Comprehensive Bonneville Cutthroat Trout Restoration Plan

Final

Bear River Hydroelectric Project

FERC Project No. 20

Southeastern Idaho

Prepared by
Frank C. Shrier
Principal Fish Biologist – PacifiCorp Energy

December 2008

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The purpose of this document is to provide a prioritized list of strategies and actions that will conserve native Bonneville cutthroat trout (BCT) in the Bear River Hydroelectric Project Action Area. The Bear River Hydroelectric Projects were licensed by the Federal Energy Regulatory Commission on December 22, 2003. This License, as well as the Settlement Agreement between PacifiCorp Energy and the Parties, outlines a series of funding mechanisms, studies, and actions to work toward conservation and restoration of BCT in the Bear River Hydroelectric Project Action Area. In addition, a technical work group, named the Environmental Coordination Committee (ECC) was formed to guide implementation of the Settlement Agreement and the new FERC License. The agency, tribal, and non-governmental organizations that were party to the settlement provided a representative and an alternate to participate on the ECC.

This plan is intended to follow the goals and objectives of the *Management Plan for Conservation of Bonneville Cutthroat Trout in Idaho* (Teuscher and Capurso 2007) and the *Range-wide Bonneville Cutthroat Trout Conservation Plan* (Lentsch, et al. 2000) with a more refined focus on specific actions to be taken within the Bear River Hydroelectric Project Action Area, which extends within Idaho from the confluence of the Bear River and the Bear Lake Outlet Canal to the Utah border with Idaho. Also, studies conducted specific to the Bonneville Cutthroat Trout Restoration Study Plan developed by the ECC in 2004 helped guide recommendations for priority actions.

The following is an overarching goal for this restoration plan:

> *To preserve, restore, and protect Bonneville cutthroat trout and their unique ecological and behavioral characteristics within the Bear River Action Area to ensure the long-term viability of the species on a population by population basis*

The actions included in this plan focus on habitat restoration and enhancement, and recommendations for re-establishing BCT in areas where they have been extirpated. The primary areas of focus in this plan include:

- Actions to protect and enhance existing BCT populations;
- Habitat assessments to identify passage issues to improve or expand existing BCT range to historic drainages; and,
- Identification of riparian areas in need of improvements.

These primary areas of focus guide the following objectives established for this restoration plan:

> 1) Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations;

2) Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible;

3) Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available;

4) Reduce impacts of wild rainbow trout populations in the Action Area by rehabilitating some key stream reaches for BCT in the Bear River Action Area where these rainbow trout directly impact BCT; and

5) Link management actions and requirements to meet specific recreation objectives and fishing opportunities for BCT.

This plan is meant to identify and prioitize areas of need for the continued restoration of BCT. The plan recommends nearly 50 action items that, if implemented, could contribute significantly to the restoration of BCT habitat that could contribute greatly to the protection and recovery of BCT within the Action Area. Through the Bear River Habitat Enhancement Fund and the Land and Water Conservation Fund mechanisms, specific proposals will be evaluated for their merits as they relate to this plan.

1.0 INTRODUCTION

The Bear River Hydroelectric Projects were licensed by the Federal Energy Regulatory Commission (FERC) on December 22, 2003. This License, as well as a Settlement Agreement between PacifiCorp Energy and the Parties, outlined a series of studies, actions and funding mechanisms to work toward conservation and restoration of Bonneville cutthroat trout (BCT) in the Bear River Hydroelectric Project Action Area (Action Area). The Action Area is defined as "the Bear River and land drained by the Bear River and its tributaries below the point of confluence of the Bear Lake Outlet Canal with the mainstem Bear River and above the Idaho-Utah border."

The FERC license calls for PacifiCorp Energy (the Licensee) to prepare a Comprehensive Bonneville Cutthroat Trout Restoration Plan in consultation with the Environmental Coordination Committee (ECC). With License issuance, FERC required submission of the restoration plan within one year of issuance of the license. The Settlement Agreement, however, calls for development of the plan after the third anniversary of the license. To resolve the discrepancy, the ECC developed and submitted a Bonneville Cutthroat Trout Restoration Study Plan (Study Plan) to the FERC on July 30, 2004. The study plan outlines the four research elements (as called for in the Settlement Agreement) to be completed prior to development of a detailed BCT Restoration Plan. These elements are: 1) genetic analysis of BCT in the Bear River Hydroelectric Project Action Area; 2) a comprehensive irrigation diversion /barrier map; 3) aerial photography of the Action Area; and 4) radio telemetry studies to assess movements of BCT in the Action Area. Elements 1, 3 and 4 were completed in early 2007. The ECC determined in 2006 that existing mapping inventory work on irrigation diversions met the license requirement for irrigation diversion mapping and redirected those funds to the thermal imaging project. To expand on the existing irrigation diversion mapping work, the ECC in 2006 approved an Idaho Department of Fish and Game (IDFG) project to gather additional information on irrigation diversions concerning their individual impacts to BCT. Since completion of the above-mentioned research elements, PacifiCorp Energy, with the cooperation of the ECC, has worked toward completing this BCT Restoration Plan.

