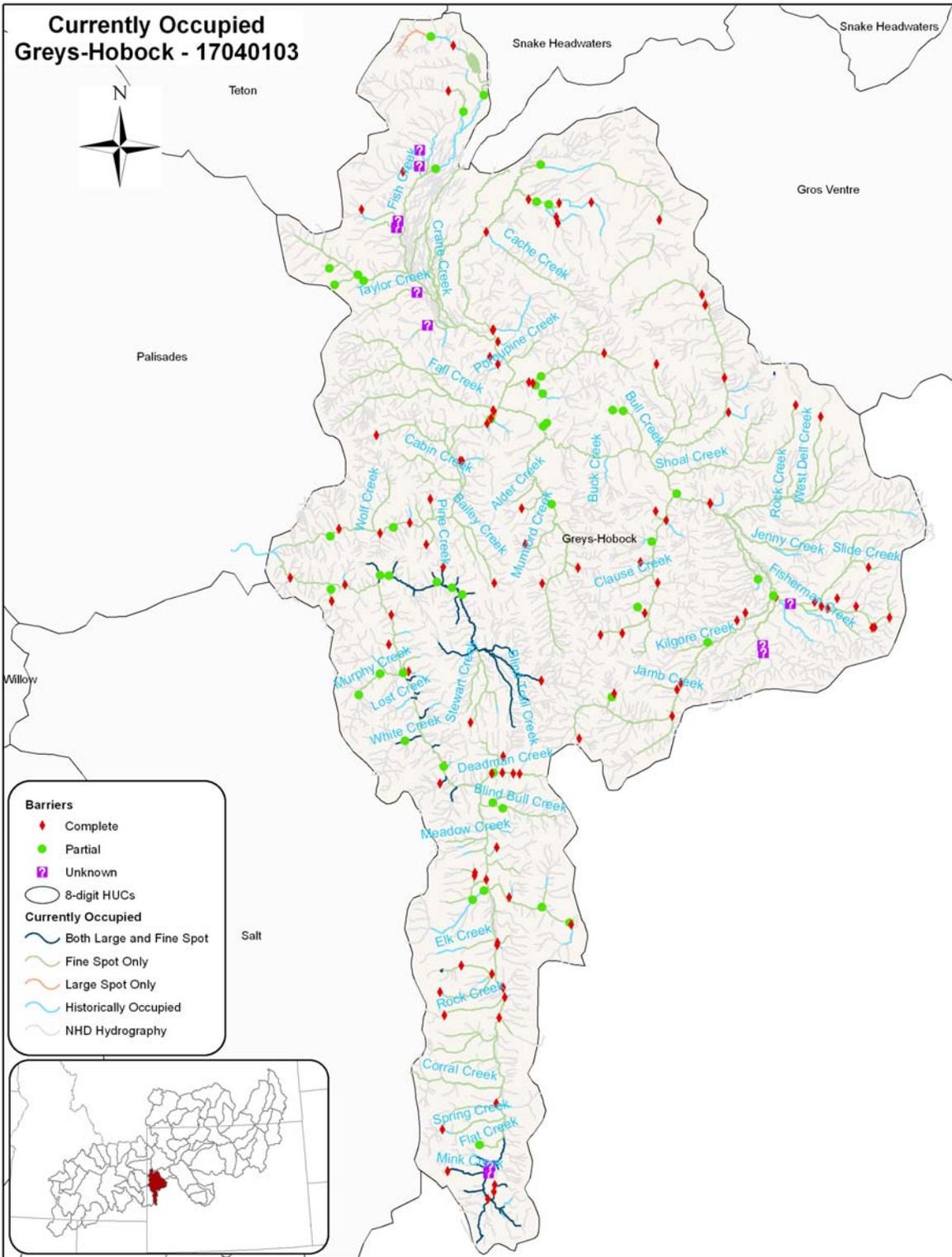
Conservation Population ID:	Non-native
10090101cp001	BRK

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
10090101cp001				0.57	

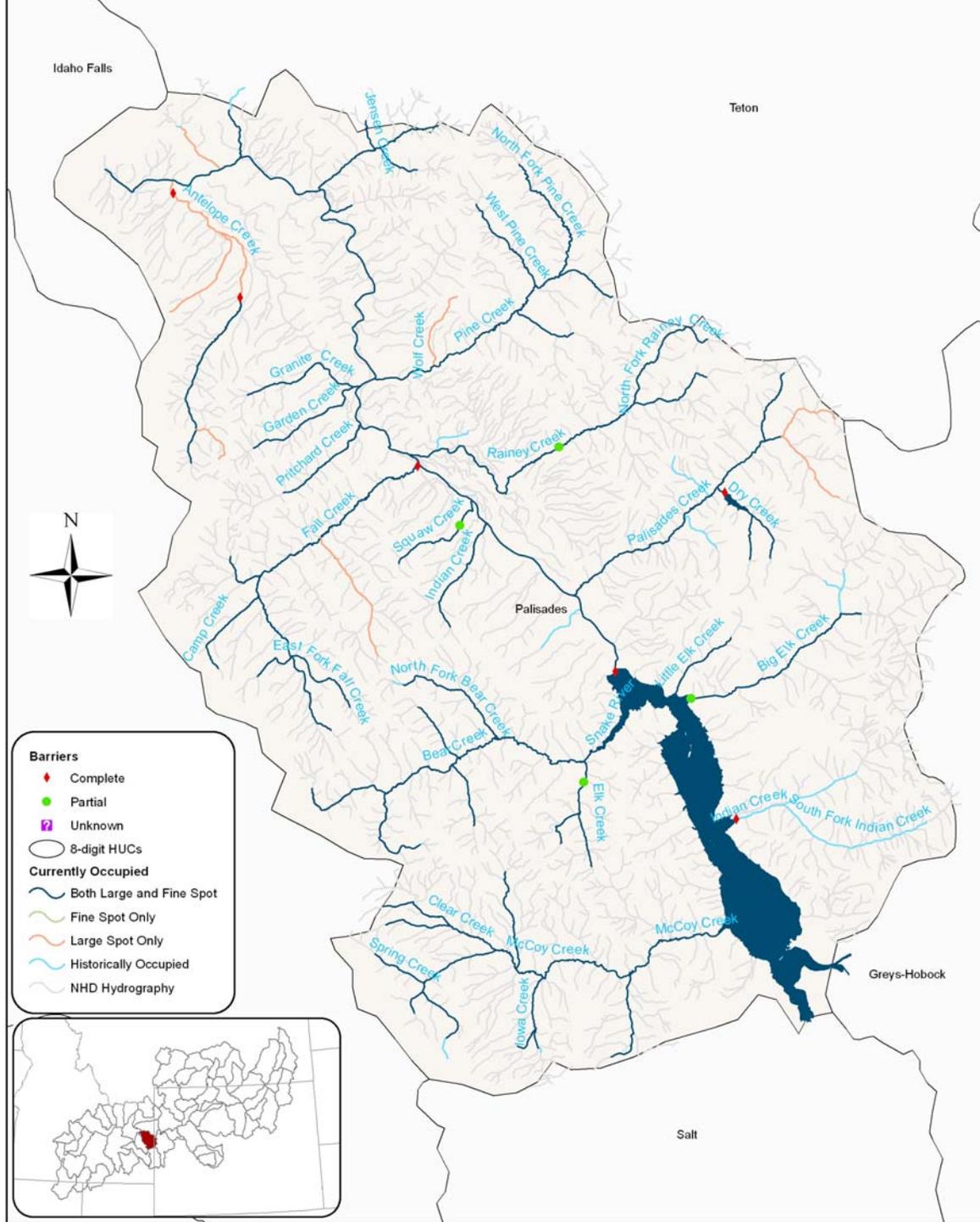
Upper Snake Geographical Management Unit

The upper Snake GMU contains 5 4th level HUCs. These watersheds encompass the headwaters of the Snake River and contains both historical and currently occupied habitat.





Currently Occupied Palisades - 17040104



Historic – Upper Snake GMU

Name	ID #	Historically Occupied Miles	Historical Lakes	Lake Acres
Snake Headwaters	17040101	663.22	30	33404.55
Gros Ventre	17040102	317.02	13	148.55
Greys-Hoback	17040103	826.09	15	598.64
Palisades	17040104	362.11		
Salt	17040105	580.37		

Current Distribution – Upper Snake GMU

Name	ID #	Spotting Pattern	Currently Occupied Miles	Currently Occupied KM
Snake Headwaters	17040101	Both Large and Fine Spot	420.59	676.91
Snake Headwaters	17040101	Fine Spot Only	122.46	197.03
Snake Headwaters	17040101	Large Spot Only	153.51	246.82
Gros Ventre	17040102	Both Large and Fine Spot	171.42	275.95
Gros Ventre	17040102	Fine Spot Only	132.76	213.55
Gros Ventre	17040102	Large Spot Only	2.18	3.54
Greys-Hoback	17040103	Both Large and Fine Spot	71.95	115.59
Greys-Hoback	17040103	Fine Spot Only	663.62	1068.3
Greys-Hoback	17040103	Large Spot Only	3.25	5.19
Palisades	17040104	Both Large and Fine Spot	287.7	462.98
Palisades	17040104	Large Spot Only	32.81	52.76
Salt	17040105	Both Large and Fine Spot	317.17	510.52
Salt	17040105	Fine Spot Only	166.69	268.25

Name	ID #	Spotting Pattern	Number of Lakes	Surface Acres
Snake Headwaters	17040101	Both Large and Fine Spot	5	167.99
Snake Headwaters	17040101	Fine Spot Only	15	31002.14
Snake Headwaters	17040101	Large Spot Only	10	2282.75
Gros Ventre	17040102	Fine Spot Only	16	760.26
Greys-Hoback	17040103	Both Large and Fine Spot	2	25.75
Greys-Hoback	17040103	Fine Spot Only	8	567.17
Greys-Hoback	17040103	Large Spot Only	1	8.21
Palisades	17040104	Both Large and Fine Spot	2	15887.4
Salt	17040105	Fine Spot Only	2	28.48

Name	HUC8	Spotting	Origin	Life History	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	308.86
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Migratory	12.96
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	10.13
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Unknown	64.07
Snake Headwaters	17040101	Both Large and Fine Spot	Restored - human restoration to start population	Non migratory	8.4
Snake Headwaters	17040101	Both Large and Fine Spot	Unknown	Combination	14.47
Snake Headwaters	17040101	Both Large and Fine Spot	Unknown	Non migratory	1.7
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Combination	81.91
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	12.76
Snake Headwaters	17040101	Fine Spot Only	Unknown	Unknown	27.79
Snake Headwaters	17040101	Large Spot Only	Aboriginal - naturally occurring population	Combination	125.9
Snake Headwaters	17040101	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	16.56
Snake Headwaters	17040101	Large Spot Only	Restored - human restoration to start population	Non migratory	11.05
Gros Ventre	17040102	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	164.08
Gros Ventre	17040102	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	7.34
Gros Ventre	17040102	Fine Spot Only	Aboriginal - naturally occurring population	Combination	94.17
Gros Ventre	17040102	Fine Spot Only	Aboriginal - naturally occurring population	Migratory	13.33
Gros Ventre	17040102	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	25.26
Gros Ventre	17040102	Large Spot Only	Aboriginal - naturally occurring population	Migratory	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	71.95
Greys-Hoback	17040103	Fine Spot Only	Aboriginal - naturally occurring population	Combination	588.48
Greys-Hoback	17040103	Fine Spot Only	Aboriginal - naturally occurring population	Non	72.84

				migratory	
Greys-Hoback	17040103	Fine Spot Only	Unknown	Non migratory	2.3
Greys-Hoback	17040103	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	3.25
Palisades	17040104	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	243.8
Palisades	17040104	Both Large and Fine Spot	Aboriginal - naturally occurring population	Migratory	4.42
Palisades	17040104	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	39.48
Palisades	17040104	Large Spot Only	Aboriginal - naturally occurring population	Combination	9.36
Palisades	17040104	Large Spot Only	Aboriginal - naturally occurring population	Migratory	17.8
Palisades	17040104	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	2.1
Palisades	17040104	Large Spot Only	Unknown	Combination	3.55
Salt	17040105	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	184.39
Salt	17040105	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	128.82
Salt	17040105	Both Large and Fine Spot	Aboriginal - naturally occurring population	Unknown	3.96
Salt	17040105	Fine Spot Only	Aboriginal - naturally occurring population	Combination	158.4
Salt	17040105	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	8.29

Name	HUC8	Spotting	Origin	Life History	Acres	Count of Lakes
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	68.68	2
Snake Headwaters	17040101	Both Large and Fine Spot	Aboriginal - naturally occurring population	Unknown	19.01	1
Snake Headwaters	17040101	Both Large and Fine Spot	Restored - human restoration to start population	Non migratory	9.48	1
Snake Headwaters	17040101	Both Large and Fine Spot	Unknown	Unknown	70.82	1
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Combination	26841.62	3
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Migratory	2.24	1
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	2420.99	3
Snake Headwaters	17040101	Fine Spot Only	Aboriginal - naturally occurring population	Unknown	1737.29	8
Snake Headwaters	17040101	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	44.45	2
Snake Headwaters	17040101	Large Spot Only	Aboriginal - naturally occurring population	Unknown	2224.9	6
Snake Headwaters	17040101	Large Spot Only	Restored - human restoration to start population	Non migratory	13.4	2
Gros Ventre	17040102	Fine Spot Only	Aboriginal - naturally occurring population	Combination	697.32	12
Gros Ventre	17040102	Fine Spot Only	Restored - human restoration to start population	Non migratory	62.94	4
Greys-Hoback	17040103	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	16.34	1
Greys-Hoback	17040103	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	9.41	1
Greys-Hoback	17040103	Fine Spot Only	Aboriginal - naturally occurring population	Combination	90.84	3
Greys-Hoback	17040103	Fine Spot Only	Aboriginal - naturally occurring population	Non migratory	473.45	4

Greys-Hoback	17040103	Fine Spot Only	Restored - human restoration to start population	Non migratory	2.88	1
Greys-Hoback	17040103	Large Spot Only	Restored - human restoration to start population	Non migratory	8.21	1
Palisades	17040104	Both Large and Fine Spot	Aboriginal - naturally occurring population	Migratory	15887.4	2
Salt	17040105	Fine Spot Only	Aboriginal - naturally occurring population	Combination	26.46	1
Salt	17040105	Fine Spot Only	Restored - human restoration to start population	Non migratory	2.02	1

Name	HUC8	Spotting	Stocking	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	No Record	17.8
Snake Headwaters	17040101	Both Large and Fine Spot	Non-Native Stocking	336.6
Snake Headwaters	17040101	Both Large and Fine Spot	YCT Stocking only	66.19
Snake Headwaters	17040101	Fine Spot Only	No Record	30.04
Snake Headwaters	17040101	Fine Spot Only	Non-Native Stocking	79.66
Snake Headwaters	17040101	Fine Spot Only	YCT Stocking only	12.76
Snake Headwaters	17040101	Large Spot Only	No Record	140.12
Snake Headwaters	17040101	Large Spot Only	Non-Native Stocking	2.34
Snake Headwaters	17040101	Large Spot Only	YCT Stocking only	11.05
Gros Ventre	17040102	Both Large and Fine Spot	No Record	37.43
Gros Ventre	17040102	Both Large and Fine Spot	Non-Native Stocking	133.99
Gros Ventre	17040102	Fine Spot Only	No Record	69.82
Gros Ventre	17040102	Fine Spot Only	Non-Native Stocking	62.94
Gros Ventre	17040102	Large Spot Only	Non-Native Stocking	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	No Record	9.42
Greys-Hoback	17040103	Both Large and Fine Spot	Non-Native Stocking	62.53
Greys-Hoback	17040103	Fine Spot Only	No Record	86.55
Greys-Hoback	17040103	Fine Spot Only	Non-Native Stocking	497.93
Greys-Hoback	17040103	Fine Spot Only	YCT Stocking only	79.14
Greys-Hoback	17040103	Large Spot Only	No Record	3.25
Palisades	17040104	Both Large and Fine Spot	No Record	178.49
Palisades	17040104	Both Large and Fine Spot	Non-Native Stocking	109.21
Palisades	17040104	Large Spot Only	No Record	26.75
Palisades	17040104	Large Spot Only	Non-Native Stocking	6.06
Salt	17040105	Both Large and Fine Spot	No Record	184.24
Salt	17040105	Both Large and Fine Spot	Non-Native Stocking	132.93
Salt	17040105	Fine Spot Only	No Record	19.32
Salt	17040105	Fine Spot Only	Non-Native Stocking	147.37

Name	HUC8	Spotting	Stocking	Acres	Number of Lakes
Snake Headwaters	17040101	Both Large and Fine Spot	No Record	70.82	1
Snake Headwaters	17040101	Both Large and Fine Spot	Non-Native Stocking	76.54	2
Snake Headwaters	17040101	Both Large and Fine Spot	YCT Stocking only	20.63	2
Snake Headwaters	17040101	Fine Spot Only	No Record	44.7	6
Snake Headwaters	17040101	Fine Spot Only	Non-Native Stocking	30943.05	7
Snake Headwaters	17040101	Fine Spot Only	YCT Stocking only	14.39	2
Snake Headwaters	17040101	Large Spot Only	No Record	128.35	8
Snake Headwaters	17040101	Large Spot Only	Non-Native Stocking	2153.86	1
Snake Headwaters	17040101	Large Spot Only	YCT Stocking only	0.54	1
Gros Ventre	17040102	Fine Spot Only	No Record	180.17	10
Gros Ventre	17040102	Fine Spot Only	Non-Native Stocking	580.09	6
Greys-Hoback	17040103	Both Large and Fine Spot	Non-Native Stocking	25.75	2
Greys-Hoback	17040103	Fine Spot Only	Non-Native Stocking	524.58	5
Greys-Hoback	17040103	Fine Spot Only	YCT Stocking only	42.59	3
Greys-Hoback	17040103	Large Spot Only	YCT Stocking only	8.21	1
Palisades	17040104	Both Large and Fine Spot	No Record	121.97	1
Palisades	17040104	Both Large and Fine Spot	Non-Native Stocking	15765.43	1
Salt	17040105	Fine Spot Only	Non-Native Stocking	28.48	2

Name	HUC8	Spotting	Genetics	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	Unaltered (< 1%)	245.09
Snake Headwaters	17040101	Both Large and Fine Spot	Not Tested - Suspected Unaltered	150.67
Snake Headwaters	17040101	Both Large and Fine Spot	Not Tested - Suspected Hybridized	24.83
Snake Headwaters	17040101	Fine Spot Only	Unaltered (< 1%)	35.43
Snake Headwaters	17040101	Fine Spot Only	Not Tested - Suspected Unaltered	59.24
Snake Headwaters	17040101	Fine Spot Only	Not Tested - Suspected Hybridized	27.79
Snake Headwaters	17040101	Large Spot Only	Unaltered (< 1%)	94.11

Snake Headwaters	17040101	Large Spot Only	>25%	2.34
Snake Headwaters	17040101	Large Spot Only	Not Tested - Suspected Unaltered	57.06
Gros Ventre	17040102	Both Large and Fine Spot	Unaltered (< 1%)	161.39
Gros Ventre	17040102	Both Large and Fine Spot	Not Tested - Suspected Unaltered	10.03
Gros Ventre	17040102	Fine Spot Only	Unaltered (< 1%)	82.54
Gros Ventre	17040102	Fine Spot Only	>1% and <=10%	3.49
Gros Ventre	17040102	Fine Spot Only	Not Tested - Suspected Unaltered	12.67
Gros Ventre	17040102	Fine Spot Only	Not Tested - Suspected Hybridized	0.46
Gros Ventre	17040102	Fine Spot Only	Co-existence	33.6
Gros Ventre	17040102	Large Spot Only	Unaltered (< 1%)	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	Unaltered (< 1%)	71.95
Greys-Hoback	17040103	Fine Spot Only	Unaltered (< 1%)	621.41
Greys-Hoback	17040103	Fine Spot Only	>1% and <=10%	32.59
Greys-Hoback	17040103	Fine Spot Only	Not Tested - Suspected Unaltered	9.62
Greys-Hoback	17040103	Large Spot Only	Unaltered (< 1%)	3.25
Palisades	17040104	Both Large and Fine Spot	Unaltered (< 1%)	136.56
Palisades	17040104	Both Large and Fine Spot	>1% and <=10%	56.71
Palisades	17040104	Both Large and Fine Spot	>10% and <=25%	12.63
Palisades	17040104	Both Large and Fine Spot	Not Tested - Suspected Unaltered	52.95
Palisades	17040104	Both Large and Fine Spot	Not Tested - Suspected Hybridized	28.85
Palisades	17040104	Large Spot Only	Unaltered (< 1%)	21.45
Palisades	17040104	Large Spot Only	Not Tested - Suspected Unaltered	11.36
Salt	17040105	Both Large and Fine Spot	Unaltered (< 1%)	167.02
Salt	17040105	Both Large and Fine Spot	Not Tested - Suspected Unaltered	114.8
Salt	17040105	Both Large and Fine Spot	Not Tested - Suspected Hybridized	35.35
Salt	17040105	Fine Spot Only	Unaltered (< 1%)	165.72
Salt	17040105	Fine Spot Only	Not Tested - Suspected Unaltered	0.97

Name	HUC8	Spotting	Genetics	Acres	Count of Lakes
Snake Headwaters	17040101	Both Large and Fine Spot	Not Tested - Suspected Unaltered	167.99	5
Snake Headwaters	17040101	Fine Spot Only	Unaltered (< 1%)	207.68	1
Snake Headwaters	17040101	Fine Spot Only	Not Tested - Suspected Unaltered	30794.46	14
Snake Headwaters	17040101	Large Spot Only	Not Tested - Suspected Unaltered	2282.75	10

Name	HUC8	Spotting	Genetics	Acres	Count of Lakes
Gros Ventre	17040102	Fine Spot Only	Not Tested - Suspected Unaltered	251.6	15
Gros Ventre	17040102	Fine Spot Only	Co-existence	508.66	1
Greys-Hoback	17040103	Both Large and Fine Spot	Not Tested - Suspected Unaltered	25.75	2
Greys-Hoback	17040103	Fine Spot Only	Not Tested - Suspected Unaltered	567.17	8
Greys-Hoback	17040103	Large Spot Only	Not Tested - Suspected Unaltered	8.21	1
Palisades	17040104	Both Large and Fine Spot	Unaltered (< 1%)	15887.4	2
Salt	17040105	Fine Spot Only	Unaltered (< 1%)	26.46	1
Salt	17040105	Fine Spot Only	Not Tested - Suspected Unaltered	2.02	1

Name	HUC8	Spotting	Population Density	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	401 to 1000 fish	70.13
Snake Headwaters	17040101	Both Large and Fine Spot	151 to 400 fish	158.32
Snake Headwaters	17040101	Both Large and Fine Spot	50 to 150 fish	101.67
Snake Headwaters	17040101	Both Large and Fine Spot	0 to 50 fish	90.47
Snake Headwaters	17040101	Fine Spot Only	50 to 150 fish	94.67
Snake Headwaters	17040101	Fine Spot Only	0 to 50 fish	27.79
Snake Headwaters	17040101	Large Spot Only	151 to 400 fish	58.43
Snake Headwaters	17040101	Large Spot Only	50 to 150 fish	78.94
Snake Headwaters	17040101	Large Spot Only	0 to 50 fish	16.14
Gros Ventre	17040102	Both Large and Fine Spot	50 to 150 fish	31.86
Gros Ventre	17040102	Both Large and Fine Spot	0 to 50 fish	139.56
Gros Ventre	17040102	Fine Spot Only	151 to 400 fish	3.45
Gros Ventre	17040102	Fine Spot Only	50 to 150 fish	44.88
Gros Ventre	17040102	Fine Spot Only	0 to 50 fish	84.43
Gros Ventre	17040102	Large Spot Only	0 to 50 fish	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	151 to 400 fish	14.14
Greys-Hoback	17040103	Both Large and Fine Spot	50 to 150 fish	55.16
Greys-Hoback	17040103	Both Large and Fine Spot	0 to 50 fish	2.65

Greys-Hoback	17040103	Fine Spot Only	401 to 1000 fish	46.46
Greys-Hoback	17040103	Fine Spot Only	151 to 400 fish	324.49
Greys-Hoback	17040103	Fine Spot Only	50 to 150 fish	262.32
Greys-Hoback	17040103	Fine Spot Only	0 to 50 fish	30.35
Greys-Hoback	17040103	Large Spot Only	50 to 150 fish	3.25
Palisades	17040104	Both Large and Fine Spot	401 to 1000 fish	39.66
Palisades	17040104	Both Large and Fine Spot	151 to 400 fish	45.99
Palisades	17040104	Both Large and Fine Spot	50 to 150 fish	69.19
Palisades	17040104	Both Large and Fine Spot	0 to 50 fish	124.64
Palisades	17040104	Both Large and Fine Spot	Unknown	8.22
Palisades	17040104	Large Spot Only	0 to 50 fish	29.26
Palisades	17040104	Large Spot Only	Unknown	3.55
Salt	17040105	Both Large and Fine Spot	401 to 1000 fish	59.28
Salt	17040105	Both Large and Fine Spot	50 to 150 fish	99.91
Salt	17040105	Both Large and Fine Spot	0 to 50 fish	157.98
Salt	17040105	Fine Spot Only	151 to 400 fish	103.53
Salt	17040105	Fine Spot Only	50 to 150 fish	34.67
Salt	17040105	Fine Spot Only	0 to 50 fish	28.49

Name	HUC8	Spotting	Habitat	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	Good	375.9
Snake Headwaters	17040101	Both Large and Fine Spot	Fair	30.22
Snake Headwaters	17040101	Both Large and Fine Spot	Unknown	14.47
Snake Headwaters	17040101	Fine Spot Only	Good	94.67
Snake Headwaters	17040101	Fine Spot Only	Unknown	27.79
Snake Headwaters	17040101	Large Spot Only	Good	153.51
Gros Ventre	17040102	Both Large and Fine Spot	Good	130.84
Gros Ventre	17040102	Both Large and Fine Spot	Fair	40.58
Gros Ventre	17040102	Fine Spot Only	Good	115.44
Gros Ventre	17040102	Fine Spot Only	Fair	13.64
Gros Ventre	17040102	Fine Spot Only	Poor	3.68
Gros Ventre	17040102	Large Spot Only	Poor	2.18
Greys-	17040103	Both Large and Fine	Good	71.88

Hoback		Spot		
Greys-Hoback	17040103	Both Large and Fine Spot	Unknown	0.07
Greys-Hoback	17040103	Fine Spot Only	Good	523.11
Greys-Hoback	17040103	Fine Spot Only	Fair	138.21
Greys-Hoback	17040103	Fine Spot Only	Unknown	2.3
Greys-Hoback	17040103	Large Spot Only	Good	3.25
Palisades	17040104	Both Large and Fine Spot	Excellent	231.58
Palisades	17040104	Both Large and Fine Spot	Good	46.18
Palisades	17040104	Both Large and Fine Spot	Fair	9.94
Palisades	17040104	Large Spot Only	Excellent	3.65
Palisades	17040104	Large Spot Only	Good	6.71
Palisades	17040104	Large Spot Only	Fair	22.45
Salt	17040105	Both Large and Fine Spot	Good	311.6
Salt	17040105	Both Large and Fine Spot	Fair	5.57
Salt	17040105	Fine Spot Only	Good	123.01
Salt	17040105	Fine Spot Only	Fair	42.8
Salt	17040105	Fine Spot Only	Poor	0.88

Name	HUC8	Spotting	Width	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	> 50 feet	41.44
Snake Headwaters	17040101	Both Large and Fine Spot	25 to 50 feet	104.77
Snake Headwaters	17040101	Both Large and Fine Spot	15 to 25 feet	193.49
Snake Headwaters	17040101	Both Large and Fine Spot	5 to 15 feet	80.08
Snake Headwaters	17040101	Both Large and Fine Spot	< 5 feet	0.81
Snake Headwaters	17040101	Fine Spot Only	15 to 25 feet	99.79
Snake Headwaters	17040101	Fine Spot Only	5 to 15 feet	22.67
Snake Headwaters	17040101	Large Spot Only	25 to 50 feet	44.11
Snake Headwaters	17040101	Large Spot Only	15 to 25 feet	103.43
Snake Headwaters	17040101	Large Spot Only	5 to 15 feet	2.78
Snake Headwaters	17040101	Large Spot Only	< 5 feet	3.19