The purpose of this Restoration Plan is to summarize the findings from the completed research elements called for in the Study Plan and provide a prioritized list of strategies and actions that will conserve native BCT in the Action Area. This plan is intended to follow the goals and objectives of the Range-wide Bonneville Cutthroat Trout Conservation Plan (Lentsch, et al. 2000) and the *Management Plan for Conservation of Bonneville Cutthroat Trout in Idaho* (Teuscher and Capurso 2007) with a more refined focus on specific actions suggested for implementation within the Action Area. In Teuscher and Capurso's plan, they quote U.S. Fish and Wildlife Service (2002): "Declines in populations of native salmonids including BCT can result from combined effects of habitat degradation and fragmentation, blocked migration corridors, degraded water quality or quantity, angler harvest and poaching, entrainment into diversion canals and dams, non-native species interactions, and other factors." They go on to state, "A primary intent of this recovery plan is to have core areas reflect the qualities of a metapopulation. The boundaries of the MUs roughly define potential metapopulations where connectivity between those populations is rare."

Of note, on Nov. 9, 2008 the ECC held discussions about this restoration plan and agreed that, since conditions change with implementation of habitat improvement, new regulations, etc., the plan should be updated every five years. The ECC may want to consider updating the restoration plan sooner if significant changes occur (e.g. Cove dam removal) prior to the end of the 5-year period.

The following are management actions recommended by Teuscher and Capurso (2007):

1) Reestablish BCT in historical habitats that no longer support BCT populations;

2) Reduce negative impacts of non-native fish on BCT populations;

3) Identify fish passage barriers;

4) Screen irrigation diversions;

5) Improve watershed habitat;

6) Identify waters where BCT populations can be enhanced to levels that will provide recreational fishing;

7) Continue genetic analysis;

8) Develop a BCT monitoring plan;

9) Maintain and expand the existing BCT databases; and

10) Public outreach.

This document will attempt to incorporate these into an action plan for BCT within the Action Area.

Teuscher and Capurso were specific in identifying areas in need of one or more of these action items. Due to their specificity, it is difficult to present actions that are more specific except as they relate to the Study Plan results. *In addition, actions described in this document are more specific to Management Units that fall within the Bear River Action Area.*

1.1 Watershed Restoration Principles

There are a number of documents and articles relating to stream or watershed restoration. For this document information will come, primarily, from Slaney and Zaldokas (1997) and Williams, et al. (1997).

Williams, et al. (1997) is an American Fisheries Society (AFS) publication that brings together many AFS experts to share their thought and ideas on habitat restoration. The first chapter identifies key elements for effective restoration programs:

1) Recognize the inherent capabilities of your stream;
2) Develop ecologically sound goals and objectives;
3) Measure progress in terms of native species and communities;
4) Eliminate the causes of problems rather than just treating symptoms;
5) Be skeptical of engineered fixes;
6) Remember the inherent relationship between a stream and its valley;
7) Reconnect severed linkages;
8) Riparian habitats are critical to proper stream function;
9) Restore habitat diversity; and
10) Monitor, evaluate, and adapt.

These are practical guidelines that will be considered in this document to provide the most effective benefit to BCT.

One particular article by Doppelt, et al. (1993), (*In* Williams et al. 1997) provided seven principles of habitat restoration:

1) Instream habitat conditions and biota are largely determined by processes in the basin, riparian, and floodplain areas and cannot be manipulated independent of this context;

2) Many disturbances propagate downstream from headwater sources along a river network. Consequently, disturbances from multiple sources interact and can do so cumulatively and synergistically;

3) Effective restoration treatment does not merely add structures or otherwise attempt to salvage the worst degraded or most visibly damaged areas. Instead, it changes the underlying processes that cause habitat deterioration;

4) Riverine habitats are highly variable and patchy in space and time, even under natural conditions. Restoration must be directed not at producing homogeneous or generic conditions but at restoring the temporal regimes and spatial diversity of the natural habitat system;

5) Maintenance and restoration of a well-dispersed network of habitat refugia – including headwater watersheds, and relatively intact lower-river segments – is necessary to sustain current fish populations. It also is necessary to ensure persistent sources of colonists to seed habitats that become available following natural recovery or restoration;

6) The current distribution and life history patterns of native fish populations are largely governed by the nature and distribution of available habitat refugia in a basin, and sometimes by the history of nonnative species introductions;

7) Recovery of degraded and biologically impoverished watersheds require a long time – many decades, and perhaps centuries. Restoration in such areas is likely to prove unsuccessful with unpredictable results in the near term.

A publication from Canada, Slaney and Zaldokas (1997), looks at habitat restoration procedures and their benefits as they relate to salmonids. They state, in the introduction, "The effectiveness of restoration measures depends on forest practices regulation, and practicing risk-averse, sustainable fisheries resource management by harvesters and by fisheries management agencies." They go on to identify common rehabilitation project types such as, 1) restoring fish access; 2) large wood and stream bank restoration; 3) channel morphology reconstruction; 4) nutrient and carbon replacement; and 5) off-channel habitat restoration. The authors also classify restoration units into the following:

Focal watersheds – These critical areas support a mosaic of high-quality, hydrologically intact habitats that sustain a diverse or unusually productive complement of native species.