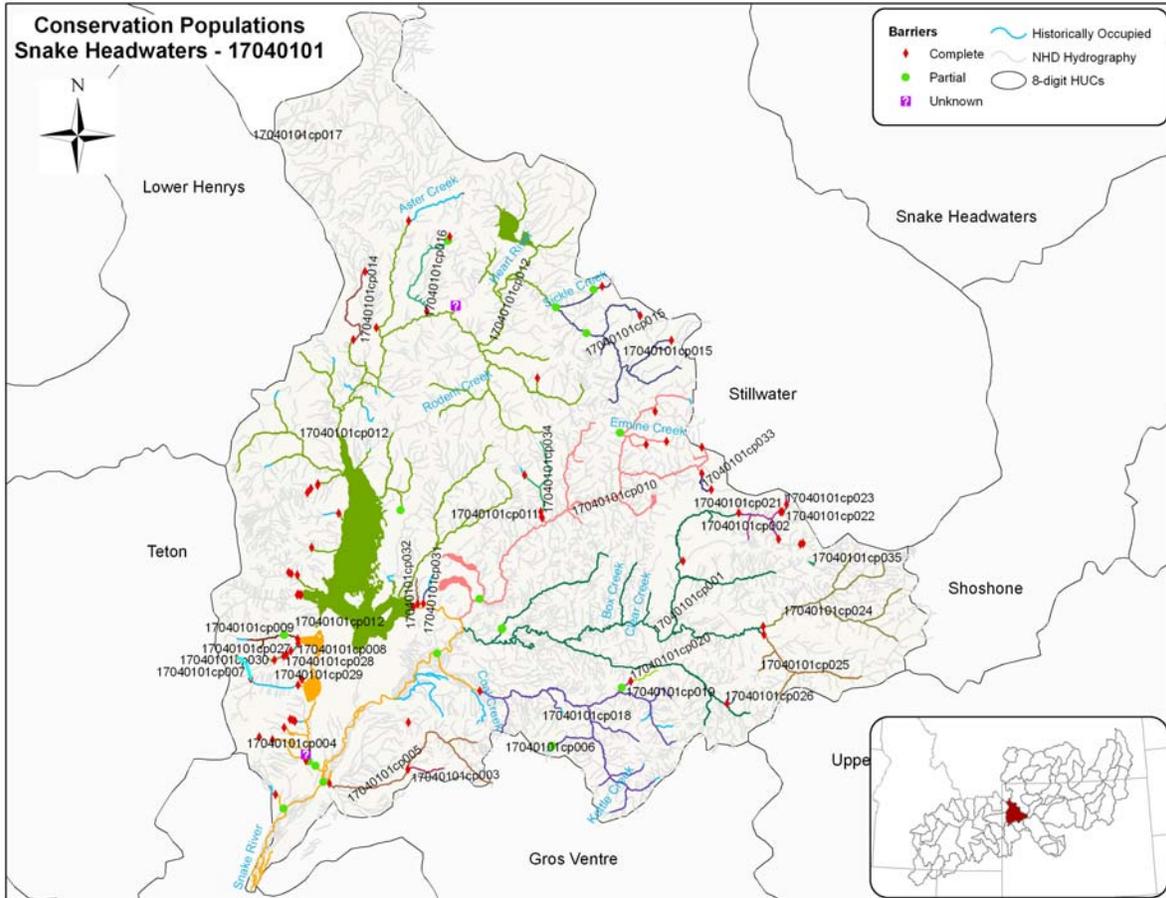
Gros Ventre	17040102	Both Large and Fine Spot	15 to 25 feet	52.84
Gros Ventre	17040102	Both Large and Fine Spot	5 to 15 feet	86.78
Gros Ventre	17040102	Both Large and Fine Spot	< 5 feet	31.8
Gros Ventre	17040102	Fine Spot Only	> 50 feet	6.43
Gros Ventre	17040102	Fine Spot Only	25 to 50 feet	24.68
Gros Ventre	17040102	Fine Spot Only	15 to 25 feet	45.85
Gros Ventre	17040102	Fine Spot Only	5 to 15 feet	51.64
Gros Ventre	17040102	Fine Spot Only	< 5 feet	4.16
Gros Ventre	17040102	Large Spot Only	25 to 50 feet	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	15 to 25 feet	14.14
Greys-Hoback	17040103	Both Large and Fine Spot	5 to 15 feet	55.09
Greys-Hoback	17040103	Both Large and Fine Spot	< 5 feet	2.72
Greys-Hoback	17040103	Fine Spot Only	> 50 feet	46.46
Greys-Hoback	17040103	Fine Spot Only	25 to 50 feet	101
Greys-Hoback	17040103	Fine Spot Only	15 to 25 feet	336.25
Greys-Hoback	17040103	Fine Spot Only	5 to 15 feet	174.3
Greys-Hoback	17040103	Fine Spot Only	< 5 feet	3.31
Greys-Hoback	17040103	Fine Spot Only	Unknown	2.3
Greys-Hoback	17040103	Large Spot Only	5 to 15 feet	3.25
Palisades	17040104	Both Large and Fine Spot	> 50 feet	39.66
Palisades	17040104	Both Large and Fine Spot	25 to 50 feet	16.92
Palisades	17040104	Both Large and Fine Spot	15 to 25 feet	27.9
Palisades	17040104	Both Large and Fine Spot	5 to 15 feet	136.48
Palisades	17040104	Both Large and Fine Spot	< 5 feet	66.74
Palisades	17040104	Large Spot Only	5 to 15 feet	28.17
Palisades	17040104	Large Spot Only	< 5 feet	4.64
Salt	17040105	Both Large and Fine Spot	15 to 25 feet	28.61
Salt	17040105	Both Large and Fine Spot	5 to 15 feet	173.76
Salt	17040105	Both Large and Fine Spot	< 5 feet	114.8
Salt	17040105	Fine Spot Only	25 to 50 feet	95.44
Salt	17040105	Fine Spot Only	15 to 25 feet	42.76

Name	HUC8	Spotting	Non-Natives	Stream Mile
Snake Headwaters	17040101	Both Large and Fine Spot	Non-Natives are not Present	47.93
Snake Headwaters	17040101	Both Large and Fine Spot	Non-Natives are Present	372.66
Snake Headwaters	17040101	Fine Spot Only	Non-Natives are not Present	22.67
Snake Headwaters	17040101	Fine Spot Only	Non-Natives are Present	99.79
Snake Headwaters	17040101	Large Spot Only	Non-Natives are not Present	114.9
Snake Headwaters	17040101	Large Spot Only	Non-Natives are Present	38.61
Gros Ventre	17040102	Both Large and Fine Spot	Non-Natives are not Present	74.77
Gros Ventre	17040102	Both Large and Fine Spot	Non-Natives are Present	96.65
Gros Ventre	17040102	Fine Spot Only	Non-Natives are not Present	80.5
Gros Ventre	17040102	Fine Spot Only	Non-Natives are Present	52.26
Gros Ventre	17040102	Large Spot Only	Non-Natives are not Present	2.18
Greys-Hoback	17040103	Both Large and Fine Spot	Non-Natives are not Present	65.08
Greys-Hoback	17040103	Both Large and Fine Spot	Non-Natives are Present	6.87
Greys-Hoback	17040103	Fine Spot Only	Non-Natives are not Present	335.01
Greys-Hoback	17040103	Fine Spot Only	Non-Natives are Present	328.61
Greys-Hoback	17040103	Large Spot Only	Non-Natives are not Present	3.25
Palisades	17040104	Both Large and Fine Spot	Non-Natives are not Present	138.87
Palisades	17040104	Both Large and Fine Spot	Non-Natives are Present	148.83
Palisades	17040104	Large Spot Only	Non-Natives are not Present	26.75
Palisades	17040104	Large Spot Only	Non-Natives are Present	6.06
Salt	17040105	Both Large and Fine Spot	Non-Natives are not Present	173.39
Salt	17040105	Both Large and Fine Spot	Non-Natives are Present	143.78
Salt	17040105	Fine Spot Only	Non-Natives are not Present	34.67
Salt	17040105	Fine Spot Only	Non-Natives are Present	132.02

Name	HUC8	Ownership	Wilderness	Stream
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				Mile
Snake Headwaters	17040101	National Park Service	No	227.8
Snake Headwaters	17040101	National Park Service	Yes	1.93
Snake Headwaters	17040101	Private	No	35.51
Snake Headwaters	17040101	State	No	0.4
Snake Headwaters	17040101	U.S. Forest Service	No	144.14
Snake Headwaters	17040101	U.S. Forest Service	Yes	254.71
Snake Headwaters	17040101	Water	No	31.84
Snake Headwaters	17040101	Water	Yes	0.23
Gros Ventre	17040102	Bureau of Land Management	No	3.96
Gros Ventre	17040102	National Park Service	No	0.27
Gros Ventre	17040102	Private	No	13.86
Gros Ventre	17040102	Private	Yes	0.2
Gros Ventre	17040102	State	No	1.09
Gros Ventre	17040102	U.S. Fish and Wildlife Service	No	9.55
Gros Ventre	17040102	U.S. Fish and Wildlife Service	Yes	0
Gros Ventre	17040102	U.S. Forest Service	No	249.11
Gros Ventre	17040102	U.S. Forest Service	Yes	26.03
Gros Ventre	17040102	Water	No	2.29
Greys-Hoback	17040103	Bureau of Land Management	No	0.88
Greys-Hoback	17040103	National Park Service	No	7.07
Greys-Hoback	17040103	Private	No	109.87
Greys-Hoback	17040103	Private	Yes	0.04
Greys-Hoback	17040103	State	No	3.48
Greys-Hoback	17040103	U.S. Fish and Wildlife Service	No	16.27
Greys-Hoback	17040103	U.S. Forest Service	No	451.36
Greys-Hoback	17040103	U.S. Forest Service	Yes	110.2
Greys-Hoback	17040103	Water	No	38.93
Greys-Hoback	17040103	Water	Yes	0.72
Palisades	17040104	Bureau of Land Management	No	4.13
Palisades	17040104	Private	No	43.42
Palisades	17040104	State	No	0.91
Palisades	17040104	U.S. Forest Service	No	229.83
Palisades	17040104	U.S. Forest Service	Yes	0.81
Palisades	17040104	Water	No	41.41
Salt	17040105	Bureau of Land Management	No	3.77
Salt	17040105	Private	No	226.96
Salt	17040105	State	No	8.69
Salt	17040105	U.S. Forest Service	No	241.3
Salt	17040105	U.S. Forest Service	Yes	1.54
Salt	17040105	Water	No	1.6

Upper Snake Conservation Populations



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040101cp001	Core Conservation Population	Strongly Networked	115.64	3	1.62	1
17040101cp002	Other	Weakly Networked	8.4	1	0	0
17040101cp003	Core Conservation Population	Non-Network	2.94	1	0	0
17040101cp004	Core Conservation Population	Strongly Networked	71.31	6	2488.05	4
17040101cp005	Other	Moderately Networked	24.95	1	0	0
17040101cp006	Other	Moderately Networked	0	0	9.48	1
17040101cp007	Known or Probable Unique Life History	Non-Network	2.14	1	37.27	1
17040101cp008	Other	Non-Network	0.81	1	7.18	1
17040101cp009	Known or Probable Unique Life History	Non-Network	4.66	1	21.09	3
17040101cp010	Core Conservation Population	Strongly Networked	73.95	1	1708.97	4
17040101cp011	Known or Probable Unique Life History	Non-Network	0.42	1	0	0
17040101cp012	Core Conservation Population	Strongly Networked	208.67	9	29068.54	10
17040101cp013	Core Conservation Population	Strongly Networked	0	0	10.6	1
17040101cp014	Other	Weakly Networked	8.28	1	0	0
17040101cp015	Core Conservation Population	Strongly Networked	39.39	1	14.02	1
17040101cp016	Other	Non-Network	10.61	1	0	0
17040101cp017	Other	Weakly Networked	0.44	1	0.54	1
17040101cp018	Core Conservation Population	Moderately Networked	64.07	1	0	0
17040101cp019	Core Conservation Population	Non-Network	0.81	1	0	0
17040101cp020	Core Conservation Population	Non-Network	2.38	1	0	0
17040101cp021	Known or Probable Unique Life History	Non-Network	0.14	1	0	0
17040101cp022	Known or Probable Unique Life History	Non-Network	0.75	1	0	0
17040101cp023	Known or Probable Unique Life History	Non-Network	0.81	1	0	0
17040101cp024	Known or Probable Unique Life History	Moderately Networked	27.79	1	0	0
17040101cp025	Known or Probable Unique Life History	Weakly Networked	14.47	1	0	0
17040101cp026	Other	Non-Network	0.9	1	0	0

17040101cp027	Core Conservation Population	Non-Network	0.43	1	0	0
17040101cp028	Core Conservation Population	Non-Network	0.26	1	0	0
17040101cp029	Core Conservation Population	Non-Network	0.83	1	0	0
17040101cp030	Core Conservation Population	Non-Network	0.58	1	0	0
17040101cp031	Other	Non-Network	1.42	1	0	0
17040101cp032	Other	Non-Network	2.43	1	0	0
17040101cp033	Other	Non-Network	2.34	1	0	0
17040101cp034	Known or Probable Unique Life History	Non-Network	8.29	1	0	0
17040101cp035	Other	Non-Network	0		70.82	1

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040101cp001	Limited Disease Risk	Hybridizing species < 10 km	No
17040101cp002	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp003	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp004	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	No
17040101cp005	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040101cp006	Limited Disease Risk	No Risk of Hybridization	No
17040101cp007	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp008	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp009	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp010	Limited Disease Risk	No Risk of Hybridization	No
17040101cp011	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp012	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp013	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp014	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp015	Limited Disease Risk	No Risk of Hybridization	No
17040101cp016	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp017	Limited Disease Risk	No Risk of Hybridization	No
17040101cp018	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040101cp019	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
17040101cp020	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040101cp021	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp022	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp023	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp024	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp025	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp026	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp027	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp028	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp029	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp030	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp031	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp032	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040101cp033	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp034	Limited Disease Risk	No Risk of Hybridization	Yes
17040101cp035	Limited Disease Risk	Hybridizing species > 10 km	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040101cp001				Local	
17040101cp002					Unknown
17040101cp003				Local	
17040101cp004				Local	
17040101cp005				Local	
17040101cp006					Unknown
17040101cp007				Local	
17040101cp008					Unknown
17040101cp009				Local	
17040101cp010			Lg. river		
17040101cp011				Local	
17040101cp012		Lake trib.		Local	
17040101cp013				Local	
17040101cp014				Local	
17040101cp015				Local	
17040101cp016				Local	
17040101cp017				Local	
17040101cp018				Local	
17040101cp019				Local	
17040101cp020				Local	
17040101cp021				Local	
17040101cp022				Local	
17040101cp023				Local	
17040101cp024				Local	
17040101cp025				Local	
17040101cp026					Unknown
17040101cp027				Local	
17040101cp028				Local	
17040101cp029				Local	
17040101cp030				Local	
17040101cp031					Unknown
17040101cp032				Local	
17040101cp033				Local	
17040101cp034				Local	
17040101cp035					Unknown

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040101cp001	115.64	186.14	115.64	186.14	3	1.62	0.66	1		
17040101cp002	8.4	13.5			1					
17040101cp003	2.94	4.72			1					
17040101cp004	71.31	114.63	69.36	111.48	6	2488.05	1006.88	4	2420.99	3
17040101cp005	24.95	40.22			1					
17040101cp006						9.48	3.84	1		
17040101cp007	2.14	3.42	2.14	3.42	1	37.27	15.08	1		
17040101cp008	0.81	1.3			1	7.18	2.9	1		
17040101cp009	4.66	7.52			1	21.09	8.53	3		
17040101cp010	73.95	118.83	73.95	118.83	1	1708.97	691.6	4	591.29	1
17040101cp011	0.42	0.67			1					
17040101cp012	208.67	335.59	121.54	195.61	9	29068.54	11763.6	10	2173.08	4
17040101cp013						10.6	4.29	1		
17040101cp014	8.28	13.32	8.28	13.32	1					
17040101cp015	39.39	63.45			1	14.02	5.67	1		
17040101cp016	10.61	17.06			1					
17040101cp017	0.44	0.72			1	0.54	0.22	1		
17040101cp018	64.07	103.23	64.07	103.23	1					
17040101cp019	0.81	1.31	0.81	1.31	1					
17040101cp020	2.38	3.8	2.38	3.8	1					
17040101cp021	0.14	0.24			1					
17040101cp022	0.75	1.2			1					
17040101cp023	0.81	1.31			1					
17040101cp024	27.79	44.76	27.79	44.76	1					
17040101cp025	14.47	23.3	14.47	23.3	1					
17040101cp026	0.9	1.45			1					
17040101cp027	0.43	0.7			1					
17040101cp028	0.26	0.42			1					
17040101cp029	0.83	1.34			1					
17040101cp030	0.58	0.94			1					

17040101cp031	1.42	2.28	1.42	2.28	1					
17040101cp032	2.43	3.92	2.43	3.92	1					
17040101cp033	2.34	3.77	2.34	3.77	1					
17040101cp034	8.29	13.35	8.29	13.35	1					
17040101cp035						70.82	28.66	1		

Conservation Population ID:	Non-native
17040101cp001	BRK, LAK, RBT
17040101cp002	None
17040101cp003	None
17040101cp004	BRK, BRN, LAK, RBT
17040101cp005	None
17040101cp006	None
17040101cp007	BRK
17040101cp008	None
17040101cp009	None
17040101cp010	BRK, TRT
17040101cp011	None
17040101cp012	BRK, BRN, LAK
17040101cp013	Unknown
17040101cp014	BRK, BRN
17040101cp015	None
17040101cp016	None
17040101cp017	Unknown
17040101cp018	BRK
17040101cp019	BRK
17040101cp020	BRK
17040101cp021	None
17040101cp022	None
17040101cp023	None
17040101cp024	BRK, RBT, TRT
17040101cp025	BRK, RBT
17040101cp026	None
17040101cp027	None
17040101cp028	None
17040101cp029	None
17040101cp030	None
17040101cp031	BRK
17040101cp032	BRK
17040101cp033	TRT
17040101cp034	BRK, TRT
17040101cp035	Unknown

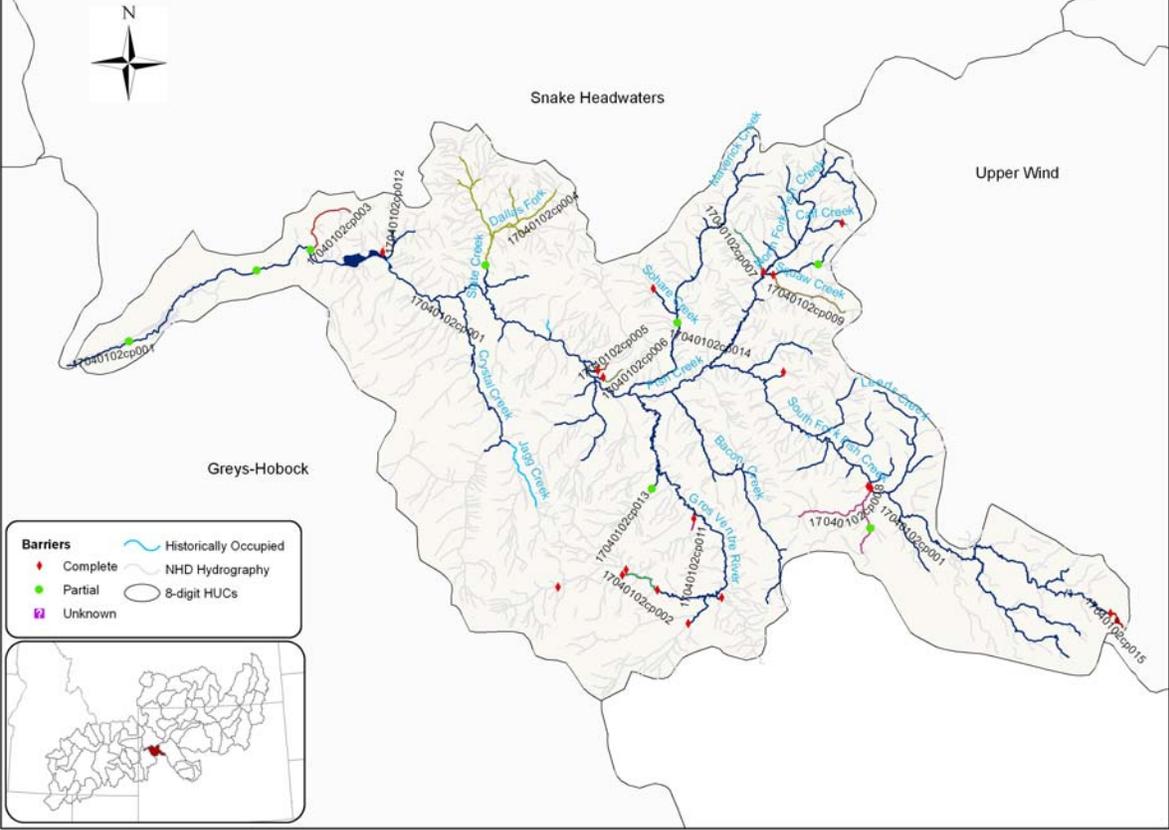
Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040101cp001			115.68		
17040101cp002			8.38		
17040101cp003		2.93			
17040101cp004		0.63	70.63		
17040101cp005		25			
17040101cp007			2.13		

17040101cp008			0.81		
17040101cp009			4.67		
17040101cp010			73.92		
17040101cp011			0.42		
17040101cp012			208.54		
17040101cp014			8.3		
17040101cp015			39.44		
17040101cp016			10.6		
17040101cp017			0.45		
17040101cp018			64.12		
17040101cp019			0.81		
17040101cp020			2.37		
17040101cp021		0.14			
17040101cp022		0.74			
17040101cp023		0.82			
17040101cp024					27.81
17040101cp025					14.47
17040101cp026		0.9			
17040101cp027			0.44		
17040101cp028			0.26		
17040101cp029			0.83		
17040101cp030			0.59		
17040101cp031		1.42			
17040101cp032		2.44			
17040101cp033			2.34		
17040101cp034			8.31		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040101cp001	Both Large and Fine Spot	115.681	24885.8	1	1	1	1	2	1
17040101cp002	Both Large and Fine Spot	8.378	209.5	1	3	3	3	2	2
17040101cp003	Both Large and Fine Spot	2.932	293.2	1	4	4	3	2	3
17040101cp004	Both Large and Fine Spot	71.261	33913.9	2	1	1	1	4	2
17040101cp005	Both Large and Fine Spot	24.995	2499.5	2	2	2	1	3	2
17040101cp007	Both Large and Fine Spot	2.131	213.1	1	4	4	3	2	3
17040101cp008	Both Large and Fine Spot	0.81	81	1	4	4	3	2	3
17040101cp009	Both Large and Fine Spot	4.666	466.6	1	4	4	3	2	3
17040101cp010	Both Large and Fine Spot	73.923	20328.8	1	1	1	1	2	1
17040101cp011	Both Large and Fine Spot	0.416	10.4	1	4	4	4	2	3
17040101cp012	Both Large and Fine Spot	208.544	49738.6	1	1	1	1	4	2
17040101cp014	Fine Spot Only	8.297	829.7	1	3	3	2	2	2
17040101cp015	Large Spot Only	39.438	3943.8	1	1	2	1	2	1
17040101cp016	Large Spot Only	10.604	265.1	1	4	3	3	2	2
17040101cp017	Large Spot Only	0.449	44.9	1	3	4	4	2	3
17040101cp018	Both Large and Fine Spot	64.116	1602.9	2	2	1	2	3	2
17040101cp019	Large Spot Only	0.812	20.3	2	4	4	4	2	3
17040101cp020	Large Spot Only	2.367	59.2	2	4	4	3	2	3
17040101cp021	Both Large and Fine Spot	0.145	3.6	1	4	4	4	2	3
17040101cp022	Both Large and Fine Spot	0.744	18.6	1	4	4	4	2	3
17040101cp023	Both Large and Fine Spot	0.823	20.6	1	4	4	4	2	3

17040101cp024	Fine Spot Only	27.811	695.3	1	2	2	2	4	3
17040101cp025	Both Large and Fine Spot	14.473	361.8	1	3	3	3	4	4
17040101cp026	Both Large and Fine Spot	0.9	22.5	1	4	4	4	2	3
17040101cp027	Both Large and Fine Spot	0.435	43.5	1	4	4	4	2	3
17040101cp028	Both Large and Fine Spot	0.256	25.6	1	4	4	4	2	3
17040101cp029	Both Large and Fine Spot	0.829	82.9	1	4	4	3	2	3
17040101cp030	Both Large and Fine Spot	0.587	58.7	1	4	4	3	2	3
17040101cp031	Fine Spot Only	1.419	35.5	1	4	4	4	2	3
17040101cp032	Fine Spot Only	2.436	60.9	1	4	4	3	2	3
17040101cp033	Large Spot Only	2.339	58.5	1	4	4	3	2	3
17040101cp034	Both Large and Fine Spot	8.309	2284.9	1	4	3	1	2	2

**Conservation Populations
Gros Ventre - 17040102**



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040102cp001	Known or Probable Unique Life History	Strongly Networked	263.64	37	645.11	10
17040102cp002	Core Conservation Population	Non-Network	3.49	1	0	0
17040102cp003	Core Conservation Population	Non-Network	3.68	1	0	0
17040102cp004	Core Conservation Population	Non-Network	17	4	0	0
17040102cp005	Core Conservation Population	Non-Network	0.72	1	0	0
17040102cp006	Core Conservation Population	Non-Network	1.3	1	0	0
17040102cp007	Core Conservation Population	Non-Network	3.08	1	0	0
17040102cp008	Core Conservation Population	Non-Network	7.6	1	0	0
17040102cp009	Core Conservation Population	Non-Network	4.64	1	0	0
17040102cp011	Core Conservation Population	Non-Network	0.56	1	0	0
17040102cp012	Core Conservation Population	Non-Network	0.36	1	0	0
17040102cp013	Core Conservation Population	Non-Network	0.23	1	0	0
17040102cp014	Core Conservation Population	Non-Network	0.21	1	0	0
17040102cp015	Known or Probable Unique Life History	Non-Network	0.49	1	52.21	2

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040102cp001	Limited Disease Risk	Hybridizing species are sympatric	No
17040102cp002	Limited Disease Risk	No Risk of Hybridization	Yes
17040102cp003	Limited Disease Risk	Hybridizing species < 10 km	No
17040102cp004	Limited Disease Risk	Hybridizing species < 10 km	No
17040102cp005	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040102cp006	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040102cp007	Limited Disease Risk	No Risk of Hybridization	Yes
17040102cp008	Limited Disease Risk	No Risk of Hybridization	Yes
17040102cp009	Limited Disease Risk	No Risk of Hybridization	Yes
17040102cp011	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040102cp012	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040102cp013	Limited Disease Risk	Hybridizing species < 10 km	No
17040102cp014	Limited Disease Risk	Hybridizing species < 10 km	No
17040102cp015	Limited Disease Risk	Hybridizing species are sympatric	Yes

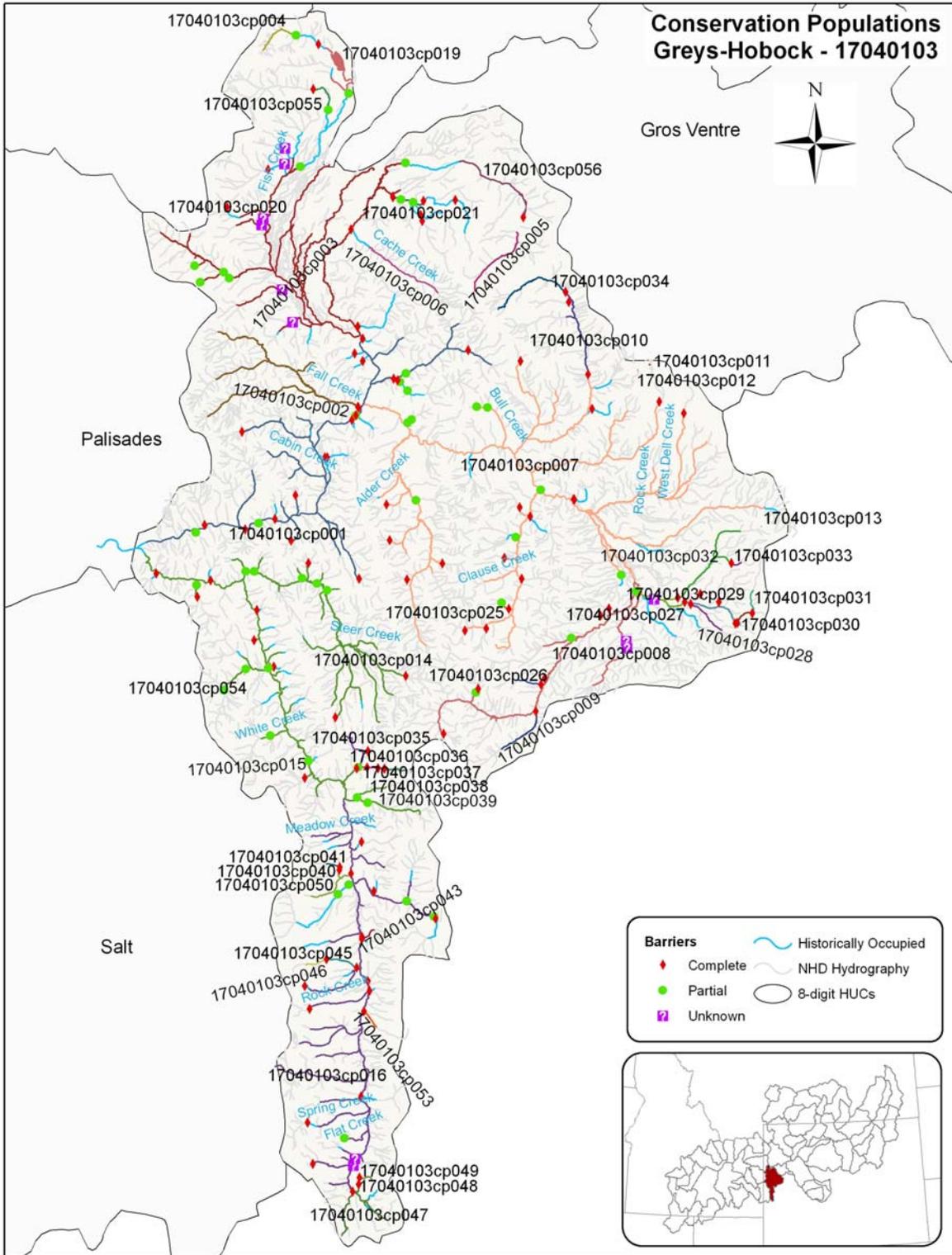
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040102cp001		Lake trib.	Lg. river	Local	
17040102cp002				Local	
17040102cp003				Local	
17040102cp004				Local	
17040102cp005				Local	
17040102cp006				Local	
17040102cp007				Local	
17040102cp008				Local	
17040102cp009				Local	
17040102cp011				Local	
17040102cp012				Local	
17040102cp013				Local	
17040102cp014				Local	
17040102cp015		Lake trib.			

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040102cp001	263.64	424.37	119.03	191.79	37	645.11	261.08	10	553.38	4
17040102cp002	3.49	5.59	3.49	5.59	1					
17040102cp003	3.68	5.94			1					
17040102cp004	17	27.32	17	27.32	4					
17040102cp005	0.72	1.16			1					
17040102cp006	1.3	2.1	1.3	2.1	1					
17040102cp007	3.08	4.95			1					
17040102cp008	7.6	12.22	7.6	12.22	1					
17040102cp009	4.64	7.47			1					
17040102cp011	0.56	0.88			1					
17040102cp012	0.36	0.58			1					
17040102cp013	0.23	0.37			1					
17040102cp014	0.21	0.34			1					
17040102cp015	0.49	0.78	0.49	0.78	1	52.21	21.13	2		

Conservation Population ID:	Non-native
17040102cp001	BRK, RBT, TRT
17040102cp002	BRK
17040102cp003	None
17040102cp004	BRK
17040102cp005	None
17040102cp006	BRK
17040102cp007	None
17040102cp008	BRK
17040102cp009	None
17040102cp011	None
17040102cp012	None
17040102cp013	None
17040102cp014	None
17040102cp015	BRK

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040102cp001		45.11	215.74	2.83	
17040102cp002			3.47		
17040102cp003				3.7	
17040102cp004			17.01		
17040102cp005		0.72			
17040102cp006			1.3		
17040102cp007			3.08		
17040102cp008		7.6			
17040102cp009			4.64		
17040102cp011			0.55		
17040102cp012		0.36			
17040102cp013		0.23			
17040102cp014		0.21			
17040102cp015			0.49		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040102cp001	Both Large and Fine Spot	263.678	12336.6	1	1	1	1	4	2
17040102cp002	Fine Spot Only	3.472	86.8	1	4	4	3	2	3
17040102cp003	Fine Spot Only	3.696	92.4	1	4	4	3	2	3
17040102cp004	Both Large and Fine Spot	17.006	722.3	1	4	3	2	3	3
17040102cp005	Fine Spot Only	0.719	18	1	4	4	4	2	3
17040102cp006	Fine Spot Only	1.302	32.6	1	4	4	4	2	3
17040102cp007	Both Large and Fine Spot	3.075	76.9	1	4	4	3	2	3
17040102cp008	Both Large and Fine Spot	7.599	759.9	1	4	3	2	2	2
17040102cp009	Both Large and Fine Spot	4.635	115.9	1	4	4	3	2	3
17040102cp011	Fine Spot Only	0.555	13.9	1	4	4	4	2	3
17040102cp012	Fine Spot Only	0.361	9	1	4	4	4	2	3
17040102cp013	Fine Spot Only	0.227	5.7	1	4	4	4	2	3
17040102cp014	Fine Spot Only	0.214	5.3	1	4	4	4	2	3
17040102cp015	Both Large and Fine Spot	0.488	12.2	1	4	4	4	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040103cp001	Core Conservation Population	Strongly Networked	77.61	7	38.51	2
17040103cp002	Other	Moderately Networked	31.71	1	0	0
17040103cp003	Core Conservation Population	Strongly Networked	105.58	6	0	0
17040103cp004	Other	Non-Network	3.25	1	0	0
17040103cp005	Other	Non-Network	5.91	1	0	0
17040103cp006	Other	Non-Network	5.85	1	0	0
17040103cp007	Core Conservation Population	Strongly Networked	171.65	9	0	0
17040103cp008	Other	Strongly Networked	41.12	8	0	0
17040103cp009	Core Conservation Population	Non-Network	4	1	0	0
17040103cp010	Other	Weakly Networked	6.86	1	0	0
17040103cp011	Other	Non-Network	0	0	8.21	1
17040103cp012	Other	Non-Network	0	0	9.41	1
17040103cp013	Other	Non-Network	0	0	4.08	1
17040103cp014	Core Conservation Population	Strongly Networked	109.13	11	0	0
17040103cp015	Core Conservation Population	Strongly Networked	0.07	1	0	0
17040103cp016	Core Conservation Population	Strongly Networked	98.11	9	0	0
17040103cp019	Other	Non-Network	4.66	1	456.82	1
17040103cp020	Core Conservation Population	Non-Network	0	0	1.08	1
17040103cp021	Other	Non-Network	2.87	2	0	0
17040103cp025	Other	Non-Network	0.66	1	0	0
17040103cp026	Other	Non-Network	1.6	1	0	0
17040103cp027	Other	Non-Network	5.42	2	0	0
17040103cp028	Other	Non-Network	4.43	3	0	0
17040103cp029	Other	Non-Network	2.81	1	0	0
17040103cp030	Other	Non-Network	1.37	1	0	0
17040103cp031	Other	Non-Network	1.72	1	0	0
17040103cp032	Other	Non-Network	8.95	2	0	0

17040103cp033	Other	Non-Network	0.72	1	0	0
17040103cp034	Other	Non-Network	6.05	1	11.47	1
17040103cp035	Known or Probable Unique Life History	Non-Network	3.73	3	0	0
17040103cp036	Other	Non-Network	0.65	1	0	0
17040103cp037	Other	Non-Network	0.74	1	0	0
17040103cp038	Other	Non-Network	0.46	1	0	0
17040103cp039	Other	Non-Network	1.69	1	0	0
17040103cp040	Core Conservation Population	Non-Network	0.2	1	0	0
17040103cp041	Core Conservation Population	Non-Network	0.98	1	0	0
17040103cp043	Other	Non-Network	1.06	1	0	0
17040103cp045	Known or Probable Unique Life History	Non-Network	2.22	1	0	0
17040103cp046	Known or Probable Unique Life History	Non-Network	1.31	1	16.34	1
17040103cp047	Core Conservation Population	Weakly Networked	7.95	4	0	0
17040103cp048	Known or Probable Unique Life History	Non-Network	0.48	1	0	0
17040103cp049	Known or Probable Unique Life History	Non-Network	0.92	1	0	0
17040103cp050	Core Conservation Population	Non-Network	4.1	2	0	0
17040103cp053	Known or Probable Unique Life History	Non-Network	1.38	1	0	0
17040103cp054	Other	Non-Network	0	0	2.88	1
17040103cp055	Other	Non-Network	2.59	1	0	0
17040103cp056	Other	Non-Network	6.25	1	52.33	1

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040103cp001	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040103cp002	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp003	Moderate Disease Risk < 10 km	Hybridizing species > 10 km	No
17040103cp004	Limited Disease Risk	No Risk of Hybridization	No
17040103cp005	Limited Disease Risk	No Risk of Hybridization	No
17040103cp006	Limited Disease Risk	No Risk of Hybridization	No
17040103cp007	Limited Disease Risk	Hybridizing species are sympatric	No
17040103cp008	Limited Disease Risk	Hybridizing species < 10 km	No
17040103cp009	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp010	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040103cp011	Limited Disease Risk	No Risk of Hybridization	No
17040103cp012	Limited Disease Risk	No Risk of Hybridization	No
17040103cp013	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp014	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp015	Limited Disease Risk	Hybridizing species are sympatric	No
17040103cp016	Limited Disease Risk	Hybridizing species > 10 km	No
17040103cp019	Limited Disease Risk	No Risk of Hybridization	No
17040103cp020	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp021	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp025	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp026	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp027	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp028	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp029	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp030	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp031	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp032	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp033	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp034	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp035	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp036	Limited Disease Risk	Hybridizing species > 10 km	No
17040103cp037	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp038	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp039	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040103cp040	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp041	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp043	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp045	Limited Disease Risk	Hybridizing species are sympatric	Yes
17040103cp046	Limited Disease Risk	Hybridizing species are sympatric	Yes
17040103cp047	Limited Disease Risk	Hybridizing species > 10 km	Yes

17040103cp048	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp049	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp050	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp053	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040103cp054	Limited Disease Risk	No Risk of Hybridization	Yes
17040103cp055	Limited Disease Risk	No Risk of Hybridization	No
17040103cp056	Limited Disease Risk	No Risk of Hybridization	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040103cp001				Local	
17040103cp002				Local	
17040103cp003				Local	
17040103cp004					Unknown
17040103cp005					Unknown
17040103cp006					Unknown
17040103cp007				Local	
17040103cp008				Local	
17040103cp009				Local	
17040103cp010					Unknown
17040103cp011					Unknown
17040103cp012					Unknown
17040103cp013					Unknown
17040103cp014				Local	
17040103cp015				Local	
17040103cp016				Local	
17040103cp019					Unknown
17040103cp020					Unknown
17040103cp021				Local	
17040103cp025				Local	
17040103cp026				Local	
17040103cp027				Local	
17040103cp028				Local	
17040103cp029				Local	
17040103cp030				Local	
17040103cp031				Local	
17040103cp032				Local	
17040103cp033				Local	
17040103cp034				Local	
17040103cp035				Local	
17040103cp036				Local	
17040103cp037				Local	
17040103cp038				Local	
17040103cp039				Local	
17040103cp040				Local	
17040103cp041				Local	

17040103cp043				Local	
17040103cp045				Local	
17040103cp046				Local	
17040103cp047				Local	
17040103cp048				Local	
17040103cp049				Local	
17040103cp050				Local	
17040103cp053				Local	
17040103cp054					Unknown
17040103cp055				Local	
17040103cp056		Lake trib.		Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040103cp001	77.61	125.15	46.34	74.74	7	38.51	15.58	2	38.51	2
17040103cp002	31.71	50.98			1					
17040103cp003	105.58	169.96	102.54	165.05	6					
17040103cp004	3.25	5.19			1					
17040103cp005	5.91	9.54			1					
17040103cp006	5.85	9.39	5.85	9.39	1					
17040103cp007	171.65	276.36	64.29	103.53	9					
17040103cp008	41.12	66.24	9.62	15.52	8					
17040103cp009	4	6.41			1					
17040103cp010	6.86	11.01			1					
17040103cp011						8.21	3.32	1		
17040103cp012						9.41	3.81	1		
17040103cp013						4.08	1.65	1		
17040103cp014	109.13	175.43	6.87	10.97	11					
17040103cp015	0.07	0.13			1					
17040103cp016	98.11	157.78	85.51	137.58	9					
17040103cp019	4.66	7.51	4.66	7.51	1	456.82	184.87	1	456.82	1
17040103cp020						1.08	0.44	1		
17040103cp021	2.87	4.69	2.3	3.76	2					
17040103cp025	0.66	1.07			1					
17040103cp026	1.6	2.58			1					
17040103cp027	5.42	8.71			2					
17040103cp028	4.43	7.15			3					
17040103cp029	2.81	4.53			1					
17040103cp030	1.37	2.18			1					
17040103cp031	1.72	2.76			1					
17040103cp032	8.95	14.43			2					
17040103cp033	0.72	1.13			1					
17040103cp034	6.05	9.74			1	11.47	4.64	1	11.47	1
17040103cp035	3.73	5.98			3					

17040103cp036	0.65	1.04			1					
17040103cp037	0.74	1.2			1					
17040103cp038	0.46	0.74			1					
17040103cp039	1.69	2.71			1					
17040103cp040	0.2	0.33			1					
17040103cp041	0.98	1.57			1					
17040103cp043	1.06	1.7			1					
17040103cp045	2.22	3.58	2.22	3.58	1					
17040103cp046	1.31	2.12	1.31	2.12	1	16.34	6.61	1		
17040103cp047	7.95	12.81			4					
17040103cp048	0.48	0.77			1					
17040103cp049	0.92	1.48			1					
17040103cp050	4.1	6.59			2					
17040103cp053	1.38	2.21	1.38	2.21	1					
17040103cp054						2.88	1.16	1		
17040103cp055	2.59	4.17	2.59	4.17	1					
17040103cp056	6.25	10.03			1	52.33	21.18	1	52.33	1

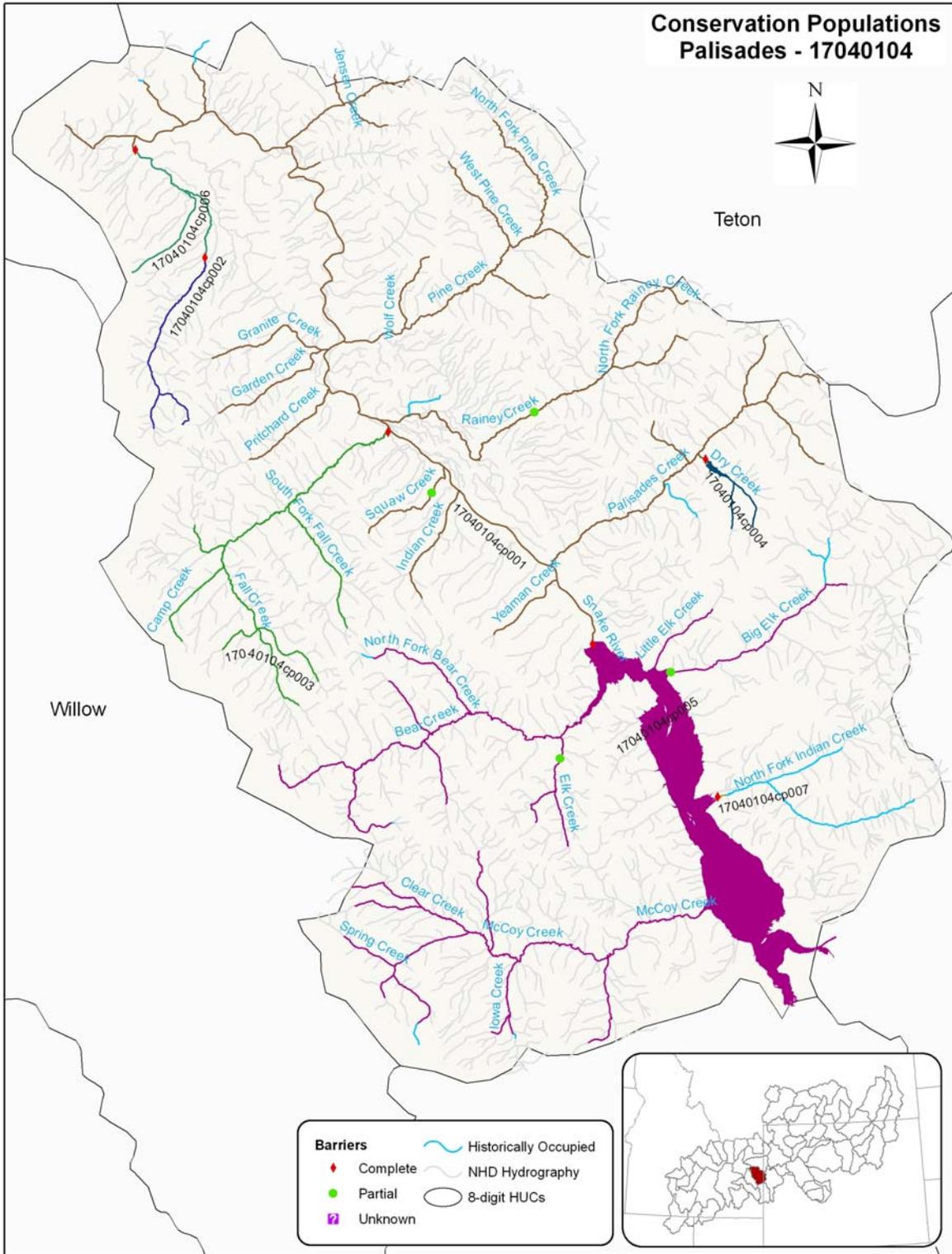
Conservation Population ID:	Non-native
17040103cp001	BRK, BRN
17040103cp002	None
17040103cp003	BRK, BRN
17040103cp004	None
17040103cp005	None
17040103cp006	BRK
17040103cp007	BRK, BRN, CUT, YSF
17040103cp008	BRK
17040103cp009	None
17040103cp010	None
17040103cp011	None
17040103cp012	None
17040103cp013	None
17040103cp014	RBT
17040103cp015	None
17040103cp016	BRK, CUT
17040103cp019	BRK
17040103cp020	None
17040103cp021	BRK, BRN
17040103cp025	None
17040103cp026	None
17040103cp027	None
17040103cp028	None
17040103cp029	None
17040103cp030	None
17040103cp031	None
17040103cp032	None
17040103cp033	None
17040103cp034	None
17040103cp035	None
17040103cp036	None
17040103cp037	None
17040103cp038	None
17040103cp039	None
17040103cp040	None
17040103cp041	None
17040103cp043	None
17040103cp045	CUT
17040103cp046	CUT
17040103cp047	None
17040103cp048	None
17040103cp049	None
17040103cp050	None
17040103cp053	BRK
17040103cp054	None
17040103cp055	BRK

17040103cp056	None
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Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040103cp001		15.11	62.67		
17040103cp002			31.68		
17040103cp003		20.51	85.1		
17040103cp004			3.23		
17040103cp005			5.92		
17040103cp006			5.84		
17040103cp007		44.29	127.39		
17040103cp008		14.48	26.65		
17040103cp009		3.99			
17040103cp010			6.85		
17040103cp014		8.11	100.94		
17040103cp015					0.07
17040103cp016			98.04		
17040103cp019		4.65			
17040103cp021			0.58		2.33
17040103cp025			0.67		
17040103cp026		1.6			
17040103cp027		5.41			
17040103cp028		4.45			
17040103cp029		2.81			
17040103cp030		1.36			
17040103cp031		1.72			
17040103cp032		8.97			
17040103cp033		0.71			
17040103cp034			6.06		
17040103cp035			3.71		
17040103cp036			0.65		
17040103cp037			0.74		
17040103cp038			0.46		
17040103cp039			1.68		
17040103cp040			0.2		
17040103cp041			0.98		
17040103cp043			1.06		
17040103cp045			2.23		
17040103cp046			1.32		
17040103cp047			7.96		
17040103cp048			0.48		
17040103cp049			0.92		
17040103cp050			4.1		
17040103cp053			1.37		
17040103cp055			2.59		
17040103cp056			6.26		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040103cp001	Fine Spot Only	77.78	24799.2	2	1	1	1	4	2
17040103cp002	Fine Spot Only	31.675	3167.5	1	2	2	1	2	1
17040103cp003	Fine Spot Only	105.61	31505.9	3	1	1	1	4	2
17040103cp004	Large Spot Only	3.227	322.7	1	4	4	3	2	3
17040103cp005	Fine Spot Only	5.925	592.5	1	4	4	2	2	2
17040103cp006	Fine Spot Only	5.841	584.1	1	4	4	2	2	2
17040103cp007	Fine Spot Only	171.685	42934.7	1	1	1	1	4	2
17040103cp008	Fine Spot Only	41.133	10909	1	1	2	1	4	2
17040103cp009	Fine Spot Only	3.989	398.9	1	4	4	3	2	3
17040103cp010	Fine Spot Only	6.847	684.7	1	3	3	2	2	2
17040103cp014	Both Large and Fine Spot	109.051	19272.7	1	1	1	1	4	2
17040103cp015	Both Large and Fine Spot	0.075	7.5	1	1	4	4	2	3
17040103cp016	Both Large and Fine Spot	98.037	14560	1	1	1	1	4	2
17040103cp019	Fine Spot Only	4.654	465.4	1	4	4	3	2	3
17040103cp021	Fine Spot Only	2.909	216.8	1	4	4	3	2	3
17040103cp025	Fine Spot Only	0.665	16.6	1	4	4	4	2	3
17040103cp026	Fine Spot Only	1.604	40.1	1	4	4	4	2	3
17040103cp027	Fine Spot Only	5.411	1488	1	4	4	2	2	2
17040103cp028	Fine Spot Only	4.445	1217.3	1	4	4	2	2	2
17040103cp029	Fine Spot Only	2.807	280.7	1	4	4	3	2	3
17040103cp030	Fine Spot Only	1.36	136	1	4	4	3	2	3
17040103cp031	Fine Spot Only	1.716	171.6	1	4	4	3	2	3
17040103cp032	Fine Spot Only	8.965	1899.4	1	4	3	2	3	3
17040103cp033	Fine Spot Only	0.707	70.7	1	4	4	3	2	3
17040103cp034	Fine Spot Only	6.059	605.9	1	4	3	2	2	2
17040103cp035	Fine Spot Only	3.714	371.4	1	4	4	3	2	3
17040103cp036	Fine Spot Only	0.647	64.7	1	4	4	3	2	3
17040103cp037	Fine Spot Only	0.743	74.3	1	4	4	3	2	3
17040103cp038	Fine Spot Only	0.462	46.2	1	4	4	4	2	3
17040103cp039	Fine Spot Only	1.684	168.4	1	4	4	3	2	3

17040103cp040	Fine Spot Only	0.204	20.4	1	4	4	4	2	3
17040103cp041	Fine Spot Only	0.977	97.7	1	4	4	3	2	3
17040103cp043	Fine Spot Only	1.055	105.5	1	4	4	3	2	3
17040103cp045	Fine Spot Only	2.227	222.7	1	4	4	3	2	3
17040103cp046	Fine Spot Only	1.321	132.1	1	4	4	3	2	3
17040103cp047	Both Large and Fine Spot	7.962	701.9	1	3	3	2	3	2
17040103cp048	Both Large and Fine Spot	0.481	12	1	4	4	4	2	3
17040103cp049	Both Large and Fine Spot	0.919	23	1	4	4	4	2	3
17040103cp050	Fine Spot Only	4.096	409.6	1	4	4	3	2	3
17040103cp053	Fine Spot Only	1.374	137.4	1	4	4	3	2	3
17040103cp055	Fine Spot Only	2.59	259	1	4	4	3	2	3
17040103cp056	Fine Spot Only	6.256	1720.4	1	4	3	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040104cp001	Core Conservation Population	Strongly Networked	193.59	31	0	0
17040104cp002	Known or Probable Ecological Adaptation	Non-Network	10.41	2	0	0
17040104cp003	Known or Probable Ecological Adaptation	Non-Network	37.23	6	0	0
17040104cp004	Known or Probable Unique Life History	Weakly Networked	4.42	2	121.97	1
17040104cp005	Core Conservation Population	Strongly Networked	97.22	19	15765.43	1
17040104cp006	Known or Probable Ecological Adaptation	Non-Network	11.11	2	0	0
17040104cp007	Core Conservation Population	Non-Network	0.41	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040104cp001	Minimal Disease Risk > 10 km	No Risk of Hybridization	No
17040104cp002	Limited Disease Risk	No Risk of Hybridization	Yes
17040104cp003	Limited Disease Risk	No Risk of Hybridization	Yes
17040104cp004	Limited Disease Risk	No Risk of Hybridization	Yes
17040104cp005	Moderate Disease Risk < 10 km	No Risk of Hybridization	Yes
17040104cp006	Limited Disease Risk	No Risk of Hybridization	Yes
17040104cp007	Limited Disease Risk	No Risk of Hybridization	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040104cp001		Lake trib.	Lg. river	Local	
17040104cp002					Unknown
17040104cp003					Unknown
17040104cp004		Lake trib.			
17040104cp005		Lake trib.			
17040104cp006				Local	
17040104cp007				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040104cp001	193.59	311.35	111.1	178.67	31					
17040104cp002	10.41	16.75			2					
17040104cp003	37.23	59.98	37.23	59.98	6					
17040104cp004	4.42	7.1			2	121.97	49.36	1		
17040104cp005	97.22	156.59	33.96	54.74	19	15765.43	6380.04	1	15765.43	1
17040104cp006	11.11	17.85			2					
17040104cp007	0.41	0.66	0.41	0.66	1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040104cp001	Both Large and Fine Spot	193.477	43660.4	2	1	1	1	4	2
17040104cp002	Both Large and Fine Spot	10.406	260.2	1	4	3	3	2	2
17040104cp003	Both Large and Fine Spot	37.236	873.2	1	4	2	2	2	2
17040104cp004	Both Large and Fine Spot	4.408	296.3	1	3	4	3	2	3
17040104cp005	Both Large and Fine Spot	97.295	11020.6	3	1	1	1	4	2
17040104cp006	Large Spot Only	11.1	277.5	1	4	3	3	3	3
17040104cp007	Both Large and Fine Spot	0.413	0	1	4	4	4	2	3

Conservation Population ID:	Non-native
17040104cp001	BRN, RBT
17040104cp002	None
17040104cp003	BRK
17040104cp004	None
17040104cp005	BRN, LAK
17040104cp006	None
17040104cp007	BRK

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040104cp001	165.29	3.16	21.49		3.53
17040104cp002		2.11	8.3		
17040104cp003		16.03	21.2		
17040104cp004	4.41				
17040104cp005	92.93		4.36		
17040104cp006		11.1			
17040104cp007	0.41				