Nodal habitats – areas that are spatially dissociated from refuge habitats (stable, protective habitat that exemplifies the near-ideal conditions of the local stream) but serve critical life history functions.

Adjunct habitats – areas are directly adjacent to and typically downstream from focal watersheds or nodal habitats.

Critical contributing areas – portions of the watershed that do not directly support habitat for the species of interest but are important sources of high quality water and stable watershed conditions for downstream focal or nodal habitats.

Grubstake habitats – tend to occur in low-elevation, heavily disturbed portions of the drainage basin generally associated with lowland floodplain rivers. These habitats may require extensive planning and experimental work and, in many cases, the cost will be high.

Slaney and Zaldokas (1997) point out operational principles in sequencing stream rehabilitation that provide good guidance on procedural steps toward successful restoration:

- Undertake hill slope stabilization first;
- Examine the biological need for off-channel mitigation to protect stocks at risk from destabilized channels;
- Focus restoration on sub-watersheds that are less highly impacted to ensure more rapid recovery; and
- Emulate nature by use of natural templates or analogues within undisturbed reaches as the key to a successful rehabilitation strategy.

Consideration will be given to the above listed principles and concepts when developing measures for the Action Area.

2.0 GOALS AND OBJECTIVES FOR THE ACTION AREA

The following summarizes goals and objectives from the Bear River Settlement Agreement, the *Range-wide Bonneville Cutthroat Trout Conservation Plan* (Rangewide BCT plan) (Lentsch et al. 2000), the *Management Plan for Conservation of Bonneville cutthroat trout in Idaho* (Management Plan) (Teuscher and Capurso 2007), and the *Cutthroat Trout Management: A Position Paper, Genetic Considerations Associated with Cutthroat Trout Management* (UDWR 2000).

2.1 Goals

The Rangewide BCT Plan (Lentsch et al. 2000) established a goal to "…ensure the long-term persistence of Bonneville cutthroat trout within its historic range by coordinating conservation efforts among states, tribal governments, Federal management agencies, and other involved parties." The Management Plan shifted the focus slightly to "Ensure the long-term viability and persistence of BCT within its historic range in Idaho at levels capable of providing angling opportunities." The Bear River Settlement Agreement (SA) calls for this BCT Restoration Plan to be consistent with the Rangewide BCT Plan and the Utah Division of Wildlife Resources (UDWR) Publication titled, "Cutthroat Trout Management: A Position Paper, Genetic Considerations Associated with Cutthroat Trout Management (Position Paper) (UDWR 2000). The Position Paper's primary goal is "To preserve and conserve unique ecological and behavioral characteristics of the subspecies that exist on a population by population basis."

With these other documents in mind, the following specific goal for this Action Area Restoration Plan is suggested:

> *To preserve, restore, and protect Bonneville cutthroat trout and their unique ecological and behavioral characteristics within the Bear River Action Area to ensure the long-term viability of the species on a population by population basis.*

2.2 Objectives

A brief summary of objectives from the key documents mentioned above follows:

The Rangewide BCT Plan (Lentsch, et al. 2000) objectives state:

- Manage for 191 conservation populations of Bonneville cutthroat trout by:

  1) Establishing and/or maintaining a minimum of five conservation populations inhabiting 70,773 surface acres in the appropriate proportion and quality of lentic waters within the historic range;

  2) Establishing and/or maintaining a minimum of 186 conservation populations inhabiting 1,593 stream miles in the appropriate proportion and quality of lotic habitats within the historic range; and

3) Establishing and/or maintaining a minimum of one meta-population within each Geographic Management Unit (MU).

- Eliminate threats to BCT that (1) warrant listing as a sensitive species by state and Federal agencies, and (2) may warrant listing as a threatened or endangered species under the Endangered Species Act of 1973, as amended. This can be accomplished by:

  1) Eliminating or significantly reducing threats that cause any present or potential destruction, modification, or curtailment of habitat or range as outlined in the conservation strategy (for the purposes of this document the proper citation is Scully et al. (unpublished));

  2) Eliminating or significantly reducing threats caused by disease, predation, competition, and hybridization as outlined in the conservation strategy;

  3) Eliminating all impacts associated with the over harvesting for commercial, recreational, scientific, or educational purposes as outlined in the conservation strategy;

  4) Eliminating or significantly reducing all threats caused by inadequate regulatory mechanisms as outlined in the conservation strategy; and

  5) Eliminating and/or significantly reducing detrimental impacts associated with threats caused by other natural or human induced factors affecting the continued existence of the species as outlined in the conservation strategy.