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040105cp001	Core Conservation Population	Weakly Networked	149.06	22	0	0
17040105cp002	Core Conservation Population	Strongly Networked	304.25	23	0	0
17040105cp003	Other	Non-Network	6.9	1	26.46	1
17040105cp004	Core Conservation Population	Weakly Networked	17.5	2	0	0
17040105cp005	Core Conservation Population	Non-Network	3.96	1	0	0
17040105cp006	Other	Non-Network	0.97	1	0	0
17040105cp007	Other	Non-Network	0	0	2.02	1
17040105cp008	Other	Non-Network	1.22	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040105cp001	Moderate Disease Risk < 10 km	Hybridizing species > 10 km	No
17040105cp002	Population is Infected	Hybridizing species are sympatric	Yes
17040105cp003	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040105cp004	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
17040105cp005	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040105cp006	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040105cp007	Limited Disease Risk	No Risk of Hybridization	Yes
17040105cp008	Limited Disease Risk	No Risk of Hybridization	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040105cp001				Local	
17040105cp002				Local	
17040105cp003				Local	
17040105cp004				Local	
17040105cp005				Local	
17040105cp006				Local	
17040105cp007					Unknown
17040105cp008				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040105cp001	149.06	240.01	35.61	57.28	22					
17040105cp002	304.25	489.63	227.14	365.63	23					
17040105cp003	6.9	11.07	6.9	11.07	1	26.46	10.71	1	26.46	1
17040105cp004	17.5	28.15			2					
17040105cp005	3.96	6.38	3.96	6.38	1					
17040105cp006	0.97	1.57	0.97	1.57	1					
17040105cp007						2.02	0.82	1		
17040105cp008	1.22	1.96	1.22	1.96	1					

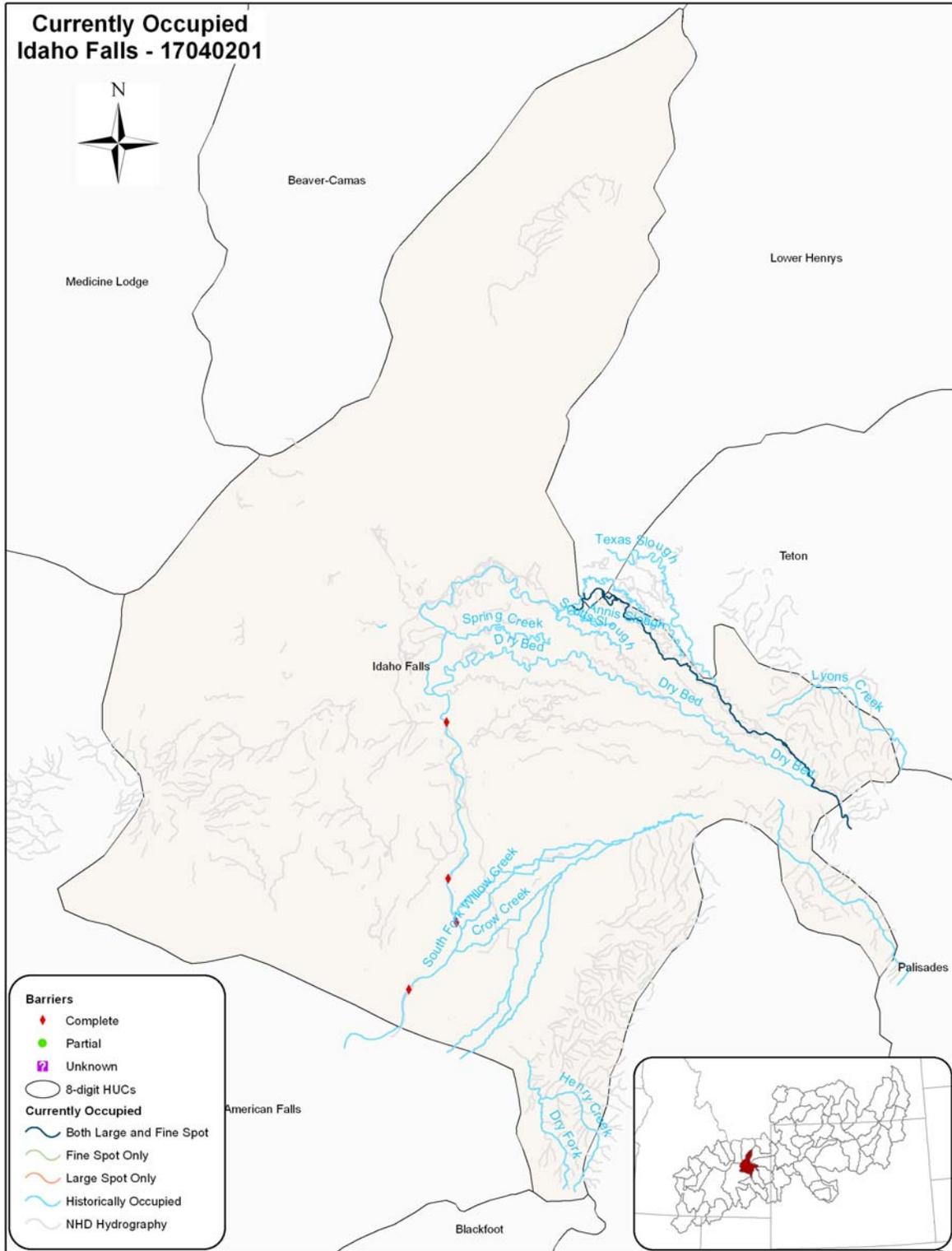
cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040105cp001	Both Large and Fine Spot	149.146	7160.5	3	3	1	1	4	2
17040105cp002	Both Large and Fine Spot	304.277	81235.8	5	1	1	1	4	2
17040105cp003	Both Large and Fine Spot	6.885	688.5	2	4	3	2	3	3
17040105cp004	Both Large and Fine Spot	17.508	1750.8	2	3	3	2	3	2
17040105cp005	Both Large and Fine Spot	3.973	99.3	2	4	4	3	3	4
17040105cp006	Fine Spot Only	0.97	24.2	2	4	4	4	3	4
17040105cp008	Both Large and Fine Spot	1.218	121.8	1	4	4	3	2	3

Conservation Population ID:	Non-native
17040105cp001	BRN, RBT
17040105cp002	BRK, BRN, RBT
17040105cp003	BRK
17040105cp004	None
17040105cp005	BRK
17040105cp006	BRK
17040105cp007	None
17040105cp008	BRK

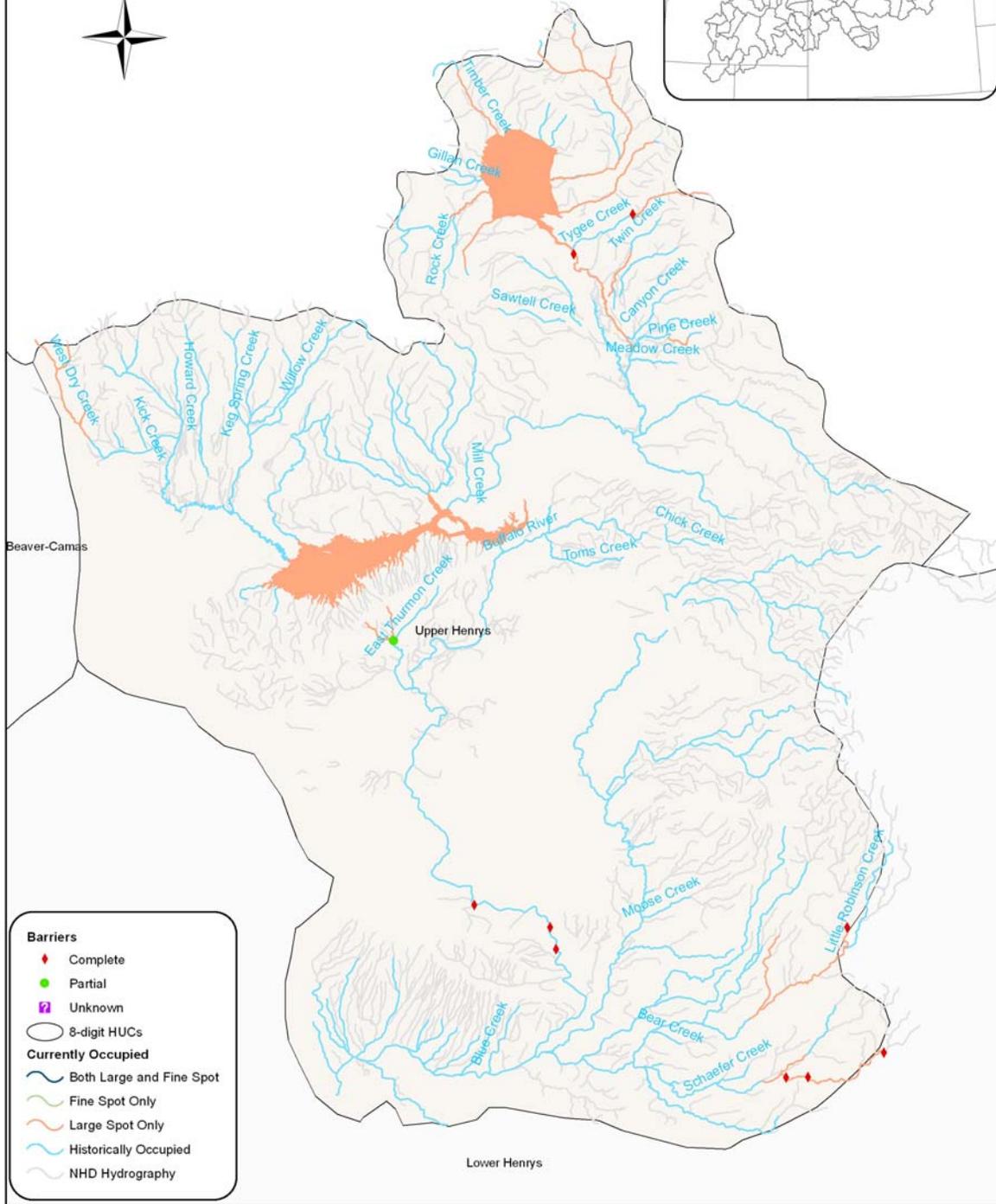
Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040105cp001		18.78	129.49	0.88	
17040105cp002		23.02	281.26		
17040105cp003			6.89		
17040105cp004		1.61	15.9		
17040105cp005		3.97			
17040105cp006		0.97			
17040105cp008			1.22		

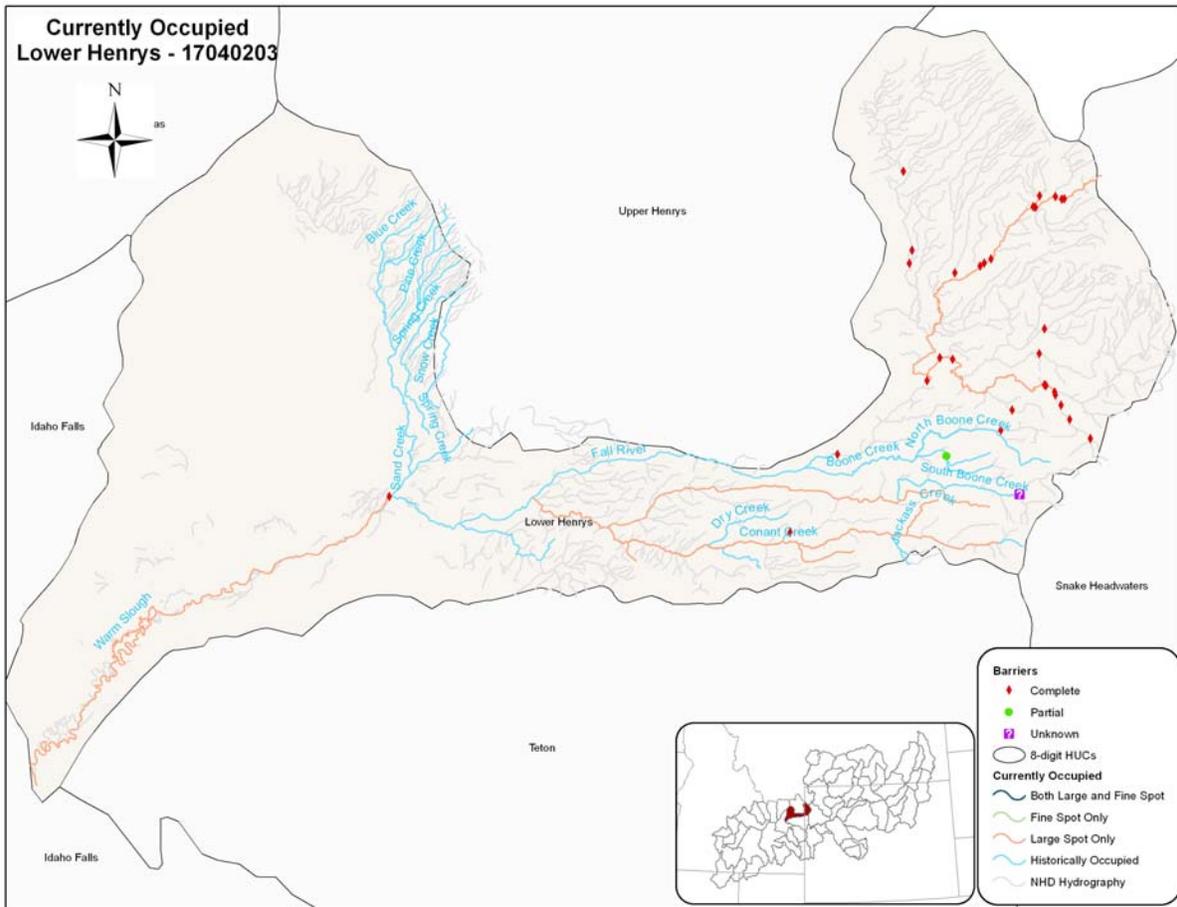
Lower Snake Geographical Management Unit

The upper Snake GMU contains 13 4th level HUCs. These watersheds encompass the Henry's Fork of the Snake River, the Teton, the Blackfoot the Portneuf, Raft River, and Goose Creek. Also included are two "sinks" watersheds.

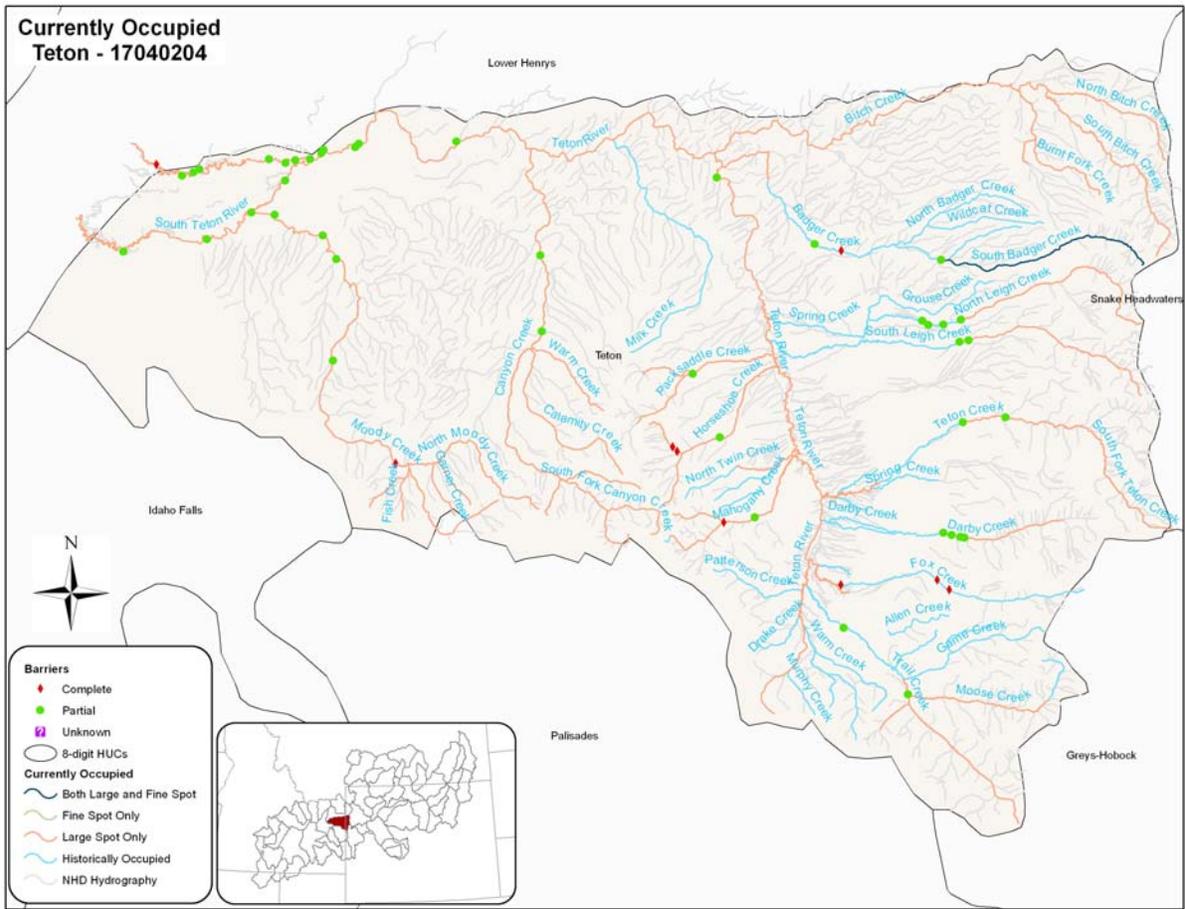


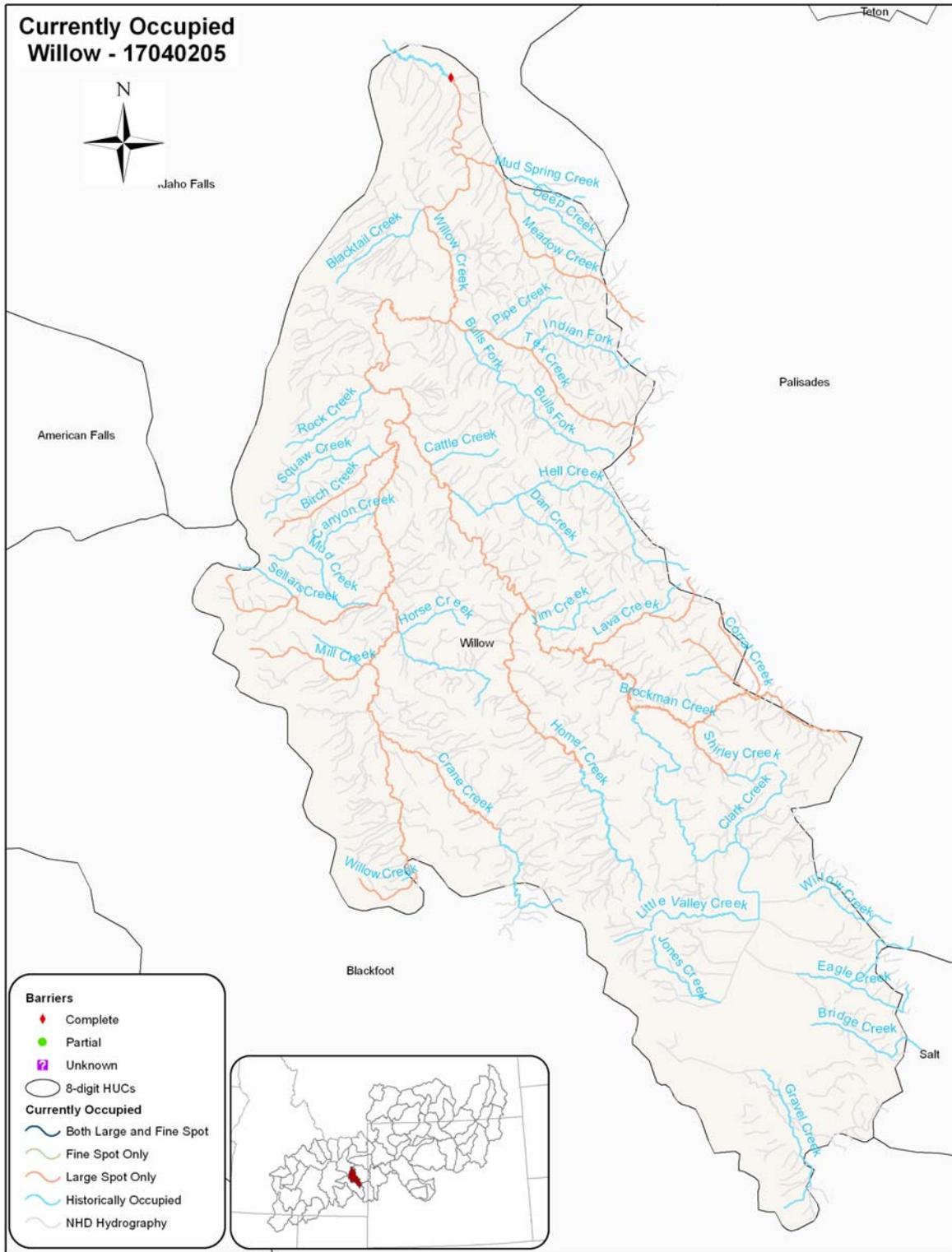
Currently Occupied Upper Henrys - 17040202

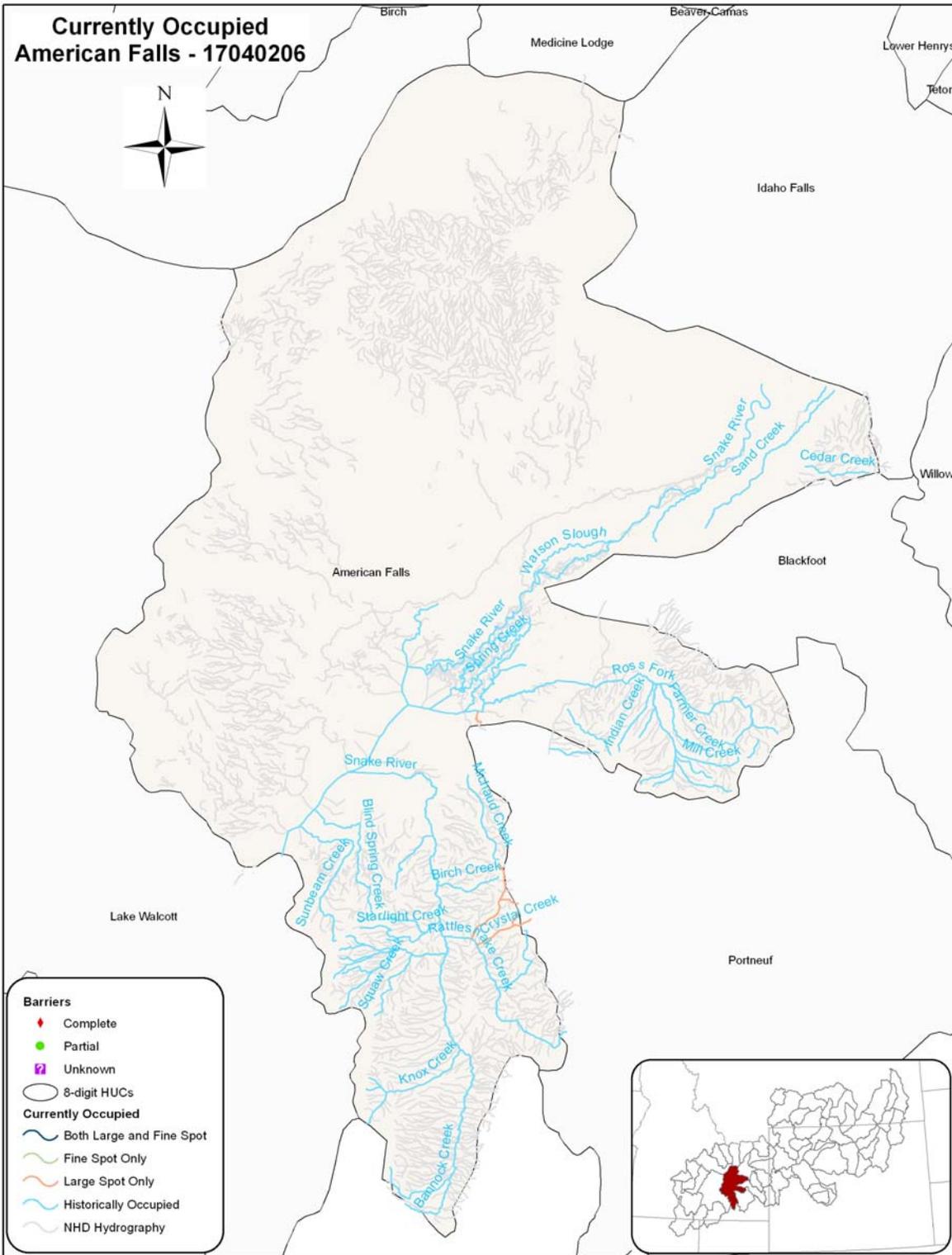


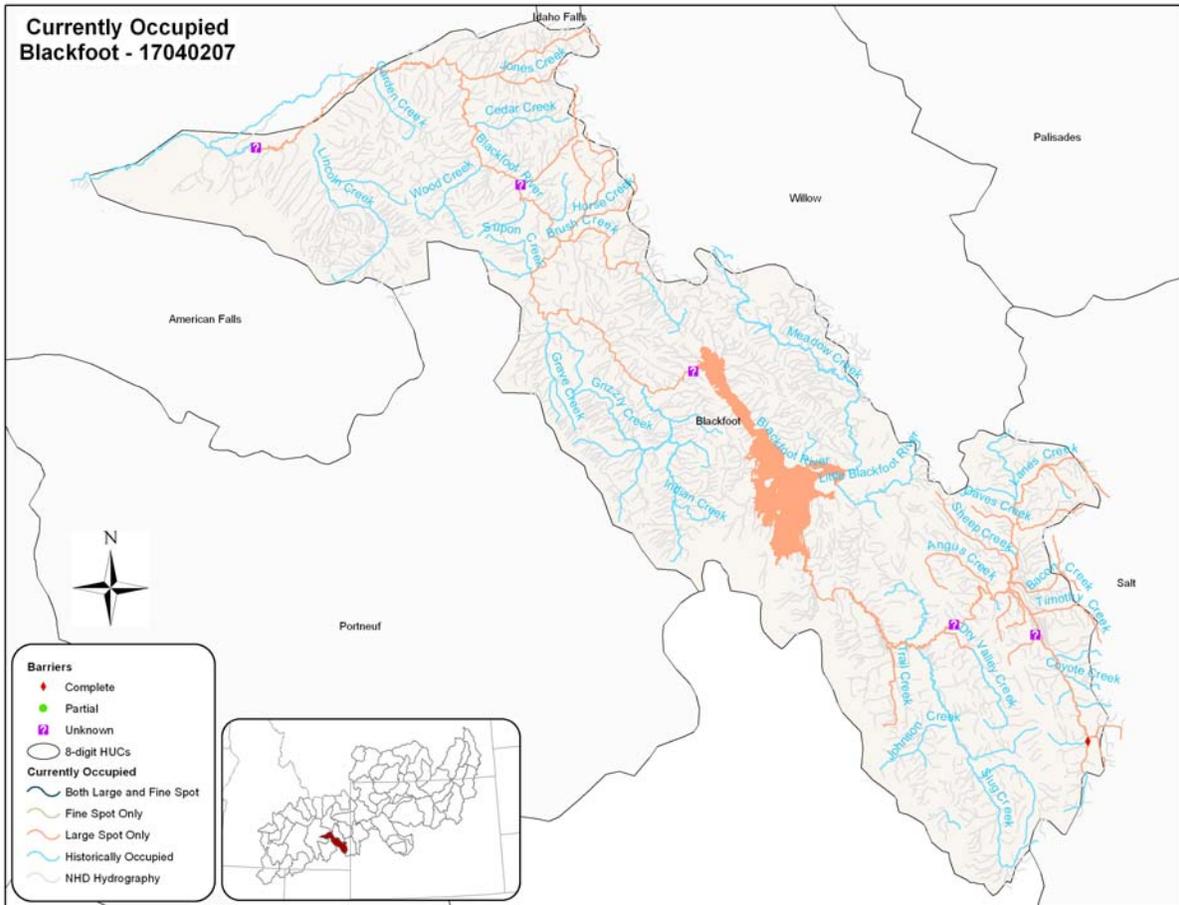


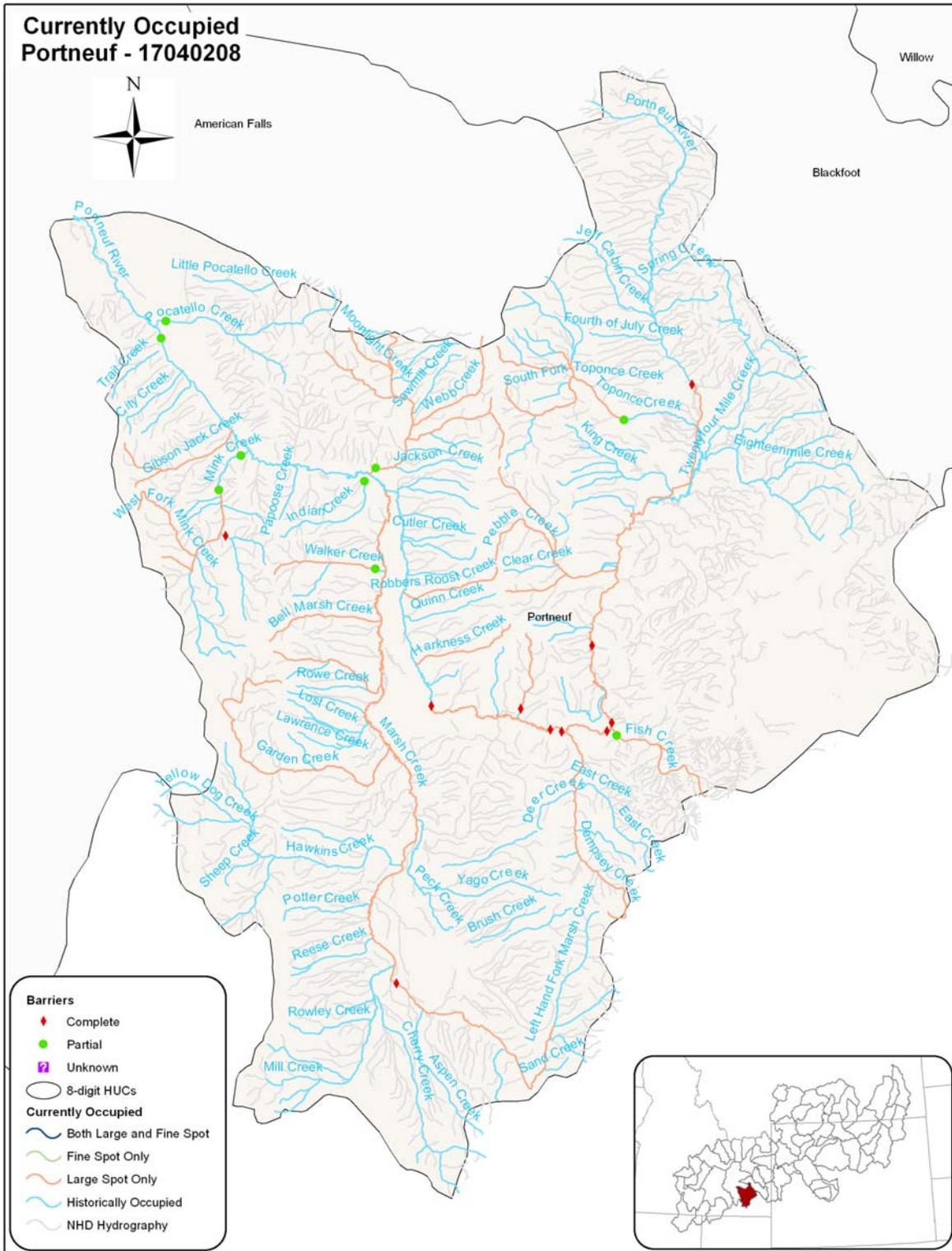
**Currently Occupied
Teton - 17040204**

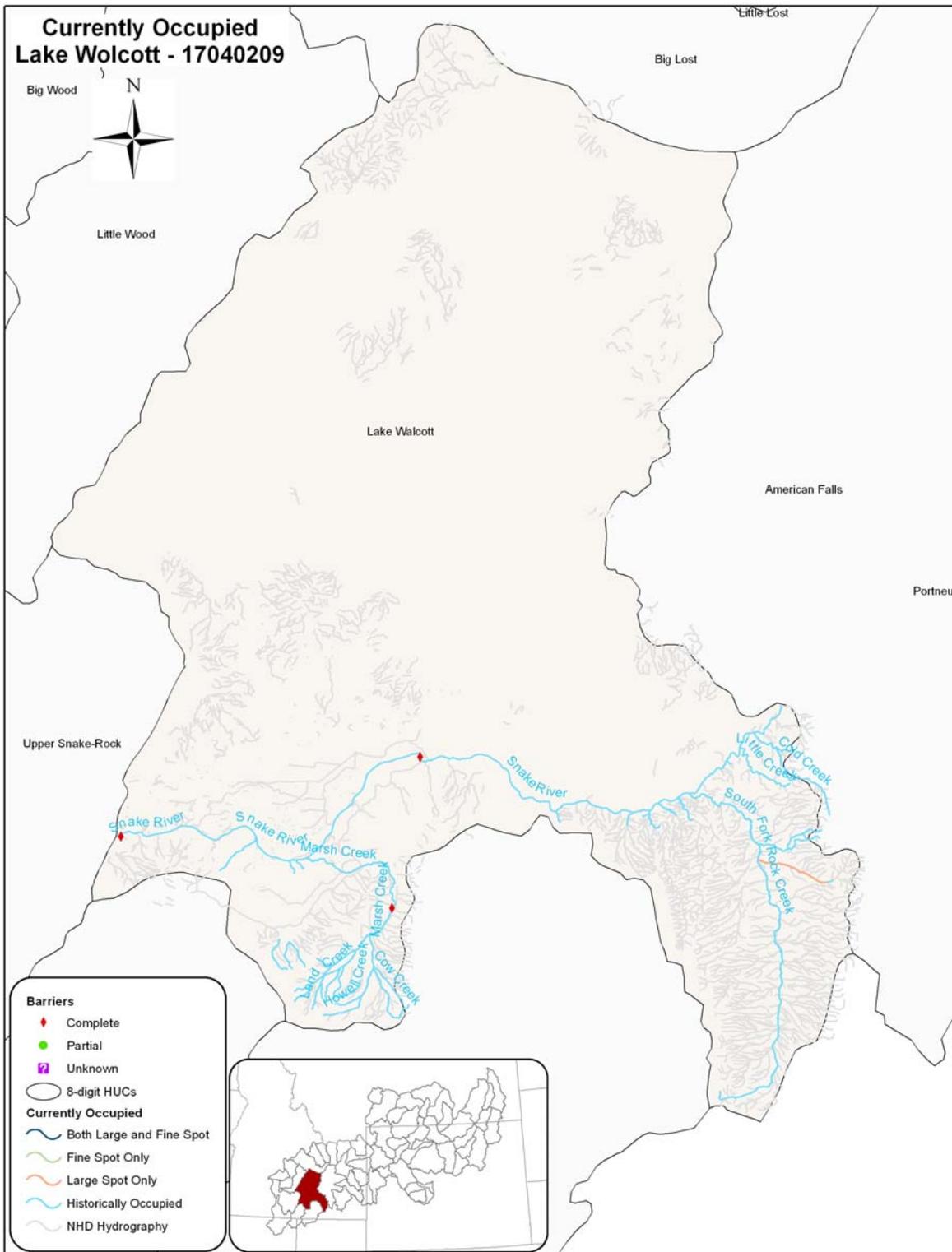


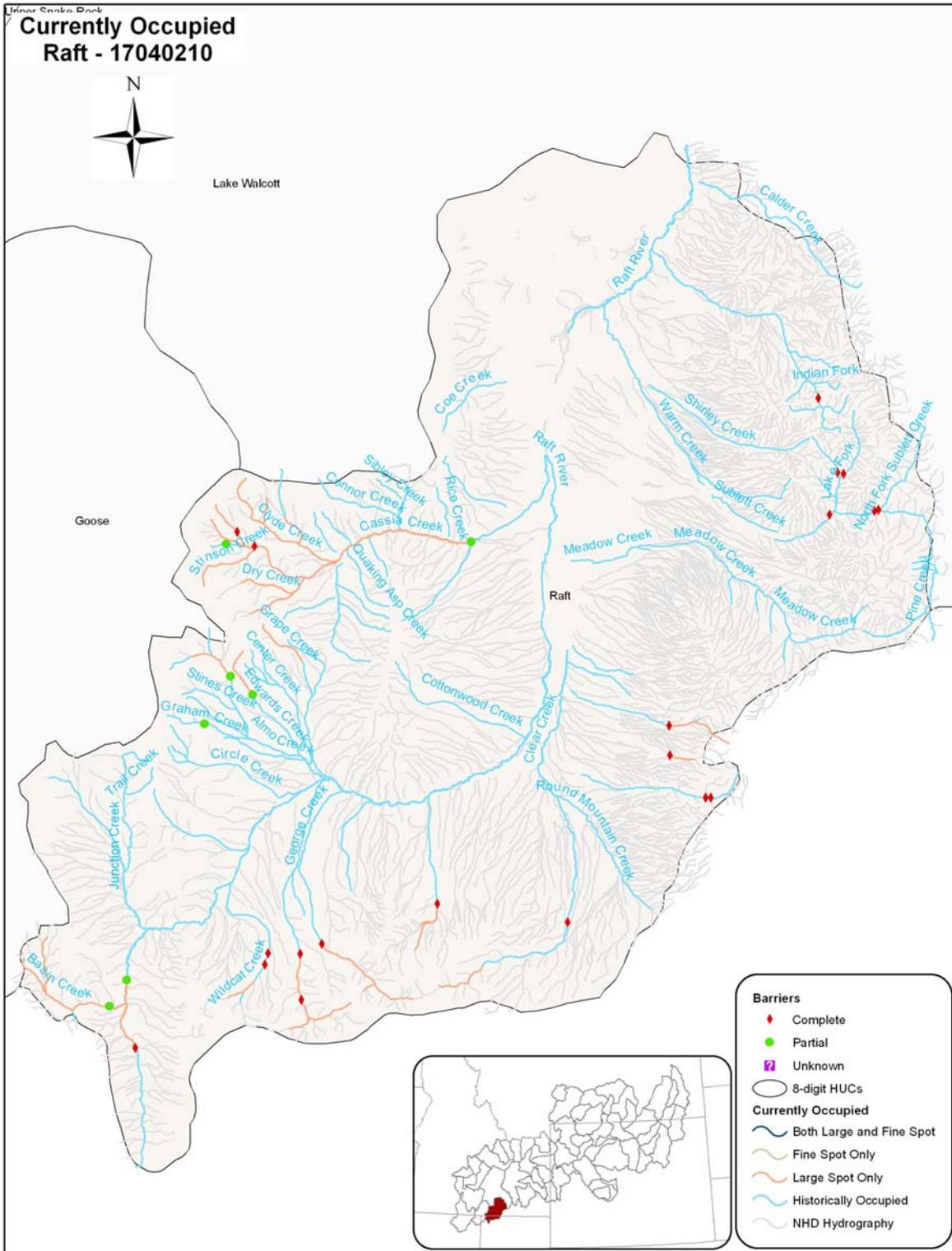


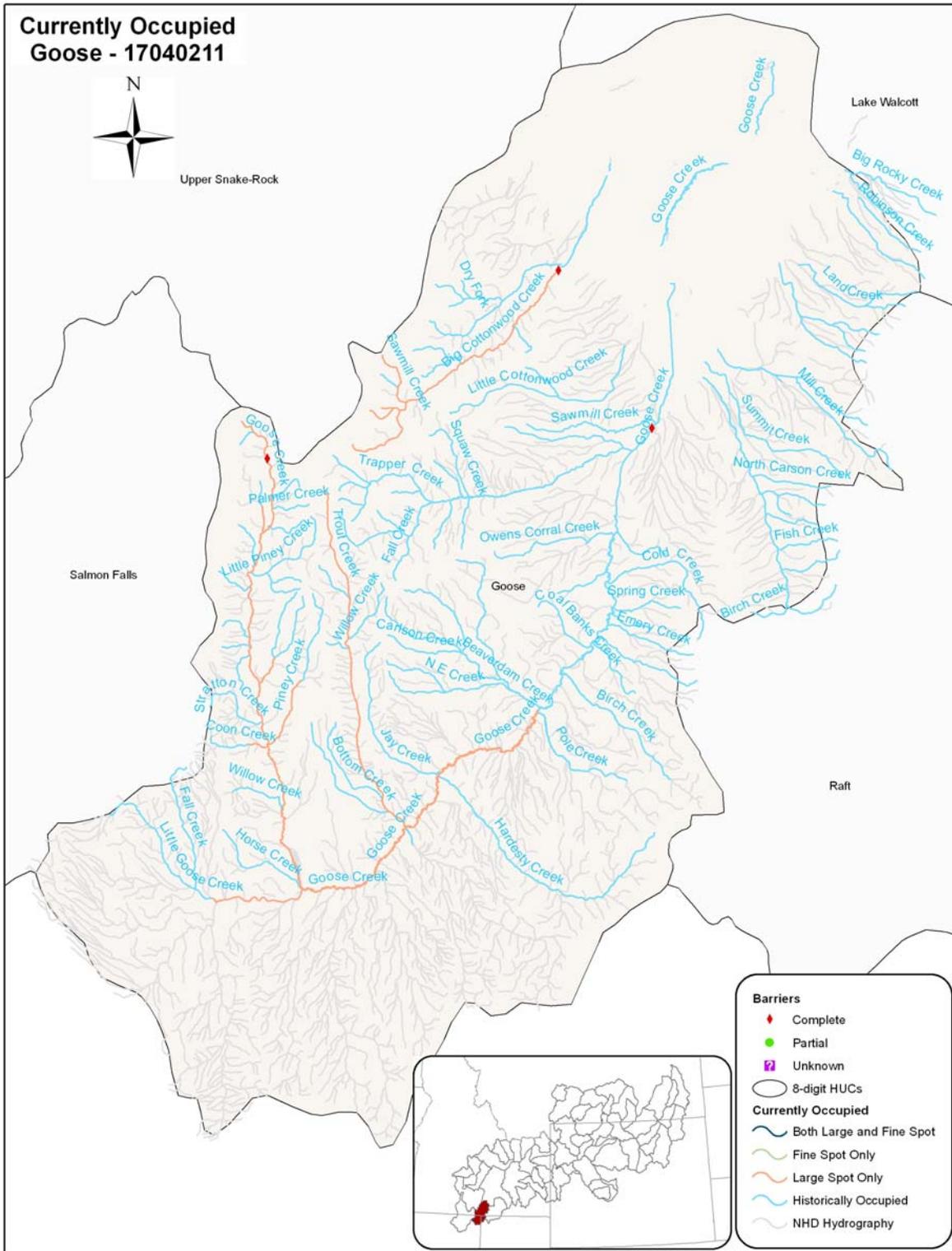




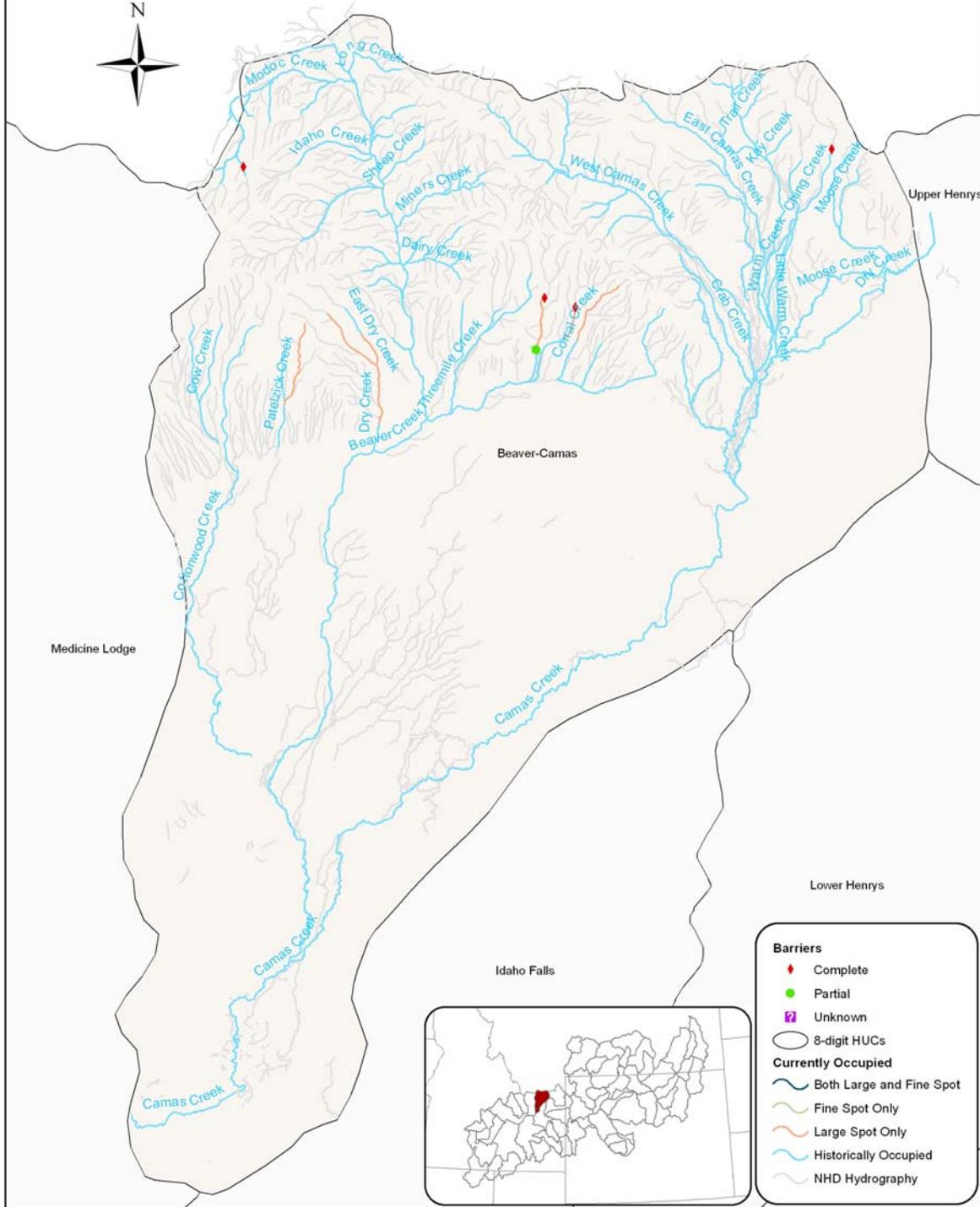


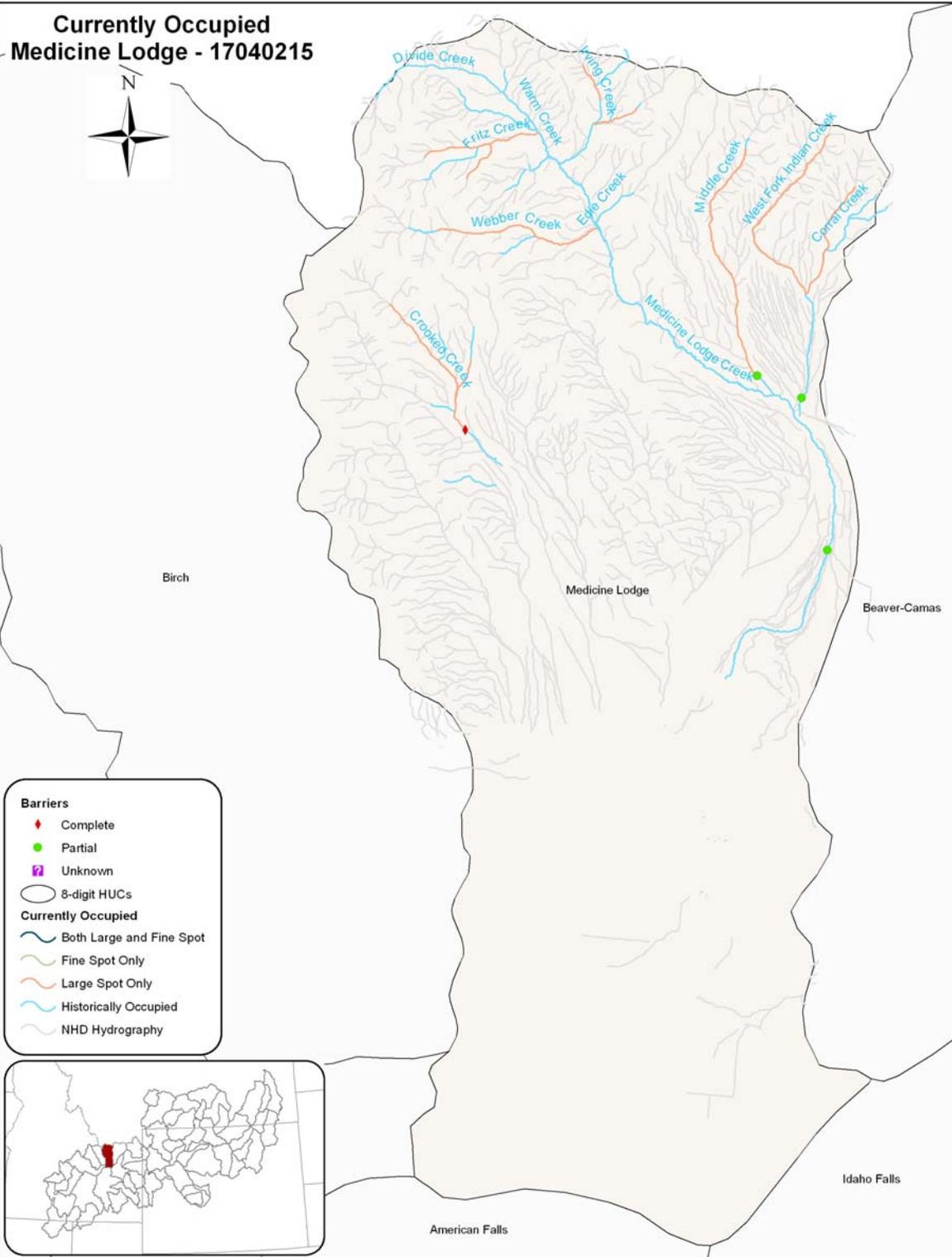






**Currently Occupied
Beaver-Camas - 17040214**





**Historic
Lower Snake GMU**

Name	ID #	Historically Occupied Miles	Historical Lakes	Lake Acres
Idaho Falls	17040201	272.7		
Upper Henrys	17040202	582.88	1	6116.87
Lower Henrys	17040203	290.81		
Teton	17040204	579.18	1	4.99
Willow	17040205	393.92		
American Falls	17040206	542.64		
Blackfoot	17040207	632.21		
Portneuf	17040208	823.61		
Lake Walcott	17040209	277.89		
Raft	17040210	661.21		
Goose	17040211	594.74		
Beaver-Camas	17040214	457.65		
Medicine Lodge	17040215	159.61		

Current Distribution – Lower Snake GMU

Name	ID #	Spotting Pattern	Currently Occupied Miles	Currently Occupied KM
Idaho Falls	17040201	Both Large and Fine Spot	27.4	44.11
Upper Henrys	17040202	Large Spot Only	71.54	115.18
Lower Henrys	17040203	Large Spot Only	155.97	251.01
Teton	17040204	Both Large and Fine Spot	11.36	18.22
Teton	17040204	Large Spot Only	387.65	623.89
Willow	17040205	Large Spot Only	195.93	315.16
American Falls	17040206	Large Spot Only	17.91	28.88
Blackfoot	17040207	Large Spot Only	271.33	436.53
Portneuf	17040208	Large Spot Only	264.26	425.29
Lake Walcott	17040209	Large Spot Only	7.79	12.55
Raft	17040210	Large Spot Only	102.34	164.68
Goose	17040211	Large Spot Only	119.15	191.58
Beaver-Camas	17040214	Large Spot Only	18.11	29.13
Medicine Lodge	17040215	Large Spot Only	58.12	93.59

Name	ID #	Spotting Pattern	Number of Lakes	Surface Acres
Upper Henrys	17040202	Large Spot Only	3	13484.74
Teton	17040204	Large Spot Only	1	4.99
Blackfoot	17040207	Large Spot	1	16842.5

		Only		
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Name	HUC8	Spotting	Origin	Life History	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	Aboriginal - naturally occurring population	Combination	0.79
Idaho Falls	17040201	Both Large and Fine Spot	Aboriginal - naturally occurring population	Unknown	26.61
Upper Henrys	17040202	Large Spot Only	Aboriginal - naturally occurring population	Combination	12.61
Upper Henrys	17040202	Large Spot Only	Aboriginal - naturally occurring population	Migratory	29.58
Upper Henrys	17040202	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	22.35
Upper Henrys	17040202	Large Spot Only	Aboriginal - naturally occurring population	Unknown	1.23
Upper Henrys	17040202	Large Spot Only	Restored - human restoration to start population	Non migratory	1.92
Upper Henrys	17040202	Large Spot Only	Unknown	Unknown	3.85
Lower Henrys	17040203	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	117.63
Lower Henrys	17040203	Large Spot Only	Restored - human restoration to start population	Non migratory	38.34
Teton	17040204	Both Large and Fine Spot	Aboriginal - naturally occurring population	Non migratory	11.36
Teton	17040204	Large Spot Only	Aboriginal - naturally occurring population	Combination	153.05
Teton	17040204	Large Spot Only	Aboriginal - naturally occurring population	Migratory	111.95
Teton	17040204	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	112.84
Teton	17040204	Large Spot Only	Aboriginal - naturally occurring population	Unknown	9.81
Willow	17040205	Large Spot Only	Aboriginal - naturally occurring population	Combination	186.98
Willow	17040205	Large Spot Only	Aboriginal - naturally occurring population	Unknown	8.95
American Falls	17040206	Large Spot Only	Aboriginal - naturally occurring population	Combination	16.53
American Falls	17040206	Large Spot Only	Aboriginal - naturally occurring population	Migratory	1.38
Blackfoot	17040207	Large Spot Only	Aboriginal - naturally occurring population	Combination	260.78
Blackfoot	17040207	Large Spot Only	Aboriginal - naturally occurring population	Migratory	7.57
Blackfoot	17040207	Large Spot Only	Aboriginal - naturally occurring population	Unknown	2.98
Portneuf	17040208	Large Spot Only	Aboriginal - naturally occurring population	Combination	145.8
Portneuf	17040208	Large Spot Only	Aboriginal - naturally occurring population	Migratory	75.55
Portneuf	17040208	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	42.91

Lake Walcott	17040209	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	7.79
Raft	17040210	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	102.34
Goose	17040211	Large Spot Only	Aboriginal - naturally occurring population	Combination	1.06
Goose	17040211	Large Spot Only	Aboriginal - naturally occurring population	Migratory	1.6
Goose	17040211	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	112.6
Goose	17040211	Large Spot Only	Aboriginal - naturally occurring population	Unknown	3.89
Beaver-Camas	17040214	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	18.11
Medicine Lodge	17040215	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	58.12

Name	HUC8	Spotting	Origin	Life History	Acres	Count of Lakes
Upper Henrys	17040202	Large Spot Only	Aboriginal - naturally occurring population	Migratory	13437.78	2
Upper Henrys	17040202	Large Spot Only	Restored - human restoration to start population	Migratory	46.96	1
Teton	17040204	Large Spot Only	Aboriginal - naturally occurring population	Non migratory	4.99	1
Blackfoot	17040207	Large Spot Only	Aboriginal - naturally occurring population	Combination	16842.5	1