The Rangewide BCT Plan includes five creeks that are identified as conservation populations within the Action Area. These are: Rock, Mill, Sheep, Fish and Birch creeks. A recent mapping exercise conducted by UDWR (Paul Burnett, email to Roger Wilson 2008) identified numerous conservation populations within the Action Area. This is discussed further in Sections 3.1 and 3.5 in this document.

Objectives from the Management Plan (Teuscher and Capurso 2007) were listed as follows:

- Preserve genetic integrity of existing populations
- Conserve genetic diversity and provide for genetic exchange
- Improve degraded habitats
- Reduce impacts of non-native fish species
- Develop recreational fishing opportunities for BCT
- Restore and maintain habitat for all BCT life history stages and strategies
- Maintain current distribution, and restore distribution in previously occupied areas, as warranted

Finally, objectives from the Position Paper (UDWR 2000) include:

- Establish conservation populations that can be considered sources of re-introductions but that cannot receive genetic material from other populations.

- Optimize habitat conditions to allow respective populations the opportunity to express the desired population characteristics

- Potential management actions and requirements would be linked to those needed to meet specific recreation objectives.

- Angling and harvest regulations should consider the potential of over utilization of cutthroat trout.

2.3 Bear River Action Area Objectives

All of the above objectives have solid, practical applicability for preserving and restoring BCT. In the interest of minimizing confusion though, it would be most beneficial to work from a specific list of objectives for the Action Area that is consistent with the key documents identified above as required by the Settlement Agreement. The proposed objectives are most similar to the Management Plan since that is specific to primarily the Action Area. With some modification the following are suggested Action Area objectives for this Restoration Plan.

1) Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations;

2) Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible;

3) Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available;

4) Reduce impacts of non-native wild rainbow trout by rehabilitating some key stream reaches for BCT in the Bear River Action Area; and

5) Link management actions and requirements to meet specific recreation objectives and angling opportunities for BCT.

3.0 SUMMARY OF STUDIES PERFORMED IN THE ACTION AREA

This section summarizes the results of each of the studies identified in the Study Plan.

3.1 Genetics

The purpose of the genetic sample analysis is to 1) determine if genetically distinct populations of BCT exist within the Bear River drainage (with a focus on the Idaho populations); 2) examine the genetic health of BCT populations, including the extent of hybridization and introgression from rainbow trout and Yellowstone cutthroat trout; and, 3) to identify genetically healthy populations of BCT that may be used as broodstock for the Conservation Hatchery Program. The first two objectives were more than adequately accomplished. Although the information may exist in the report, potential stocks for the Broodstock Program were not identified.

The following summarizes the Bonneville Cutthroat genetics report (Campbell et al. 2007). Genetic tissue samples were collected from about 1,200 cutthroat trout in 44 tributaries to the Bear River. The objectives identified in the report were to:

1) Assess intraspecific and interspecific hybridization and introgression in cutthroat trout populations in the Bear River drainage; and

2) Assess mitochondrial DNA diversity and distribution in cutthroat trout populations in the Bear River and Snake River drainages.

The most common haplotype HAP02 was observed in all the Bear River MUs (57.5% frequency). This suggests that all the MUs were connected at one time, which is intuitive. In contrast, the HAP01 haplotype was only observed in the Malad MU.

Other common haplotypes include HAP07 (16%) and HAP10 (6%) which occur in the Gentile and Riverdale MUs. With statistical analysis using pair-wise tests, no differentiation was evident between the Pegram and Nounan MUs. Tests of genetic differentiation between the MUs indicates strong, distinguishable structure of haplotypes between and within MUs. In other words, the MUs are all different from one another to some degree (pers. comm. Matt Campbell, IDFG). Large haplotype differences that occur indicate there is some genetic isolation that prevents or limits gene flow among the MUs and even among tributaries within an MU. Eighteen of the 54 sample locations contained rainbow/cutthroat hybrids with hybridization approaching 33.3% at some sites. The HAP012, found in Montpelier and Pearl creeks, is associated with reference samples from Henry's Lake and can be linked to Yellowstone cutthroat and Jackson National Fish Hatchery (NFH). Those fish were assumed to be non-native in Montpelier and Pearl creeks. All of the haplotypes, except for HAP08 and HAP12 cluster into a separate, well supported subclade. One of the most divergent haplotypes, HAP03 was found in Montpelier, Eightmile, and Giraffe creeks. Of note, the Giraffe Creek population is part of the original broodstock for Daniels NFH.

The designated management units were generally supported by the genetic analysis (Table 3.1.1). While the Bear Lake group sample was closely associated with the Pegram and Nounan MUs, there was significant differentiation with pair-wise comparisons of the Bear Lake Group and Pegram MU and, separately, the Bear Lake Group and the Nounan MU.

The report cautions managers to carefully weigh genetic structuring identified when considering translocations, reintroductions, or broodstock programs and states, "Removing naturally reproducing rainbow trout populations and continuing with management policies of stocking only sterile rainbow trout are two strategies that may limit the spread of introgression in the future."

Table 3.1.1. Summary of genetic haplotype information from Campbell, et al. (2007) as it relates to the Management Units and Hydrologic Unit Codes (HUCs)* in Idaho. Conservation Populations are identified in the BCT Rangewide Working Group (BCTRWG).