Name	HUC8	Spotting	Stocking	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	Non-Native Stocking	27.4
Upper Henrys	17040202	Large Spot Only	No Record	26.13
Upper Henrys	17040202	Large Spot Only	Non-Native Stocking	32.47
Upper Henrys	17040202	Large Spot Only	YCT Stocking only	12.94
Lower Henrys	17040203	Large Spot Only	No Record	7.91
Lower Henrys	17040203	Large Spot Only	Non-Native Stocking	144.83
Lower Henrys	17040203	Large Spot Only	YCT Stocking only	3.23
Teton	17040204	Both Large and Fine Spot	YCT Stocking only	11.36
Teton	17040204	Large Spot Only	No Record	49.3
Teton	17040204	Large Spot Only	Non-Native Stocking	328.63
Teton	17040204	Large Spot Only	YCT Stocking only	9.72
Willow	17040205	Large Spot Only	No Record	134.95
Willow	17040205	Large Spot Only	Non-Native Stocking	60.98
American Falls	17040206	Large Spot Only	No Record	16.53
American Falls	17040206	Large Spot Only	Non-Native Stocking	1.38
Blackfoot	17040207	Large Spot Only	No Record	105.86
Blackfoot	17040207	Large Spot Only	Non-Native Stocking	165.47
Portneuf	17040208	Large Spot Only	No Record	111.72
Portneuf	17040208	Large Spot Only	Non-Native Stocking	152.54
Lake Walcott	17040209	Large Spot Only	Non-Native Stocking	7.79
Raft	17040210	Large Spot Only	No Record	38.8
Raft	17040210	Large Spot Only	Non-Native Stocking	63.54
Goose	17040211	Large Spot Only	No Record	26.21
Goose	17040211	Large Spot Only	Non-Native Stocking	92.94
Beaver-Camas	17040214	Large Spot Only	No Record	18.11
Medicine Lodge	17040215	Large Spot Only	No Record	7.85
Medicine Lodge	17040215	Large Spot Only	Non-Native Stocking	43.17
Medicine Lodge	17040215	Large Spot Only	YCT Stocking only	7.1

Name	HUC8	Spotting	Stocking	Acres	Number of Lakes
Upper Henrys	17040202	Large Spot Only	Non-Native Stocking	13437.78	2
Upper Henrys	17040202	Large Spot Only	YCT Stocking only	46.96	1
Teton	17040204	Large Spot Only	Non-Native Stocking	4.99	1
Blackfoot	17040207	Large Spot Only	Non-Native Stocking	16842.5	1

Name	HUC8	Spotting	Genetics	Stream Mile
Upper Henrys	17040202	Large Spot Only	Unaltered (< 1%)	14.44
Upper Henrys	17040202	Large Spot Only	>1% and <=10%	12.21
Upper Henrys	17040202	Large Spot Only	Not Tested - Suspected Unaltered	26.65
Upper Henrys	17040202	Large Spot Only	Not Tested - Suspected Hybridized	18.24
Lower Henrys	17040203	Large Spot Only	Not Tested - Suspected Unaltered	11.14
Lower Henrys	17040203	Large Spot Only	Not Tested - Suspected Hybridized	144.83
Teton	17040204	Both Large and Fine Spot	Unaltered (< 1%)	11.36
Teton	17040204	Large Spot Only	>1% and <=10%	181.56
Teton	17040204	Large Spot Only	Not Tested - Suspected Unaltered	168.09
Teton	17040204	Large Spot Only	Not Tested - Suspected Hybridized	38
Willow	17040205	Large Spot Only	Not Applicable	7.43
Willow	17040205	Large Spot Only	Unaltered (< 1%)	59.67
Willow	17040205	Large Spot Only	>1% and <=10%	12.84
Willow	17040205	Large Spot Only	Not Tested - Suspected Unaltered	115.99
American Falls	17040206	Large Spot Only	Not Tested - Suspected Unaltered	16.53
American Falls	17040206	Large Spot Only	Not Tested - Suspected Hybridized	1.38
Blackfoot	17040207	Large Spot Only	>1% and <=10%	9.28
Blackfoot	17040207	Large Spot Only	>10% and <=25%	37.67
Blackfoot	17040207	Large Spot Only	Not Tested - Suspected Unaltered	22.38
Blackfoot	17040207	Large Spot Only	Not Tested - Suspected Hybridized	202
Portneuf	17040208	Large Spot Only	Unaltered (< 1%)	29.26
Portneuf	17040208	Large Spot Only	>1% and <=10%	0.97
Portneuf	17040208	Large Spot Only	>10% and <=25%	13.57
Portneuf	17040208	Large Spot Only	Not Tested - Suspected Unaltered	57.82
Portneuf	17040208	Large Spot Only	Not Tested - Suspected Hybridized	162.64
Lake Walcott	17040209	Large Spot Only	Not Tested - Suspected Hybridized	7.79
Raft	17040210	Large Spot Only	Unaltered (< 1%)	21.35
Raft	17040210	Large Spot Only	>25%	1.38
Raft	17040210	Large Spot Only	Not Tested - Suspected Unaltered	79.61
Goose	17040211	Large Spot Only	Unaltered (< 1%)	81.44
Goose	17040211	Large Spot Only	Not Tested - Suspected Unaltered	23.55
Goose	17040211	Large Spot Only	Not Tested - Suspected Hybridized	14.16
Beaver-Camas	17040214	Large Spot Only	Not Tested - Suspected Unaltered	18.11
Medicine Lodge	17040215	Large Spot Only	Not Tested - Suspected Unaltered	9
Medicine Lodge	17040215	Large Spot Only	Not Tested - Suspected Hybridized	49.12

Name	HUC8	Spotting	Genetics	Acres	Count of Lakes
Upper Henrys	17040202	Large Spot Only	>1% and <=10%	6116.87	1
Upper Henrys	17040202	Large Spot Only	Not Tested - Suspected Hybridized	7367.87	2
Teton	17040204	Large Spot Only	Not Tested - Suspected Hybridized	4.99	1
Blackfoot	17040207	Large Spot Only	>1% and <=10%	16842.5	1

Name	HUC8	Spotting	Population Density	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	401 to 1000 fish	0.79
Idaho Falls	17040201	Both Large and Fine Spot	50 to 150 fish	26.61
Upper Henrys	17040202	Large Spot Only	151 to 400 fish	10.95
Upper Henrys	17040202	Large Spot Only	50 to 150 fish	19.87
Upper Henrys	17040202	Large Spot Only	0 to 50 fish	10.82
Upper Henrys	17040202	Large Spot Only	Unknown	29.9
Lower Henrys	17040203	Large Spot Only	401 to 1000 fish	4.44
Lower Henrys	17040203	Large Spot Only	151 to 400 fish	39.87
Lower Henrys	17040203	Large Spot Only	50 to 150 fish	29.32
Lower Henrys	17040203	Large Spot Only	0 to 50 fish	51.42
Lower Henrys	17040203	Large Spot Only	Unknown	30.92
Teton	17040204	Both Large and Fine Spot	151 to 400 fish	11.36
Teton	17040204	Large Spot Only	401 to 1000 fish	18.57
Teton	17040204	Large Spot Only	151 to 400 fish	137.13
Teton	17040204	Large Spot Only	50 to 150 fish	47.35
Teton	17040204	Large Spot Only	0 to 50 fish	173.3
Teton	17040204	Large Spot Only	Unknown	11.3
Willow	17040205	Large Spot Only	151 to 400 fish	1.11
Willow	17040205	Large Spot Only	50 to 150 fish	72.5
Willow	17040205	Large Spot Only	0 to 50 fish	111.35
Willow	17040205	Large Spot Only	Unknown	10.97
American Falls	17040206	Large Spot Only	401 to 1000 fish	13.33
American Falls	17040206	Large Spot Only	151 to 400 fish	1.65
American Falls	17040206	Large Spot Only	50 to 150 fish	1.55
American Falls	17040206	Large Spot Only	0 to 50 fish	1.38
Blackfoot	17040207	Large Spot Only	1001 to 2000 fish	18.64
Blackfoot	17040207	Large Spot Only	401 to 1000 fish	25.07

Blackfoot	17040207	Large Spot Only	151 to 400 fish	46.95
Blackfoot	17040207	Large Spot Only	50 to 150 fish	98.09
Blackfoot	17040207	Large Spot Only	0 to 50 fish	76.27
Blackfoot	17040207	Large Spot Only	Unknown	6.31
Portneuf	17040208	Large Spot Only	1001 to 2000 fish	5.53
Portneuf	17040208	Large Spot Only	401 to 1000 fish	6.71
Portneuf	17040208	Large Spot Only	151 to 400 fish	58.98
Portneuf	17040208	Large Spot Only	50 to 150 fish	23.97
Portneuf	17040208	Large Spot Only	0 to 50 fish	156.2
Portneuf	17040208	Large Spot Only	Unknown	12.87
Lake Walcott	17040209	Large Spot Only	0 to 50 fish	7.79
Raft	17040210	Large Spot Only	401 to 1000 fish	19.99
Raft	17040210	Large Spot Only	151 to 400 fish	44.26
Raft	17040210	Large Spot Only	50 to 150 fish	27.56
Raft	17040210	Large Spot Only	0 to 50 fish	10.53
Goose	17040211	Large Spot Only	50 to 150 fish	35.21
Goose	17040211	Large Spot Only	0 to 50 fish	83.94
Beaver-Camas	17040214	Large Spot Only	401 to 1000 fish	7.36
Beaver-Camas	17040214	Large Spot Only	151 to 400 fish	8.38
Beaver-Camas	17040214	Large Spot Only	50 to 150 fish	2.37
Medicine Lodge	17040215	Large Spot Only	151 to 400 fish	2.51
Medicine Lodge	17040215	Large Spot Only	50 to 150 fish	7.53
Medicine Lodge	17040215	Large Spot Only	0 to 50 fish	46.02
Medicine Lodge	17040215	Large Spot Only	Unknown	2.06

Name	HUC8	Spotting	Habitat	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	Excellent	27.4
Upper Henrys	17040202	Large Spot Only	Excellent	21.82
Upper Henrys	17040202	Large Spot Only	Good	27.27
Upper Henrys	17040202	Large Spot Only	Fair	9.25
Upper Henrys	17040202	Large Spot Only	Poor	6.69
Upper Henrys	17040202	Large Spot Only	Unknown	6.51
Lower Henrys	17040203	Large Spot Only	Excellent	44.44
Lower Henrys	17040203	Large Spot Only	Good	82.52
Lower Henrys	17040203	Large Spot Only	Poor	29.01
Teton	17040204	Both Large and Fine Spot	Excellent	11.36
Teton	17040204	Large Spot Only	Excellent	116.09
Teton	17040204	Large Spot Only	Good	108.24
Teton	17040204	Large Spot Only	Fair	81.59
Teton	17040204	Large Spot Only	Poor	81.73
Willow	17040205	Large Spot Only	Good	15.95
Willow	17040205	Large Spot Only	Fair	73.01
Willow	17040205	Large Spot Only	Poor	16.38
Willow	17040205	Large Spot Only	Unknown	90.59
American Falls	17040206	Large Spot Only	Excellent	9.64
American Falls	17040206	Large Spot Only	Good	6.89
American Falls	17040206	Large Spot Only	Poor	1.38
Blackfoot	17040207	Large Spot Only	Good	85.85
Blackfoot	17040207	Large Spot Only	Fair	124.15
Blackfoot	17040207	Large Spot Only	Poor	58.35
Blackfoot	17040207	Large Spot Only	Unknown	2.98
Portneuf	17040208	Large Spot Only	Excellent	33.67
Portneuf	17040208	Large Spot Only	Good	96.29
Portneuf	17040208	Large Spot Only	Fair	70.03
Portneuf	17040208	Large Spot Only	Poor	64.27
Lake Walcott	17040209	Large Spot Only	Fair	7.79
Raft	17040210	Large Spot Only	Good	36.04
Raft	17040210	Large Spot Only	Fair	46.32
Raft	17040210	Large Spot Only	Poor	12.96

Raft	17040210	Large Spot Only	Unknown	7.02
Goose	17040211	Large Spot Only	Good	17.15
Goose	17040211	Large Spot Only	Fair	81.28
Goose	17040211	Large Spot Only	Unknown	20.72
Beaver-Camas	17040214	Large Spot Only	Unknown	18.11
Medicine Lodge	17040215	Large Spot Only	Unknown	58.12

Name	HUC8	Spotting	Width	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	> 50 feet	27.4
Upper Henrys	17040202	Large Spot Only	25 to 50 feet	6.66
Upper Henrys	17040202	Large Spot Only	15 to 25 feet	20.49
Upper Henrys	17040202	Large Spot Only	5 to 15 feet	34.1
Upper Henrys	17040202	Large Spot Only	< 5 feet	5.21
Upper Henrys	17040202	Large Spot Only	Unknown	5.08
Lower Henrys	17040203	Large Spot Only	> 50 feet	63.69
Lower Henrys	17040203	Large Spot Only	25 to 50 feet	49.61
Lower Henrys	17040203	Large Spot Only	15 to 25 feet	24.84
Lower Henrys	17040203	Large Spot Only	5 to 15 feet	17.83
Teton	17040204	Both Large and Fine Spot	15 to 25 feet	11.36
Teton	17040204	Large Spot Only	> 50 feet	88.3
Teton	17040204	Large Spot Only	25 to 50 feet	82.44
Teton	17040204	Large Spot Only	15 to 25 feet	55.27
Teton	17040204	Large Spot Only	5 to 15 feet	145.77
Teton	17040204	Large Spot Only	< 5 feet	15.87
Willow	17040205	Large Spot Only	25 to 50 feet	60.98
Willow	17040205	Large Spot Only	15 to 25 feet	9.25
Willow	17040205	Large Spot Only	5 to 15 feet	26.16
Willow	17040205	Large Spot Only	Unknown	99.54
American Falls	17040206	Large Spot Only	> 50 feet	1.38
American Falls	17040206	Large Spot Only	5 to 15 feet	13.33
American Falls	17040206	Large Spot Only	< 5 feet	3.2
Blackfoot	17040207	Large Spot Only	> 50 feet	37.67
Blackfoot	17040207	Large Spot Only	25 to 50 feet	63.4

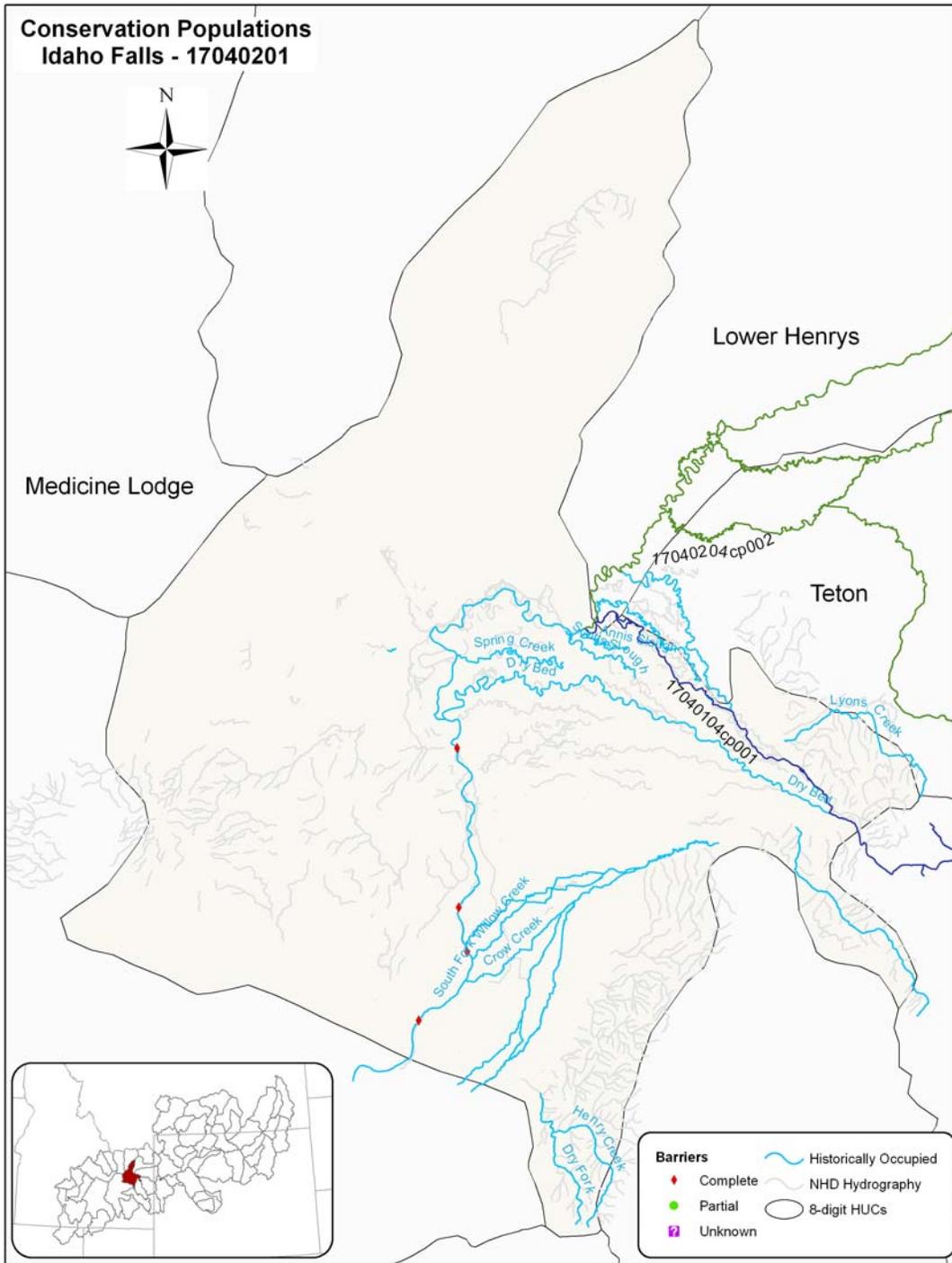
Blackfoot	17040207	Large Spot Only	5 to 15 feet	131.4
Blackfoot	17040207	Large Spot Only	< 5 feet	35.88
Blackfoot	17040207	Large Spot Only	Unknown	2.98
Portneuf	17040208	Large Spot Only	25 to 50 feet	31.83
Portneuf	17040208	Large Spot Only	15 to 25 feet	86.65
Portneuf	17040208	Large Spot Only	5 to 15 feet	111.72
Portneuf	17040208	Large Spot Only	< 5 feet	34.06
Lake Walcott	17040209	Large Spot Only	5 to 15 feet	7.79
Raft	17040210	Large Spot Only	5 to 15 feet	23.17
Raft	17040210	Large Spot Only	< 5 feet	73.83
Raft	17040210	Large Spot Only	Unknown	5.34
Goose	17040211	Large Spot Only	15 to 25 feet	64.83
Goose	17040211	Large Spot Only	5 to 15 feet	26.44
Goose	17040211	Large Spot Only	< 5 feet	7.16
Goose	17040211	Large Spot Only	Unknown	20.72
Beaver-Camas	17040214	Large Spot Only	5 to 15 feet	18.11
Medicine Lodge	17040215	Large Spot Only	5 to 15 feet	50.55
Medicine Lodge	17040215	Large Spot Only	< 5 feet	5.51
Medicine Lodge	17040215	Large Spot Only	Unknown	2.06

Name	HUC8	Spotting	Non-Natives	Stream Mile
Idaho Falls	17040201	Both Large and Fine Spot	Non-Natives are Present	27.4
Upper Henrys	17040202	Large Spot Only	Non-Natives are not Present	16.6
Upper Henrys	17040202	Large Spot Only	Non-Natives are Present	54.94
Lower Henrys	17040203	Large Spot Only	Non-Natives are not Present	18.57
Lower Henrys	17040203	Large Spot Only	Non-Natives are Present	137.4
Teton	17040204	Both Large and Fine Spot	Non-Natives are not Present	11.36
Teton	17040204	Large Spot Only	Non-Natives are not Present	74.05
Teton	17040204	Large Spot Only	Non-Natives are Present	313.6
Willow	17040205	Large Spot Only	Non-Natives are not Present	128.25
Willow	17040205	Large Spot Only	Non-Natives are Present	67.68
American Falls	17040206	Large Spot Only	Non-Natives are not Present	16.53
American Falls	17040206	Large Spot Only	Non-Natives are Present	1.38
Blackfoot	17040207	Large Spot Only	Non-Natives are not Present	105.86
Blackfoot	17040207	Large Spot Only	Non-Natives are Present	165.47
Portneuf	17040208	Large Spot Only	Non-Natives are not Present	101.99

Portneuf	17040208	Large Spot Only	Non-Natives are Present	162.27
Lake Walcott	17040209	Large Spot Only	Non-Natives are Present	7.79
Raft	17040210	Large Spot Only	Non-Natives are not Present	43.78
Raft	17040210	Large Spot Only	Non-Natives are Present	58.56
Goose	17040211	Large Spot Only	Non-Natives are not Present	92.55
Goose	17040211	Large Spot Only	Non-Natives are Present	26.6
Beaver-Camas	17040214	Large Spot Only	Non-Natives are not Present	14.36
Beaver-Camas	17040214	Large Spot Only	Non-Natives are Present	3.75
Medicine Lodge	17040215	Large Spot Only	Non-Natives are not Present	1.58
Medicine Lodge	17040215	Large Spot Only	Non-Natives are Present	56.54

Name	HUC8	Ownership	Wilderness	Stream Mile
Idaho Falls	17040201	Bureau of Land Management	No	9.31
Idaho Falls	17040201	Private	No	3.37
Idaho Falls	17040201	Water	No	14.72
Upper Henrys	17040202	Bureau of Land Management	No	0.51
Upper Henrys	17040202	National Park Service	No	2.57
Upper Henrys	17040202	Private	No	20.3
Upper Henrys	17040202	State	No	3.91
Upper Henrys	17040202	U.S. Forest Service	No	39.73
Upper Henrys	17040202	U.S. Forest Service	Yes	4.52
Upper Henrys	17040202	Water	No	0
Lower Henrys	17040203	Bureau of Land Management	No	4.38
Lower Henrys	17040203	National Park Service	No	37.3
Lower Henrys	17040203	Private	No	42.91
Lower Henrys	17040203	U.S. Forest Service	No	34.16
Lower Henrys	17040203	U.S. Forest Service	Yes	4.31
Lower Henrys	17040203	Water	No	32.91
Teton	17040204	Bureau of Land Management	No	17.08
Teton	17040204	Private	No	171.3
Teton	17040204	State	No	9.05
Teton	17040204	U.S. Forest Service	No	137.57
Teton	17040204	U.S. Forest Service	Yes	53.72
Teton	17040204	Water	No	10.29
Willow	17040205	Bureau of Land Management	No	20.79
Willow	17040205	Department of Defense	No	2.51
Willow	17040205	Private	No	95.33
Willow	17040205	State	No	51.15

Willow	17040205	U.S. Forest Service	No	13.99
Willow	17040205	Water	No	12.16
American Falls	17040206	Bureau of Indian Affairs	No	2.2
American Falls	17040206	Bureau of Land Management	No	3.55
American Falls	17040206	Private	No	2.12
American Falls	17040206	State	No	1.74
American Falls	17040206	U.S. Forest Service	No	6.93
American Falls	17040206	Water	No	1.37
Blackfoot	17040207	Bureau of Indian Affairs	No	14.65
Blackfoot	17040207	Bureau of Land Management	No	32.07
Blackfoot	17040207	Private	No	133.96
Blackfoot	17040207	State	No	31.77
Blackfoot	17040207	U.S. Forest Service	No	58.41
Blackfoot	17040207	Water	No	0.47
Portneuf	17040208	Bureau of Land Management	No	10.08
Portneuf	17040208	Private	No	172.09
Portneuf	17040208	State	No	9.93
Portneuf	17040208	U.S. Forest Service	No	67.66
Portneuf	17040208	U.S. Forest Service	Yes	4.5
Lake Walcott	17040209	Private	No	5.95
Lake Walcott	17040209	State	No	1.84
Raft	17040210	Bureau of Land Management	No	1.18
Raft	17040210	Private	No	50.48
Raft	17040210	State	No	0.19
Raft	17040210	U.S. Forest Service	No	50.49
Goose	17040211	Bureau of Land Management	No	14.27
Goose	17040211	Private	No	55.04
Goose	17040211	U.S. Forest Service	No	49.84
Beaver-Camas	17040214	Bureau of Land Management	No	5.56
Beaver-Camas	17040214	Private	No	2.07
Beaver-Camas	17040214	State	No	0.67
Beaver-Camas	17040214	U.S. Forest Service	No	9.81
Medicine Lodge	17040215	Bureau of Land Management	No	11.25
Medicine Lodge	17040215	Private	No	22.68
Medicine Lodge	17040215	State	No	0.72
Medicine Lodge	17040215	U.S. Forest Service	No	23.47



For conservation population information refer to CP# 17040104cp001

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040202cp001	Known or Probable Predisposition for Large Size	Moderately Networked	28.84	7	6116.87	1
17040202cp002	Other	Weakly Networked	10.46	3	0	0
17040202cp003	Core Conservation Population	Non-Network	3.72	1	0	0
17040202cp004	Core Conservation Population	Weakly Networked	7.69	3	0	0
17040202cp005	Other	Weakly Networked	4.9	3	46.96	1
17040202cp006	Core Conservation Population	Non-Network	10.51	2	0	0
17040202cp007	Other	Non-Network	2.63	2	0	0
17040202cp009	Other	Non-Network	1.06	1	0	0
17040202cp010	Other	Non-Network	4.71	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040202cp001	Limited Disease Risk	Hybridizing species are sympatric	Yes
17040202cp002	Limited Disease Risk	Hybridizing species are sympatric	No
17040202cp003	Limited Disease Risk	No Risk of Hybridization	Yes
17040202cp004	Limited Disease Risk	No Risk of Hybridization	No
17040202cp005	Limited Disease Risk	Hybridizing species are sympatric	No
17040202cp006	Limited Disease Risk	Hybridizing species > 10 km	No
17040202cp007	Limited Disease Risk	Hybridizing species are sympatric	No
17040202cp009	Limited Disease Risk	Hybridizing species are sympatric	Yes
17040202cp010	Limited Disease Risk	Hybridizing species are sympatric	Yes

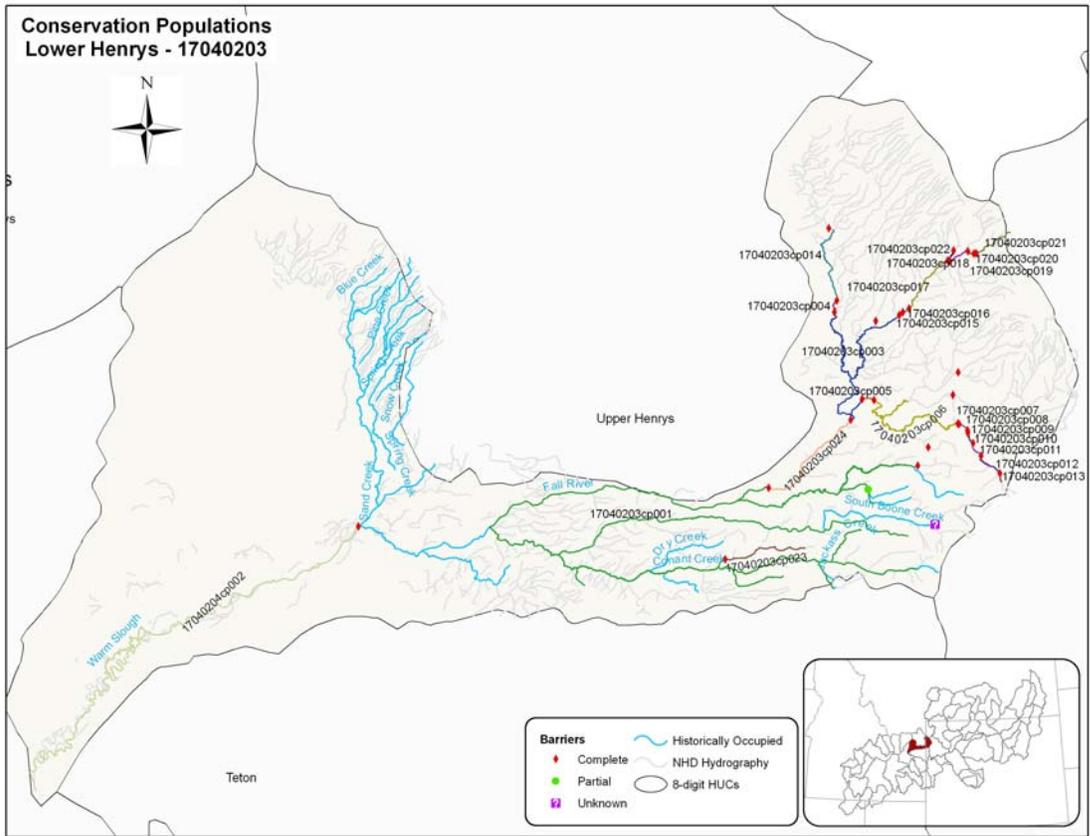
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040202cp001		Lake trib.		Local	
17040202cp002	Lake out.				
17040202cp003				Local	
17040202cp004				Local	
17040202cp005		Lake trib.			
17040202cp006				Local	
17040202cp007				Local	
17040202cp009				Local	
17040202cp010				Local	

Conservation Population ID:	Non-native
17040202cp001	BRK
17040202cp002	BRK, RBT
17040202cp003	None
17040202cp004	BRK
17040202cp005	BRK, RBT
17040202cp006	BRK, BRN, RBT
17040202cp007	BRK, RBT
17040202cp009	BRK, RBT
17040202cp010	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040202cp001	16.9	5.97	5.95		
17040202cp002		2.54		6.71	1.23
17040202cp003	3.72				
17040202cp004			6.26		1.43
17040202cp005	1.18	0.75		2.98	
17040202cp006			6.67		3.85
17040202cp007			2.64		
17040202cp009			1.06		
17040202cp010			4.71		

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040202cp001	28.84	46.37	22.93	36.85	7	6116.87	2475.41	1	6116.87	1
17040202cp002	10.46	16.9	9.23	14.92	3					
17040202cp003	3.72	5.98			1					
17040202cp004	7.69	12.37	5.8	9.34	3					
17040202cp005	4.9	7.89	4.9	7.89	3	46.96	19	1	46.96	1
17040202cp006	10.51	16.94	6.66	10.74	2					
17040202cp007	2.63	4.25	2.63	4.25	2					
17040202cp009	1.06	1.7	1.06	1.7	1					
17040202cp010	4.71	7.57	4.71	7.57	1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040202cp001	Large Spot Only	28.822	1468.5	1	2	2	2	4	3
17040202cp002	Large Spot Only	10.485	63.5	1	3	3	3	2	2
17040202cp003	Large Spot Only	3.718	1022.4	1	4	4	2	2	2
17040202cp004	Large Spot Only	7.687	1987.2	1	3	3	2	2	2
17040202cp005	Both Large and Fine Spot	4.907	0	1	3	4	4	4	4
17040202cp006	Large Spot Only	10.527	667.3	1	4	3	2	2	2
17040202cp007	Large Spot Only	2.637	58.5	1	4	4	3	2	3
17040202cp009	Large Spot Only	1.057	0	1	4	4	4	2	3
17040202cp010	Large Spot Only	4.707	0	1	4	4	4	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040203cp001	Known or Probable Unique Life History	Moderately Networked	112.59	12	0	0
17040203cp003	Known or Probable Unique Life History	Moderately Networked	22.78	3	0	0
17040203cp004	Known or Probable Unique Life History	Non-Network	1.01	1	0	0
17040203cp005	Known or Probable Unique Life History	Non-Network	0.79	1	0	0
17040203cp006	Known or Probable Unique Life History	Weakly Networked	12.9	2	0	0
17040203cp007	Known or Probable Unique Life History	Non-Network	0.09	1	0	0
17040203cp008	Known or Probable Unique Life History	Non-Network	0.7	1	0	0
17040203cp009	Known or Probable Unique Life History	Non-Network	0.18	1	0	0
17040203cp010	Known or Probable Unique Life History	Non-Network	0.87	1	0	0
17040203cp011	Known or Probable Unique Life History	Non-Network	1.67	1	0	0
17040203cp012	Known or Probable Unique Life History	Non-Network	1.99	1	0	0
17040203cp013	Known or Probable Unique Life History	Non-Network	0.56	1	0	0
17040203cp014	Known or Probable Unique Life History	Non-Network	6.04	1	0	0
17040203cp015	Known or Probable Unique Life History	Non-Network	0.29	1	0	0
17040203cp016	Known or Probable Unique Life History	Non-Network	0.49	1	0	0
17040203cp017	Known or Probable Unique Life History	Weakly Networked	4.48	2	0	0
17040203cp018	Known or Probable Unique Life History	Non-Network	1.45	1	0	0
17040203cp019	Known or Probable Unique Life History	Non-Network	0.43	1	0	0
17040203cp020	Known or Probable Unique Life History	Non-Network	0.16	1	0	0
17040203cp021	Known or Probable Unique Life History	Weakly Networked	3.07	1	0	0
17040203cp022	Known or Probable Unique Life History	Non-Network	0.77	1	0	0
17040203cp023	Known or Probable Unique Life History	Non-Network	5.52	2	0	0
17040203cp024	Known or Probable Unique Life History	Non-Network	7.31	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040203cp001	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040203cp003	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
17040203cp004	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp005	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp006	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp007	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp008	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp009	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp010	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp011	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp012	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp013	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp014	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp015	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp016	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp017	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp018	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp019	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp020	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp021	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp022	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040203cp023	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	Yes
17040203cp024	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040203cp001				Local	
17040203cp003				Local	
17040203cp004				Local	
17040203cp005				Local	
17040203cp006				Local	
17040203cp007				Local	
17040203cp008				Local	
17040203cp009				Local	
17040203cp010				Local	
17040203cp011				Local	
17040203cp012				Local	
17040203cp013				Local	
17040203cp014				Local	
17040203cp015				Local	
17040203cp016				Local	

17040203cp017				Local	
17040203cp018				Local	
17040203cp019				Local	
17040203cp020				Local	
17040203cp021				Local	
17040203cp022				Local	
17040203cp023				Local	
17040203cp024				Local	

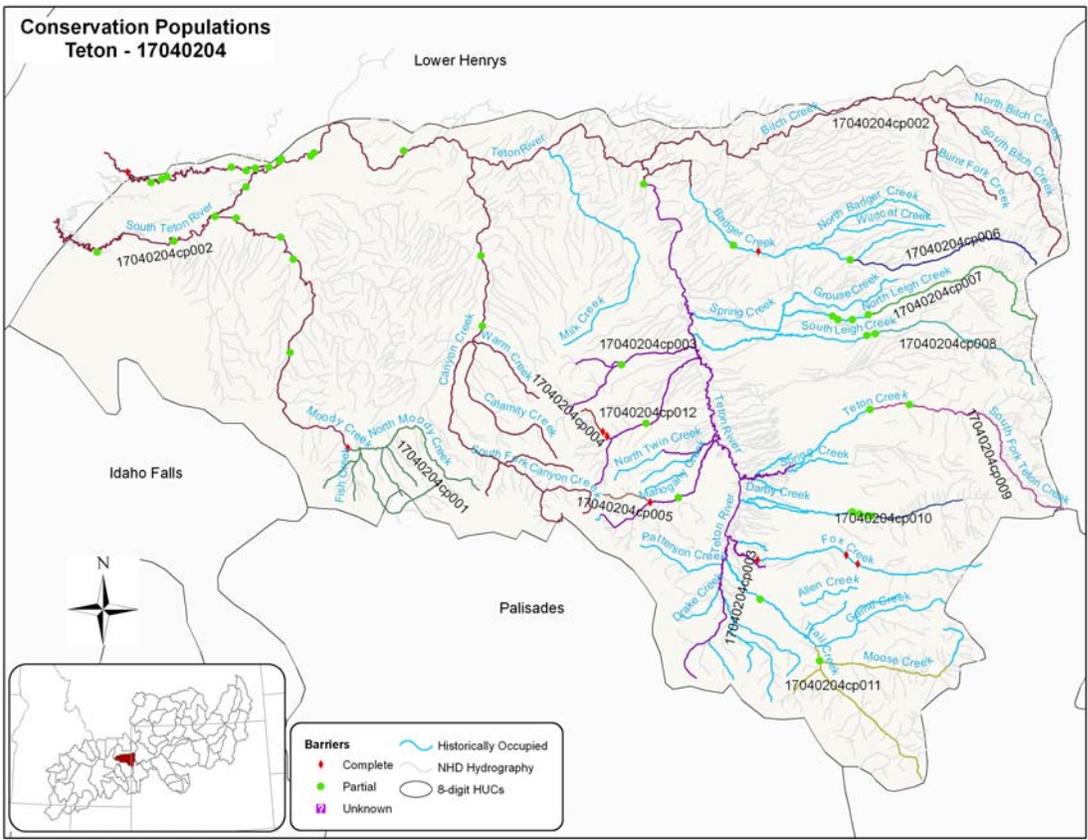
Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040203cp001	112.59	181.32	105.16	169.35	12					
17040203cp003	22.78	36.63	22.78	36.63	3					
17040203cp004	1.01	1.62			1					
17040203cp005	0.79	1.26	0.79	1.26	1					
17040203cp006	12.9	20.8	12.9	20.8	2					
17040203cp007	0.09	0.15	0.09	0.15	1					
17040203cp008	0.7	1.13	0.7	1.13	1					
17040203cp009	0.18	0.28	0.18	0.28	1					
17040203cp010	0.87	1.41	0.87	1.41	1					
17040203cp011	1.67	2.68	1.67	2.68	1					
17040203cp012	1.99	3.17	1.99	3.17	1					
17040203cp013	0.56	0.9			1					
17040203cp014	6.04	9.7			1					
17040203cp015	0.29	0.46			1					
17040203cp016	0.49	0.79			1					
17040203cp017	4.48	7.24			2					
17040203cp018	1.45	2.33			1					
17040203cp019	0.43	0.69			1					
17040203cp020	0.16	0.26			1					
17040203cp021	3.07	4.94			1					
17040203cp022	0.77	1.24			1					
17040203cp023	5.52	8.87	5.52	8.87	2					
17040203cp024	7.31	11.78	7.31	11.78	1					

Conservation Population ID:	Non-native
17040203cp001	BRK, RBT
17040203cp003	RBT
17040203cp004	None
17040203cp005	RBT
17040203cp006	BRK, RBT
17040203cp007	RBT
17040203cp008	RBT
17040203cp009	RBT
17040203cp010	RBT
17040203cp011	RBT
17040203cp012	RBT
17040203cp013	Unknown
17040203cp014	None
17040203cp015	Unknown
17040203cp016	Unknown
17040203cp017	None
17040203cp018	None
17040203cp019	None
17040203cp020	None
17040203cp021	None
17040203cp022	None
17040203cp023	BRK, RBT
17040203cp024	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040203cp001	26.58	19.18	66.88		
17040203cp003	22.78				
17040203cp004	1.01				
17040203cp005	0.78				
17040203cp006	12.92				
17040203cp007	0.09				
17040203cp008	0.7				
17040203cp009	0.17				
17040203cp010	0.88				
17040203cp011	1.66				
17040203cp012	1.98				
17040203cp013	0.56				
17040203cp014	6.03				
17040203cp015	0.29				
17040203cp016	0.49				
17040203cp017	4.51				
17040203cp018	1.45				
17040203cp019	0.43				

17040203cp020	0.16				
17040203cp021	3.07				
17040203cp022	0.77				
17040203cp023			5.51		
17040203cp024		7.32			

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040203cp001	Both Large and Fine Spot	112.633	14645.7	3	2	1	1	4	2
17040203cp003	Large Spot Only	22.783	193.4	3	2	2	3	3	2
17040203cp004	Large Spot Only	1.007	25.2	2	4	4	4	2	3
17040203cp005	Large Spot Only	0.781	0	2	4	4	4	2	3
17040203cp006	Large Spot Only	12.918	58.4	2	3	3	3	2	2
17040203cp007	Large Spot Only	0.092	0	2	4	4	4	2	3
17040203cp008	Large Spot Only	0.701	0	2	4	4	4	2	3
17040203cp009	Both Large and Fine Spot	0.174	4.3	2	4	4	4	2	3
17040203cp010	Large Spot Only	0.876	21.9	2	4	4	4	2	3
17040203cp011	Large Spot Only	1.663	41.6	2	4	4	4	2	3
17040203cp012	Large Spot Only	1.98	49.5	2	4	4	4	2	3
17040203cp013	Large Spot Only	0.56	0	2	4	4	4	2	3
17040203cp014	Large Spot Only	6.029	150.7	2	4	3	3	2	2
17040203cp015	Large Spot Only	0.285	0	2	4	4	4	2	3
17040203cp016	Large Spot Only	0.49	0	2	4	4	4	2	3
17040203cp017	Large Spot Only	4.508	3360.7	2	3	4	1	3	2
17040203cp018	Large Spot Only	1.447	0	2	4	4	4	2	3
17040203cp019	Large Spot Only	0.427	117.5	2	4	4	3	2	3
17040203cp020	Large Spot Only	0.159	0	2	4	4	4	2	3
17040203cp021	Large Spot Only	3.069	76.7	2	3	4	3	2	3
17040203cp022	Large Spot Only	0.768	211.3	2	4	4	3	2	3
17040203cp023	Large Spot Only	5.511	137.8	2	4	4	3	3	4
17040203cp024	Large Spot Only	7.322	183	3	4	3	3	3	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040204cp001	Core Conservation Population	Moderately Networked	30.44	1	0	0
17040204cp002	Core Conservation Population	Moderately Networked	251.87	14	0	0
17040204cp003	Core Conservation Population	Moderately Networked	86.25	12	4.99	1
17040204cp004	Core Conservation Population	Non-Network	0.34	1	0	0
17040204cp005	Core Conservation Population	Non-Network	2.72	1	0	0
17040204cp006	Core Conservation Population	Moderately Networked	11.36	1	0	0
17040204cp007	Core Conservation Population	Non-Network	12.02	1	0	0
17040204cp008	Core Conservation Population	Weakly Networked	10.68	1	0	0
17040204cp009	Core Conservation Population	Weakly Networked	14.44	1	0	0
17040204cp010	Core Conservation Population	Non-Network	6.23	1	0	0
17040204cp011	Core Conservation Population	Weakly Networked	20.36	3	0	0
17040204cp012	Core Conservation Population	Non-Network	1.89	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040204cp001	Limited Disease Risk	No Risk of Hybridization	Yes
17040204cp002	Population is Infected	Hybridizing species are sympatric	No
17040204cp003	Population is Infected	Hybridizing species > 10 km	No
17040204cp004	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
17040204cp005	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
17040204cp006	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp007	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp008	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp009	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp010	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp011	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040204cp012	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes

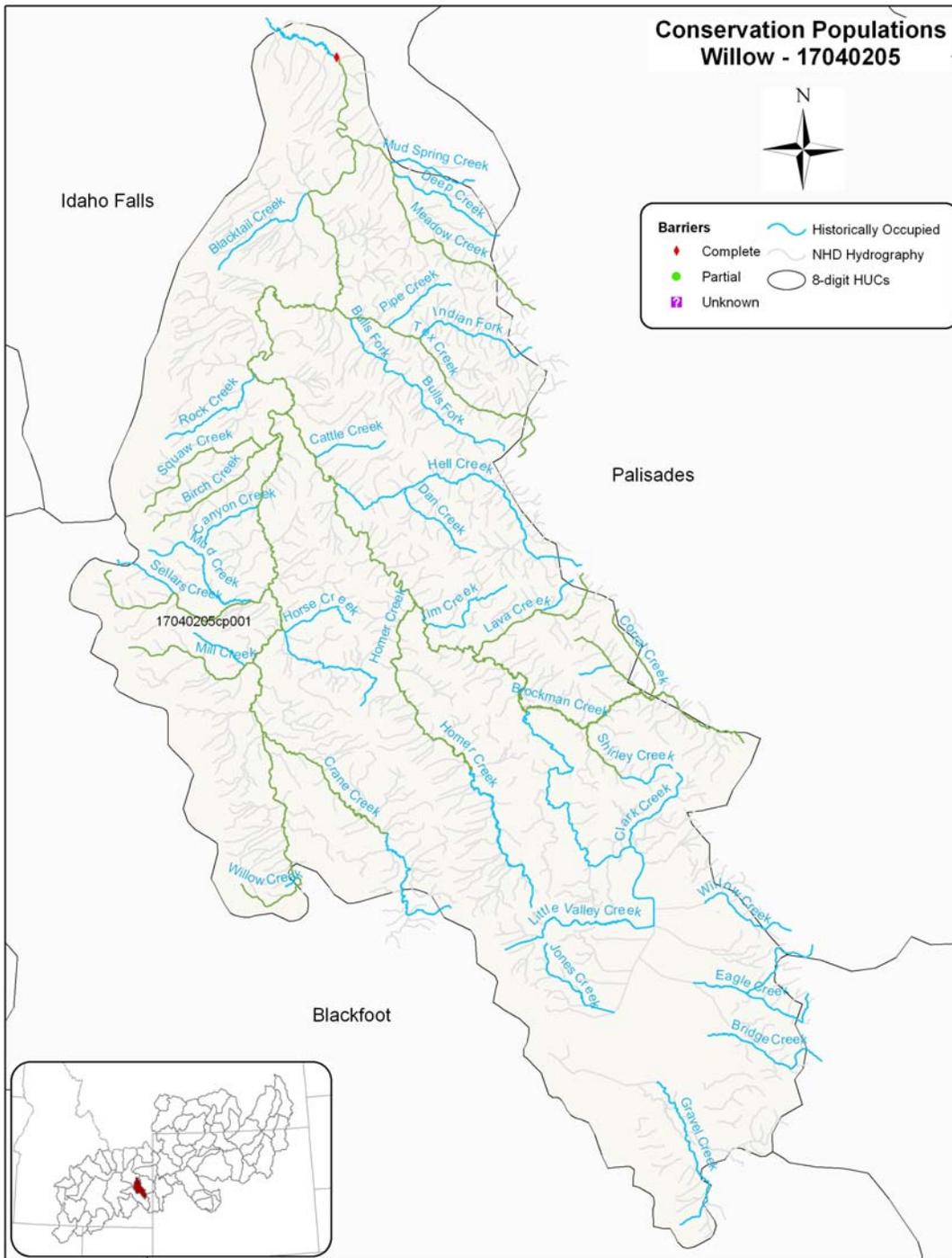
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040204cp001				Local	
17040204cp002			Lg. river	Local	
17040204cp003			Lg. river		
17040204cp004				Local	
17040204cp005				Local	
17040204cp006			Lg. river	Local	
17040204cp007				Local	
17040204cp008				Local	
17040204cp009				Local	
17040204cp010				Local	
17040204cp011			Lg. river	Local	
17040204cp012				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040204cp001	30.44	48.97	30.44	48.97	1					
17040204cp002	251.87	405.19	197.45	317.73	14					
17040204cp003	86.25	138.89	86.25	138.89	12	4.99	2.02	1	4.99	1
17040204cp004	0.34	0.54	0.34	0.54	1					
17040204cp005	2.72	4.37			1					
17040204cp006	11.36	18.22			1					
17040204cp007	12.02	19.37	12.02	19.37	1					
17040204cp008	10.68	17.18			1					
17040204cp009	14.44	23.31	14.44	23.31	1					
17040204cp010	6.23	10.05			1					
17040204cp011	20.36	32.71	20.36	32.71	3					
17040204cp012	1.89	3.05	1.89	3.05	1					

Conservation Population ID:	Non-native
17040204cp001	BRK
17040204cp002	BRK, BRN, RBT
17040204cp003	BRK, RBT
17040204cp004	BRK
17040204cp005	None
17040204cp006	None
17040204cp007	BRK
17040204cp008	None
17040204cp009	BRK
17040204cp010	None
17040204cp011	BRK
17040204cp012	BRK

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040204cp001		30.42			
17040204cp002	99.11		45.53	107.19	
17040204cp003		51.2	30.29	4.83	
17040204cp004			0.33		
17040204cp005			2.72		
17040204cp006	11.33				
17040204cp007			12.03		
17040204cp008	10.68				
17040204cp009			14.46		
17040204cp010	6.26				
17040204cp011			20.34		
17040204cp012			1.89		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040204cp001	Large Spot Only	30.422	3042.2	1	2	2	1	3	2
17040204cp002	Large Spot Only	251.822	53728.1	5	2	1	1	4	2
17040204cp003	Large Spot Only	86.318	2157.9	5	2	1	1	4	2
17040204cp004	Large Spot Only	0.334	8.4	3	4	4	4	2	3
17040204cp005	Large Spot Only	2.716	67.9	3	4	4	3	2	3
17040204cp006	Both Large and Fine Spot	11.331	3116.1	3	2	3	1	2	1
17040204cp007	Large Spot Only	12.03	300.8	3	4	3	3	2	2
17040204cp008	Large Spot Only	10.684	1068.4	3	3	3	2	2	2
17040204cp009	Large Spot Only	14.465	361.6	3	3	3	3	2	2
17040204cp010	Large Spot Only	6.256	625.6	3	4	3	2	2	2
17040204cp011	Large Spot Only	20.343	508.6	3	3	2	2	3	2
17040204cp012	Large Spot Only	1.885	47.1	3	4	4	4	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040205cp001	Core Conservation Population	Moderately Networked	203.28	18	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040205cp001	Limited Disease Risk	Hybridizing species > 10 km	Yes

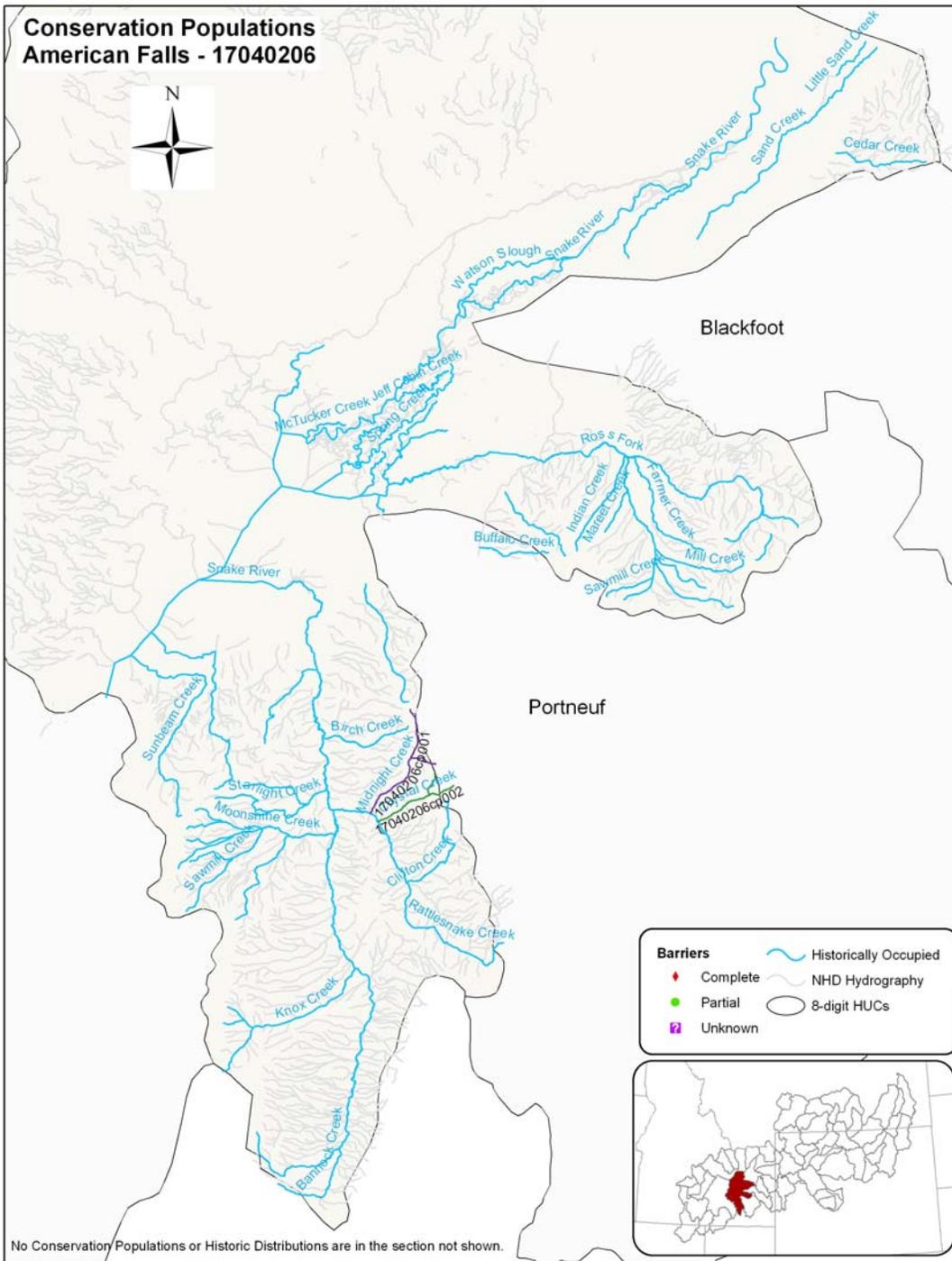
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040205cp001			Lg. river	Local	

Conservation Population ID:	Non-native
17040205cp001	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040205cp001		72.98	15.96	23.69	90.55

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040205cp001	203.28	327	67.68	108.86	18					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040205cp001	Large Spot Only	203.183	10519.4	1	2	1	1	4	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040206cp001	Known or Probable Unique Life History	Weakly Networked	9.64	2	0	0
17040206cp002	Known or Probable Unique Life History	Weakly Networked	6.89	2	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040206cp001	Limited Disease Risk	No Risk of Hybridization	No
17040206cp002	Limited Disease Risk	No Risk of Hybridization	No

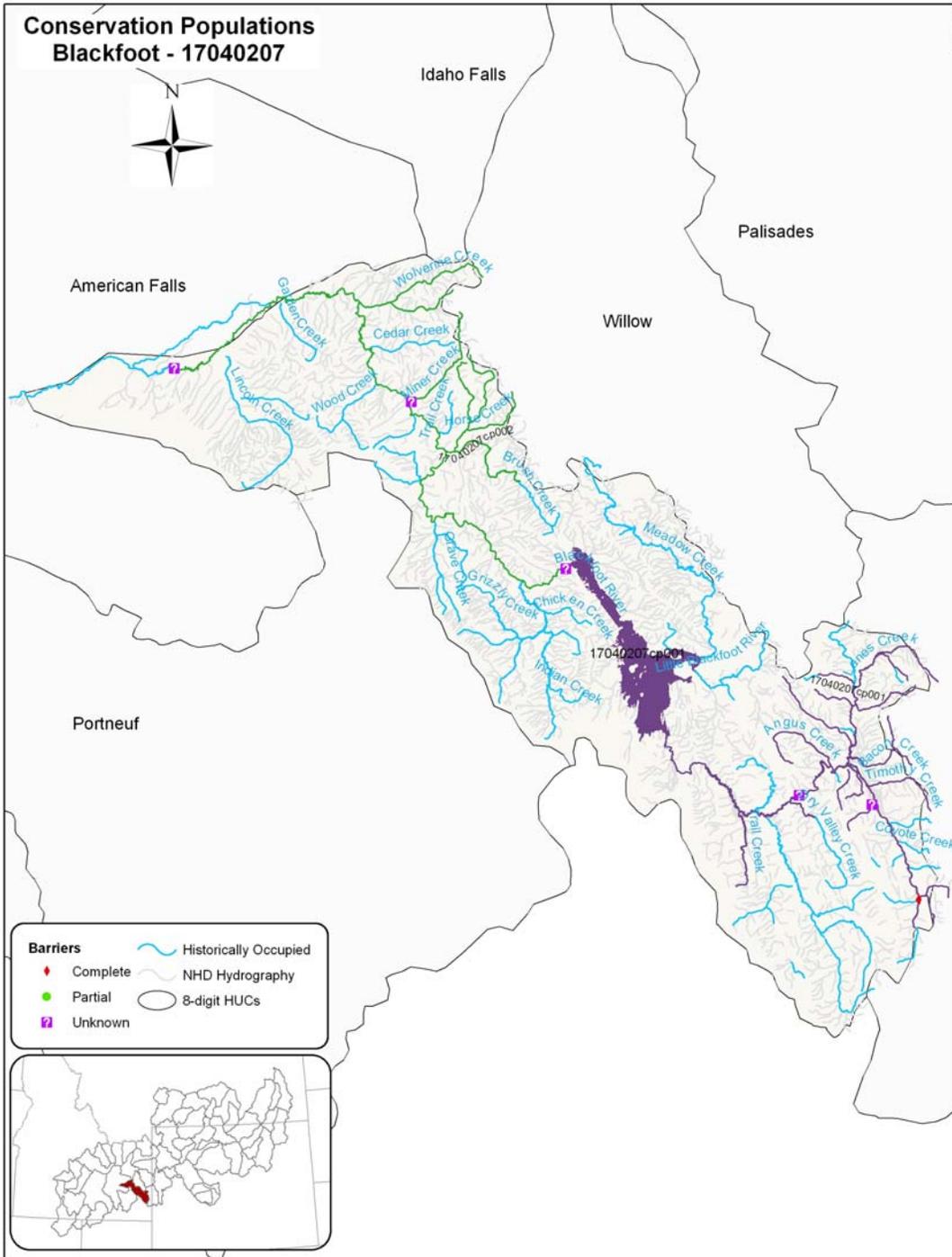
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040206cp001				Local	
17040206cp002				Local	

Conservation Population ID:	Non-native
17040206cp001	None
17040206cp002	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040206cp001	9.65				
17040206cp002			6.88		

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040206cp001	9.64	15.56			2					
17040206cp002	6.89	11.09			2					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040206cp001	Large Spot Only	9.651	6449.1	1	3	3	1	2	2
17040206cp002	Large Spot Only	6.882	4152.5	1	3	3	1	3	2



Conservation Population ID	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040207cp001	Strongly Networked	152.03	19	16842.5	1
17040207cp002	Strongly Networked	122.09	8	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040207cp001	Moderate Disease Risk < 10 km	Hybridizing species > 10 km	No
17040207cp002	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040207cp001		Lake trib.			
17040207cp002		Lake trib.			