Tributary	Haplotype	Comment
Nounan MU		Bear Lake HUC Conservation Populations - BCTRWG
Montpelier Creek	HAP02, HAP03, HAP12	cp002, cp003
Stauffer Creek	HAP02	cp004, cp009
Skinner Creek	HAP02	
N. Skinner Creek	HAP02	
S. Skinner Creek	HAP02	
Co-op Creek	HAP02	
Pearl Creek	HAP02, HAP12	
N. Pearl Creek	HAP02, HAP05	
Eightmile Creek	HAP02, HAP03	cp008
Ovid Creek	Unknown	cp001
Gentile MU		Middle Bear HUC Conservation Populations - BCTRWG
Dry Creek	HAP02, HAP07	
North Hoops Creek	HAP02, HAP06, HAP18	
South Hoops Creek	HAP02	
Cottonwood Creek	HAP02 HAP10	cp003
Riverdale MU		Middle Bear HUC Conservation Populations - BCTRWG
Mink Creek	HAP02, HAP07	cp001
Cub River		cp002
Foster Creek	HAP07	
Sugar Creek	HAP02, HAP07, HAP10	
Maple Creek	HAP02, HAP07, HAP10	
Logan River	HAP02, HAP07, HAP10	
Hatcheries		Central Bear HUC Conservation Populations - BCTRWG
Daniels FH		
Coantag Creek	HAP02, HAP06, HAP09	cp003
Giraffe Creek	HAP02, HAP03	
Raymond Creek	Unknown	cp001
Sawmill Creek	Unknown	cp003
Water Canyon Creek	Unknown	

* See diversion map section for explanation of the HUCs and conservation populations

The following are recommendations from the genetics report:

1) Continue with Department (IDFG) policy of only stocking rainbow trout that have been treated to be sterile;

2) Test (i.e. evaluate) biologist's/manager's ability to phenotypically identify cutthroat trout, rainbow trout, and hybrids, and investigate methods to remove rainbow trout and hybrids; and

3) Identify "core conservation populations" and "conservation populations" (UDWR 2000) within each management unit for conservation and preservation.

These recommendations are considered in the proposed actions section (Section 5.0) of this plan.

3.2 Telemetry

A radio-telemetry study was conducted by Idaho Fish and Game in the spring of 2005 through the fall of 2006. Results of the study were presented to the ECC at the February 15, 2006 meeting. This investigation addressed three main goals:

1) Identify spawning tributaries;
2) Monitor habitat selection related to summer temperatures in the Bear River; and
3) Describe BCT seasonal movement.

The original study area was intended to be the entire Action Area but since so few fish were collected in the lower Bear River, efforts were concentrated on the Bear River upstream of Alexander Reservoir. Cutthroat were surgically implanted with radio transmitters and movement was monitored using fixed antennas, and mobile tracking using boats, land vehicles, and on foot. Some aerial surveys were also used to provide broader coverage since the potential area was rather large and some tagged fish could not be located. Sixty-eight BCT were tagged in the Pegram MU and 42 were tagged in the Nounan MU. Monitoring occurred primarily from May through July 2006. The radio tags included built-in temperature sensors to allow for accurate records of thermal selection by BCT. In addition, 31 temperature loggers were placed throughout the study area, including five tributaries. Temperature data from the BCT radio tags and *in situ* thermographs was coupled with the thermal imaging to verify results. Floating temperature surveys added to the data base and served to verify data from the thermal imaging study.

Johnstone and Rahel (2003) determined that the upper lethal temperature for BCT is 24.2 ºC .The mainstem Bear River in the Nounan MU exhibited temperatures that approached or exceeded 24.2 ºC while the Nounan tributaries and the Pegram MU and tributaries did not. Generally, when maximum thermal temperatures in the river exceeded 24.2 ºC, temperature sensors within the BCT demonstrated that fish used thermal strata that were slightly cooler than 24.2 ºC.

Radio-tagged BCT were tracked to spawning streams where the majority of the fish were found in Smith Fork and Eightmile creeks. Other areas used for spawning were Thomas Fork in the Pegram MU and Bailey, Stauffer, Skinner, and Georgetown creeks in the Nounan MU.

3.3 Thermal Imaging

Thermal remote sensing was completed in 2006 and a report was issued to the ECC (Watershed Sciences 2007). In late July 2006, the Bear River from Cutler Reservoir upstream to Cokeville, Wyoming and the Cub River, Thomas Fork/Salt Creek, and Smith Fork/Hobble Creek were surveyed using thermal infrared (TIR) sensing. The purpose of this study was to identify water temperature conditions throughout the Bear River basin to aid with management decisions related to BCT restoration efforts.

Approximately 245 miles of mainstem Bear River were surveyed. For the tributaries, 35 miles of the Cub River, 40 miles of Smith Fork/Hobble Creek, and 35 miles of Thomas Fork/Salt Creek were surveyed. Over 40 Ryan® Tidbit temperature monitors were placed in the rivers and creeks to verify TIR measurements.