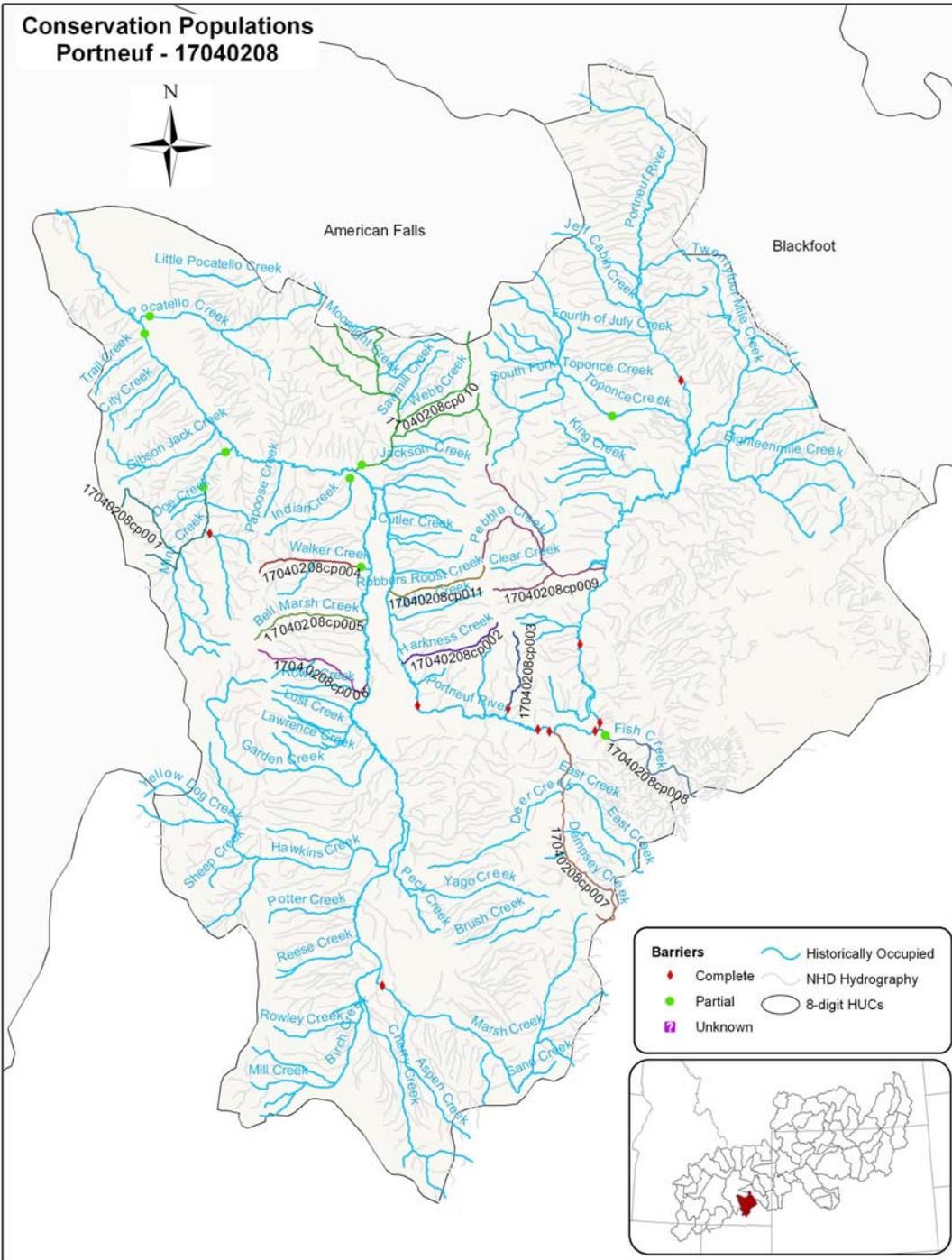
Conservation Population ID:	Non-native
17040207cp001	BRK, RBT
17040207cp002	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040207cp001		44.05	46.69	58.31	2.97
17040207cp002		82.92	39.1		

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040207cp001	152.03	244.65	79.62	128.16	19	16842.5	6815.92	1	16842.5	1
17040207cp002	122.09	196.37	88.64	142.54	8					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040207cp001	Large Spot Only	152.013	15669.9	3	1	1	1	4	2
17040207cp002	Large Spot Only	122.023	55755.1	3	1	1	1	4	2

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Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040208cp001	Known or Probable Unique Life History	Weakly Networked	12.69	3	0	0
17040208cp002	Known or Probable Unique Life History	Weakly Networked	5.83	1	0	0
17040208cp003	Known or Probable Unique Life History	Moderately Networked	4.54	1	0	0
17040208cp004	Known or Probable Unique Life History	Weakly Networked	5.67	1	0	0
17040208cp005	Known or Probable Unique Life History	Weakly Networked	6.41	1	0	0
17040208cp006	Known or Probable Unique Life History	Weakly Networked	6.9	1	0	0
17040208cp007	Known or Probable Unique Life History	Moderately Networked	13.03	1	0	0
17040208cp008	Known or Probable Unique Life History	Strongly Networked	8.6	1	0	0
17040208cp009	Known or Probable Unique Life History	Strongly Networked	19.02	5	0	0
17040208cp010	Known or Probable Unique Life History	Strongly Networked	34.5	8	0	0
17040208cp011	Known or Probable Unique Life History	Weakly Networked	5.58	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040208cp001	Limited Disease Risk	Hybridizing species > 10 km	No
17040208cp002	Limited Disease Risk	No Risk of Hybridization	No
17040208cp003	Limited Disease Risk	No Risk of Hybridization	Yes
17040208cp004	Limited Disease Risk	No Risk of Hybridization	No
17040208cp005	Limited Disease Risk	No Risk of Hybridization	No
17040208cp006	Limited Disease Risk	No Risk of Hybridization	No
17040208cp007	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	Yes
17040208cp008	Limited Disease Risk	No Risk of Hybridization	Yes
17040208cp009	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040208cp010	Limited Disease Risk	Hybridizing species < 10 km	No
17040208cp011	Limited Disease Risk	No Risk of Hybridization	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040208cp001			Lg. river	Local	
17040208cp002			Lg. river	Local	
17040208cp003			Lg. river	Local	
17040208cp004				Local	
17040208cp005				Local	
17040208cp006				Local	
17040208cp007			Lg. River	Local	
17040208cp008			Lg. river	Local	
17040208cp009			Lg. river	Local	
17040208cp010			Lg. river	Local	
17040208cp011			Lg. river	Local	

Conservation Population ID:	Non-native
17040208cp001	BRN
17040208cp002	None
17040208cp003	BRK
17040208cp004	None
17040208cp005	None
17040208cp006	None
17040208cp007	None
17040208cp008	None
17040208cp009	RBT
17040208cp010	BRN
17040208cp011	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040208cp001	5.77		6.93		
17040208cp002			5.81		
17040208cp003			4.57		
17040208cp004		5.67			
17040208cp005			6.41		
17040208cp006			6.9		
17040208cp007		13.02			
17040208cp008		8.6			
17040208cp009	9.67	3.49	5.85		
17040208cp010	12.63		21.89		
17040208cp011	5.55				

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040208cp001	12.69	20.46	10	16.12	3					
17040208cp002	5.83	9.36			1					
17040208cp003	4.54	7.34	4.54	7.34	1					
17040208cp004	5.67	9.14			1					
17040208cp005	6.41	10.31			1					
17040208cp006	6.9	11.12			1					
17040208cp007	13.03	20.94			1					
17040208cp008	8.6	13.86			1					
17040208cp009	19.02	30.55	4.18	6.7	5					
17040208cp010	34.5	55.58	6.59	10.61	8					
17040208cp011	5.58	8.92			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040208cp001	Large Spot Only	12.702	2751.6	1	3	3	1	2	2
17040208cp002	Large Spot Only	5.815	145.4	1	3	4	3	2	3
17040208cp003	Large Spot Only	4.566	456.6	1	2	4	3	2	2
17040208cp004	Large Spot Only	5.674	141.9	1	3	4	3	2	3
17040208cp005	Large Spot Only	6.405	160.1	1	3	3	3	2	2
17040208cp006	Large Spot Only	6.898	172.4	1	3	3	3	2	2
17040208cp007	Large Spot Only	13.018	325.4	3	2	3	3	3	3
17040208cp008	Large Spot Only	8.599	859.9	1	1	3	2	2	2
17040208cp009	Large Spot Only	19.01	12103.4	3	1	3	1	3	2
17040208cp010	Large Spot Only	34.518	5729.4	1	1	2	1	4	2
17040208cp011	Large Spot Only	5.553	1527.1	1	3	4	2	2	2

Conservation Population ID	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes

Conservation Population ID:	Non-native

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown

cplD	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040210cp001	Known or Probable Unique Life History	Weakly Networked	41.56	8	0	0
17040210cp002	Core Conservation Population	Weakly Networked	3.81	1	0	0
17040210cp003	Known or Probable Unique Life History	Non-Network	3.26	1	0	0
17040210cp004	Core Conservation Population	Non-Network	3	1	0	0
17040210cp005	Core Conservation Population	Non-Network	2.78	1	0	0
17040210cp006	Core Conservation Population	Non-Network	3.87	1	0	0
17040210cp007	Known or Probable Unique Life History	Moderately Networked	16.64	3	0	0
17040210cp008	Known or Probable Unique Life History	Non-Network	1.75	1	0	0
17040210cp009	Known or Probable Unique Life History	Weakly Networked	5.21	2	0	0
17040210cp010	Known or Probable Unique Life History	Non-Network	7.21	2	0	0
17040210cp011	Known or Probable Unique Life History	Weakly Networked	4.03	2	0	0
17040210cp012	Known or Probable Unique Life History	Non-Network	2.03	1	0	0
17040210cp013	Known or Probable Unique Life History	Weakly Networked	2.76	1	0	0
17040210cp014	Known or Probable Unique Life History	Non-Network	1.38	1	0	0
17040210cp015	Known or Probable Unique Life History	Non-Network	3.05	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040210cp001	Moderate Disease Risk < 10 km	Hybridizing species < 10 km	No
17040210cp002	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040210cp003	Limited Disease Risk	No Risk of Hybridization	No
17040210cp004	Limited Disease Risk	No Risk of Hybridization	No
17040210cp005	Limited Disease Risk	No Risk of Hybridization	No
17040210cp006	Limited Disease Risk	No Risk of Hybridization	Yes
17040210cp007	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040210cp008	Limited Disease Risk	No Risk of Hybridization	No
17040210cp009	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040210cp010	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040210cp011	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040210cp012	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040210cp013	Limited Disease Risk	Hybridizing species > 10 km	Yes
17040210cp014	Limited Disease Risk	No Risk of Hybridization	Yes
17040210cp015	Limited Disease Risk	No Risk of Hybridization	No

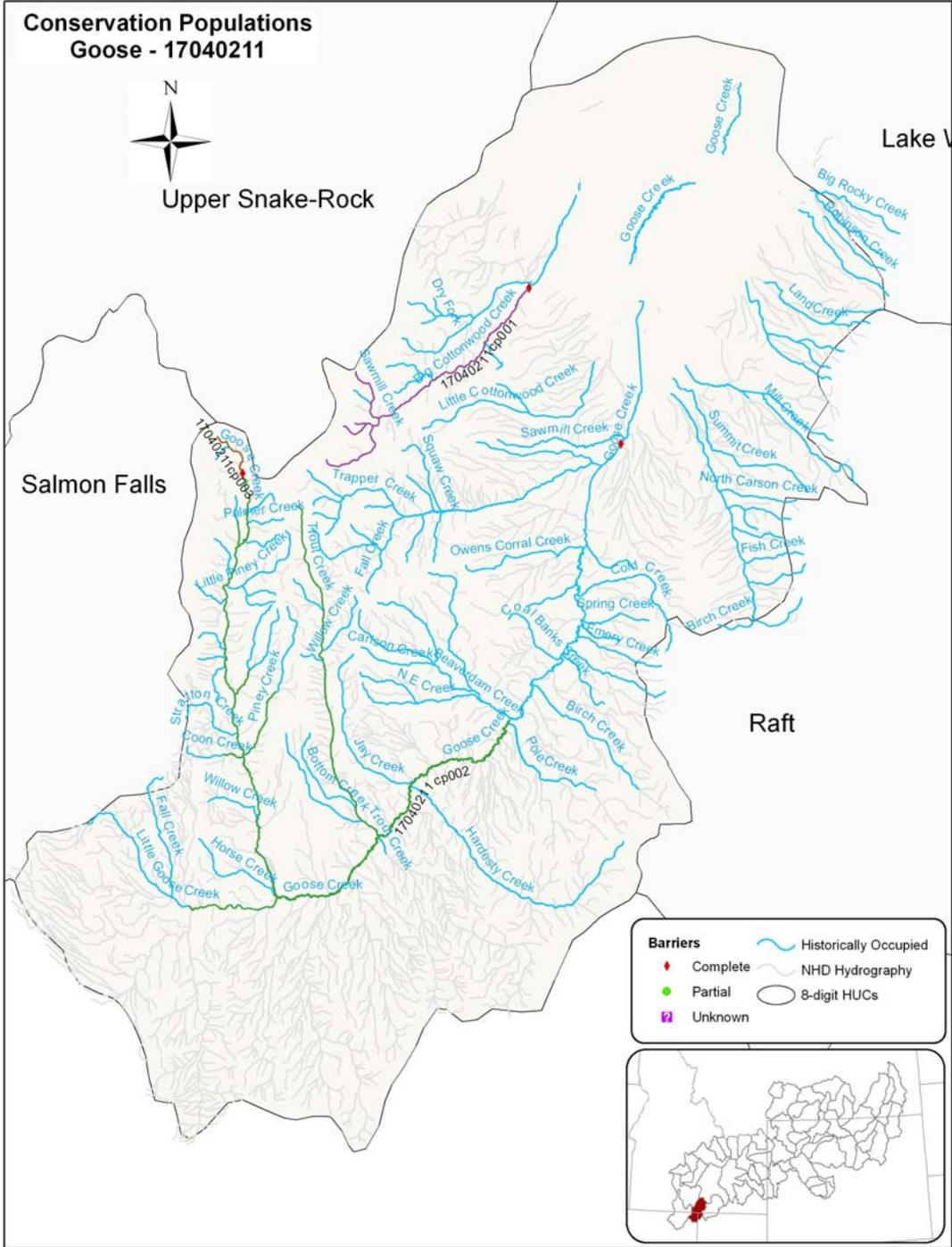
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040210cp001				Local	
17040210cp002				Local	
17040210cp003				Local	
17040210cp004				Local	
17040210cp005				Local	
17040210cp006				Local	
17040210cp007				Local	
17040210cp008				Local	
17040210cp009				Local	
17040210cp010				Local	
17040210cp011				Local	
17040210cp012				Local	
17040210cp013				Local	
17040210cp014				Local	
17040210cp015				Local	

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040210cp001	41.56	66.89	41.56	66.89	8					
17040210cp002	3.81	6.12			1					
17040210cp003	3.26	5.24			1					
17040210cp004	3	4.83			1					
17040210cp005	2.78	4.46			1					
17040210cp006	3.87	6.24			1					
17040210cp007	16.64	26.77			3					
17040210cp008	1.75	2.83			1					
17040210cp009	5.21	8.37	3.75	6.01	2					
17040210cp010	7.21	11.59			2					
17040210cp011	4.03	6.51	4.03	6.51	2					
17040210cp012	2.03	3.28	2.03	3.28	1					
17040210cp013	2.76	4.43	2.76	4.43	1					
17040210cp014	1.38	2.22	1.38	2.22	1					
17040210cp015	3.05	4.9	3.05	4.9	1					

Conservation Population ID:	Non-native
17040210cp001	BRK, RBT
17040210cp002	None
17040210cp003	None
17040210cp004	None
17040210cp005	None
17040210cp006	None
17040210cp007	None
17040210cp008	None
17040210cp009	BRK
17040210cp010	None
17040210cp011	BRK
17040210cp012	BRK
17040210cp013	BRK
17040210cp014	RBT
17040210cp015	BRK, BRN

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040210cp001		19.5	22.06		
17040210cp002					3.8
17040210cp003		3.26			
17040210cp004			3		
17040210cp005			2.78		
17040210cp006				3.88	
17040210cp007		11.28		5.35	
17040210cp008					1.75
17040210cp009				3.75	1.47
17040210cp010		7.19			
17040210cp011		0.91	3.12		
17040210cp012			2.04		
17040210cp013		2.75			
17040210cp014		1.38			
17040210cp015			3.03		

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040210cp001	Large Spot Only	41.566	10601.7	3	3	2	1	4	2
17040210cp002	Large Spot Only	3.8	95	1	3	4	3	2	3
17040210cp003	Large Spot Only	3.259	325.9	1	4	4	3	2	3
17040210cp004	Large Spot Only	3.001	300.1	1	4	4	3	2	3
17040210cp005	Large Spot Only	2.779	2084	1	4	4	1	2	2
17040210cp006	Large Spot Only	3.876	1066	1	4	4	2	2	2
17040210cp007	Large Spot Only	16.636	6354.4	2	2	3	1	3	2
17040210cp008	Large Spot Only	1.753	175.3	1	4	4	3	2	3
17040210cp009	Large Spot Only	5.214	1433.8	1	3	4	2	2	2
17040210cp010	Large Spot Only	7.188	5033.2	1	4	3	1	2	2
17040210cp011	Large Spot Only	4.032	995.3	1	3	4	2	2	2
17040210cp012	Large Spot Only	2.039	560.7	1	4	4	2	2	2
17040210cp013	Large Spot Only	2.751	275.1	1	3	4	3	2	3
17040210cp014	Large Spot Only	1.382	34.6	1	4	4	4	2	3
17040210cp015	Large Spot Only	3.033	834.1	1	4	4	2	2	2



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040211cp001	Core Conservation Population	Strongly Networked	21.11	4	0	0
17040211cp002	Known or Probable Unique Life History	Moderately Networked	95.3	7	0	0
17040211cp003	Known or Probable Unique Life History	Non-Network	2.74	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040211cp001	Limited Disease Risk	Hybridizing species < 10 km	Yes
17040211cp002	Limited Disease Risk	Hybridizing species are sympatric	No
17040211cp003	Limited Disease Risk	Hybridizing species < 10 km	Yes

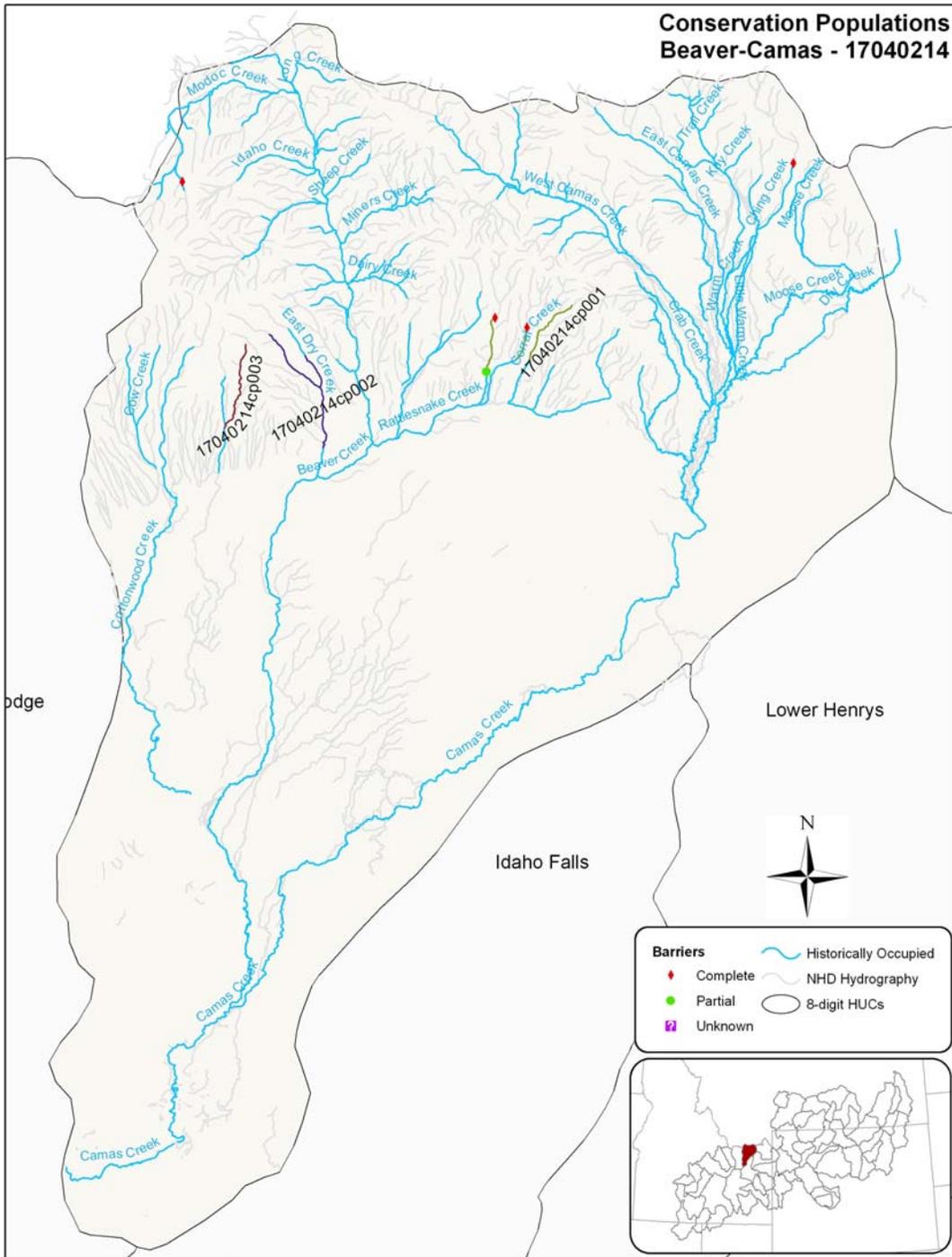
Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040211cp001				Local	
17040211cp002			Lg. river		
17040211cp003				Local	

Conservation Population ID:	Non-native
17040211cp001	BRK, RBT
17040211cp002	BRK, RBT
17040211cp003	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040211cp001		5.56	15.54		
17040211cp002		72.9	1.58		20.73
17040211cp003		2.75			

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040211cp001	21.11	33.96	21.11	33.96	4					
17040211cp002	95.3	153.18	5.49	8.8	7					
17040211cp003	2.74	4.44			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040211cp001	Large Spot Only	21.102	1692.9	1	1	2	2	2	1
17040211cp002	Large Spot Only	95.221	3856	1	2	1	1	4	2
17040211cp003	Large Spot Only	2.75	68.8	1	4	4	3	2	3



Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040214cp001	Known or Probable Unique Life History	Weakly Networked	6.95	3	0	0
17040214cp002	Known or Probable Unique Life History	Weakly Networked	7.24	3	0	0
17040214cp003	Known or Probable Unique Life History	Non-Network	3.92	1	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040214cp001	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
17040214cp002	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No
17040214cp003	Minimal Disease Risk > 10 km	Hybridizing species > 10 km	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040214cp001				Local	
17040214cp002				Local	
17040214cp003				Local	

Conservation Population ID:	Non-native
17040214cp001	BRK
17040214cp002	None
17040214cp003	None

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040214cp001					6.94
17040214cp002					7.23
17040214cp003					3.92

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040214cp001	6.95	11.17	3.75	6.04	3					
17040214cp002	7.24	11.64			3					
17040214cp003	3.92	6.32			1					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040214cp001	Large Spot Only	6.941	3015.8	2	3	3	1	2	2
17040214cp002	Large Spot Only	7.232	3957.2	2	3	3	1	2	2
17040214cp003	Large Spot Only	3.921	1078.3	2	4	4	2	2	2

Conservation Population ID	Population Qualifier	Connectivity	Stream Mile	Count of Habitat Segments	Acres	Count of Lakes
17040215cp001	Known or Probable Unique Life History	Weakly Networked	10.15	3	0	0
17040215cp002	Known or Probable Unique Life History	Strongly Networked	105.73	17	0	0

Conservation Population ID	Disease Risk	Genetic Risk	Presence of Complete Barrier
17040215cp001	Minimal Disease Risk > 10 km	Hybridizing species < 10 km	Yes
17040215cp002	Minimal Disease Risk > 10 km	Hybridizing species are sympatric	No

Conservation Population ID	Lake Out Spawning	Lake Trib Spawning	Large River Spawning	Local Dispersing Spawning	Unknown
17040215cp001				Local	
17040215cp002				Local	

Conservation Population ID:	Non-native
17040215cp001	BRK
17040215cp002	BRK, RBT

Conservation Population ID	Habitat Condition in Miles of Stream				
	Excellent	Fair	Good	Poor	Unknown
17040215cp001				1.15	9.02
17040215cp002					105.7

Conservation Population ID	Total Stream Mile	Total Stream KM	With Non-Natives Stream Miles	With Non Natives Stream KM	Count of Stream Segments	Total Acres	Total Hectares	Total Count of Lakes	With Non-Natives Acres	With Non-Natives Count of Lakes
17040215cp001	10.15	16.35	9	14.49	3					
17040215cp002	105.73	170.14	97.6	157.07	17					

cpID	Spotting	StreamMI	Total Fish	DiseaseRisk	Network	TempVar	PopSize	PopProdCat	FinalRank
17040215cp001	Large Spot Only	10.17	254.2	2	3	3	3	2	2
17040215cp002	Large Spot Only	105.7	3784.8	2	1	1	1	4	2