For the reach from Cutler Reservoir to Alexander Reservoir, mainstem water temperatures exceeded the critical 24.2 ºC in late July and did not demonstrate any noticeable influence from tributaries or springs up to Oneida Dam, where there was dramatic cooling. This is probably related to the water withdrawal level for the turbine intakes since the reservoir surface temperature was greater than 24.2 ºC. This is not the case downstream of the Cove and Grace power plants since Cove plant was not operational at the time of the thermal imaging (and therefore spilling surface water) and Grace has a surface water intake. The springs in the Black Canyon area are considerably cooler and cause a dramatic 8 ºC decrease in mainstem temperature. There was significant cooling observed beginning about 5 miles downstream of the Cove Project to about the confluence with Kuntz Creek, where a steady rise in temperature occurred. A number of springs in the reach downstream of Kuntz Creek introduce warm temperatures in the 20º to 26 ºC range.

In the mainstem reach from Alexander Reservoir to Cokeville, WY, water temperatures in the lower Nounan MU were surprisingly high and exceeded 24.2 ºC. Considering that this MU and the Pegram MU contain the majority of the mainstem BCT according to the radio telemetry study, water temperature is a major concern. River temperature reached 27.6 ºC downstream of the Rainbow Canal, which marks the division between the Nounan and Pegram MUs. The mainstem Bear is relatively cool from river mile (RM) 75 (above Alexander Reservoir) to Cokeville but in the reach between about RM 70 and RM 75, water temperatures rise nearly 3 ºC to about 25 ºC. In this reach, Watershed Sciences noted two canals and four diversions.

The Cub River, which enters the Bear River just downstream of the Riverdale MU, exhibited high temperatures in the lower reaches, where it appears that City Creek and Spring Creek have a strong influence, whereas springs at around RM 10 provide some cooling between the two creeks. Several springs in the upper reach tended to be around 10 ºC while Bergquist Spring

entered the Cub at a very cold 7.5 ºC. Aside from the warm creek inputs, change in morphology from steep gradient to a flattened low valley probably contributes to the warm temperatures in the lower Cub.

Smith's Fork and Hobble Creek, part of the Pegram MU, provide relatively cool conditions upstream from about RM 6. At RM 6, the Covey Canal diverts most of the water away from Smith's Fork and a nearly 4 ºC water temperature increase occurs, most likely due to reduced flows. Also, the South Fork comes into the Smith's Fork at about 20 ºC, which contributes to the warming. There are at least ten springs in the reach from RM 6 to RM 40, all of which are under 16 ºC.

Thomas Fork and Salt Creek, also part of the Pegram MU, were cooler than the 24.2 ºC upper limit. It is possible that there are some cool water sources in Salt Creek that are subsurface since a cooling trend was evident from the upper part of the reach to the lower with no visible source. The same is true between RM 25.4 and RM 26.7 on the Thomas Fork. Watershed Sciences surmised that numerous sources of subsurface cool water must exist in this 35-mile reach since there were several areas of cooling with no visible surface source. This may explain why there is some spawning that occurs in Thomas Fork as observed during the radio-telemetry study.

3.4 Creel Census

After considerable discussion on the merits of using a creel census to document fish population trends as they relate to boater flows in the Black Canyon reach, the ECC elected to conduct a monitoring study to gather pre-boater flow implementation and post-boater flow implementation on biological conditions in the Black Canyon. That study has been ongoing since 2004 and will continue through 2010. Annual reports have been provided to the ECC.

3.5 Diversion Map

The diversion mapping project has been modified from the original task that was identified in the Bonneville Cutthroat Restoration Study Plan (PacifiCorp and the ECC 2004). There is an existing data layer that shows the location of many of the diversions and their associated water rights. This negated the need to do a complete irrigation diversion mapping project so the ECC redirected the money to be spent on the thermal imaging study. The thermal imaging study identified many of the diversions along the Bear River corridor, including key tributaries. In addition, during 2006, the ECC matched Federal Emergency Management Agency (FEMA) money that IDFG had applied for to do a more intensive look at the characteristics of a subset of these diversions, such as which are fish passage barriers or need fish screens. Subsequently, the BCT Rangewide Working Group (BCTRWG) has developed its own set of maps of the historic distribution, conservation populations, and barriers for each of the twenty-nine occupied, 8th order Hydrologic Unit Codes (HUCs) in the Bear River drainage in Wyoming and Idaho and the southern range in Utah and parts of Nevada. These maps have been incorporated in this document in lieu of the anticipated IDFG diversion maps. It is understood that there are some discrepancies within these BCTRWG maps and current information but the ECC agrees to use these and update them each year until such time as the IDFG mapping effort is complete. The

maps provided by IDFG will not be of the same scale and will only cover eight key tributaries. Thus future versions of this restoration plan will likely include maps from IDFG and the BCTRWG. The following is a summary of the effort by BCTRWG for those HUCs that are within the Action Area.

Figure 3.5-1, which BCTRWG labeled the 'Bear Lake,' is a portion of the Pegram MU and all of the Nounan MU. For all intents and purposes, the Pegram MU is not part of the Action Area so the area from Stewart Dam (cb007) down to about Soda Creek will be discussed here. This stretch includes important creeks such as Ovid, Skinner, Eightmile, Georgetown, and Montpelier. The diversions and/or barriers are identified in light blue as 'cbXXX' and the symbol '(' is used to approximate the location. Also of note, conservation populations are identified as 'cpXXX' in black lettering.

On Montpelier Creek there are four significant barriers. The lowermost, cb029, is a perched culvert that confines the population to a small area of unusable habitat. Another perched culvert occurs at cb030 that also confines the population. A dam exists above that area (cb006) that confines the population, limits or precludes opportunity for population re-founding, and limits expression of life history characteristics (i.e. if a fluvial or an adfluvial life history exists in a particular stock, those types would not be allowed expression if migration paths continue to be blocked) . Upstream of the dam is yet another culvert (cb031) that creates a velocity barrier that limits expression of life history characteristics. Montpelier and Whiskey creeks are shown to contain two conservation populations of BCT (cp003 and cp002).

Ovid Creek is not depicted to have any migration barriers on the BCTRWG maps. However, there actually are two diversions on the lower Ovid that can preclude year-round access to upper Ovid Creek. A bubbler screen and upgraded diversion structure was installed by Trout Unlimited in 2008 at an existing smaller diversion (Ovid diversion) using PacifiCorp funding. The creek contains one conservation population (cp001) occurring in Mill, North, and Emigration creeks.

There is a new diversion installed on Liberty Creek (a tributary to Mill Creek) that is an undershot drum screen with an internal paddle wheel. This structure appears to be very effective and efficient and should aid in enhancing the Mill Creek population. This project was also funded by PacifiCorp funding.

Georgetown Creek has one migration barrier shown on the map (cb028), a submerged culvert, which is said to limit expression of life history characteristics. The USFS has applied for and received funding to reclaim the entire roadway that leads up to the abandoned phosphorus smelter. This project will remove the submerged culvert and two other adjacent culverts in the process. This particular location is routinely stocked for fishing. Just downstream of that culvert is a small hydroelectric diversion that is scheduled for installation of a fish ladder by the U.S. Bureau of Land Management (BLM) in August 2008.

Skinner Creek has two barriers with the lowermost (cb026) being a water diversion that dries up the stream channel for approximately two months during the summer and is said to limit expression of life history characteristics. There are actually three barriers shown in the vicinity

of this diversion but they are not labeled. The next barrier upstream (cb023) is a perched culvert under Nounan Road that has been replaced with a concrete bridge using Bear River restoration dollars and equipment and labor from the Idaho Dept. of Transportation. There was actually a third barrier upstream on the South Fork Skinner Creek that is not shown on the map. This perched culvert was replaced by the USFS with a bottomless arch. Two conservation populations (cp004 and cp009) are shown to exist in Stauffer Creek and many of its tributaries including Skinner and Eightmile creeks, and others.

Eightmile Creek contains a barrier (cb020) that is a culvert which limits expression of life history characteristics and limits or precludes opportunity for population re-founding. A conservation population (cp008) is identified in the upper portion of this creek. This is inconsistent with the Management Plan in the sense that very few BCT reside in the upper reach of Eightmile Creek. However the telemetry study observed the majority of the tagged fish were detected in Stauffer and Eightmile creeks. Also the Management Plan that assigns a number one priority to Eightmile Creek for conservation opportunities. There are opportunities to enhance upper and lower Eightmile Creek in a manner that would assist BCT expansion into the upper watershed and that should be pursued.

Figure 3.5-2 is labeled the 'Middle Bear,' which contains the remaining three Management Units in the Action Area. The Dam Complex MU extends from the uppermost portion of this map down to the Cove Dam site (cb003). [*Note: Since Cove dam was removed, Teuscher and Capurso (2007) recommend that the Dam Complex MU end at Grace Dam and the Gentile Valley MU extend up through the Black Canyon to Grace. This Plan is developed around the assumption that the recommended changes in MUs will be implemented.*] Grace Dam (cb001), Last Chance Dam (cb002) and Soda Dam (cb009) are identified in the map. In this reach there are no tributaries to the mainstem Bear River and no conservation populations are identified. The three remaining dams are noted to limit expression of life history characteristics and limit or preclude opportunity for population re-founding.

The Gentile Valley MU extends from Grace Dam down to Oneida Dam (cb004). Cottonwood Creek is the predominant tributary in this MU. One barrier on Cottonwood Creek, the Cleveland Diversion (cb007), is shown and described as having unknown significance. However, this barrier was identified by the ECC for habitat funding and a rotary drum screen was installed under Trout unlimited supervision. Cottonwood Creek is shown in the map to contain one conservation population of BCT (cp003).

The Riverdale MU extends from Oneida Dam downstream to the Utah border, which is just upstream of the confluence of Cub River with the mainstem Bear River. Within this reach, there is a proposal and FERC application for a new mainstem hydroelectric dam sponsored by the local irrigation district.

Mink Creek is the first significant tributary downstream of Oneida Dam. One barrier is identified (cb006) to confine the population to a small area of useable habitat, limit expression of life history characteristics, and limit or preclude opportunity for population re-founding. Birch Creek, a tributary to Mink Creek is shown to contain a conservation population (cp001). This

conservation population extends from the confluence of Birch Creek and Mink Creek down to the Utah border and beyond.

Cub River is part of the Riverdale MU and its upper waters are encompassed by the MU. This river has a significant population of BCT and the ECC recognizes its importance. There is one barrier identified (cb008) as a water diversion structure with unknown significance to BCT (Note: Warren Colyer, Trout Unlimited, has identified three). The Cub River Canal Company owns the diversion and has worked with Trout Unlimited and the ECC to allow installation of upstream and downstream passage facilities. A conservation population (cp002) is identified in Figure 3.5-2 and is found in the Cub River and its tributaries including Foster, Sugar, and Maple creeks.

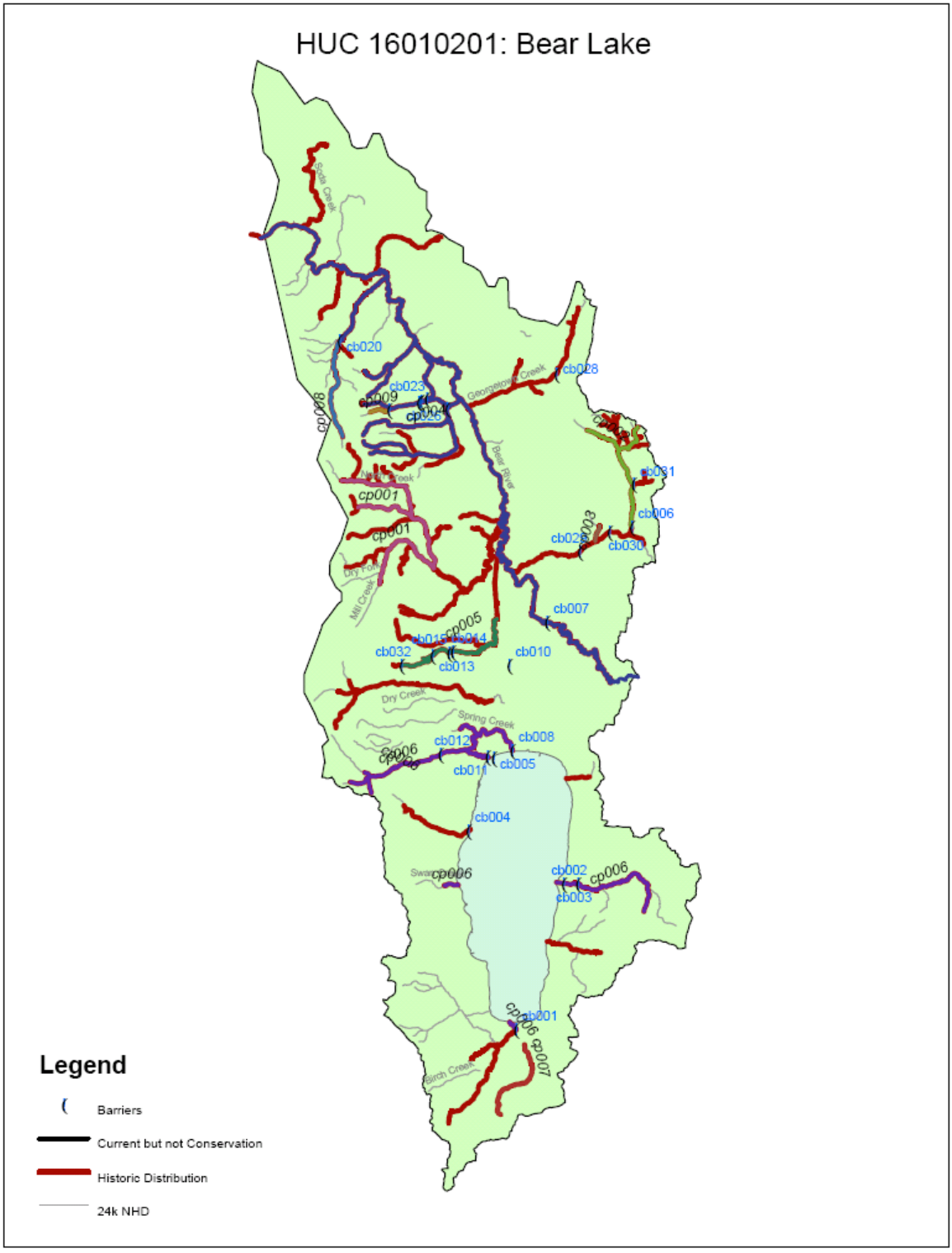

Figure 3.5-1. Map of the Bear Lake 8th field HUC showing barriers affecting BCT movement. This map includes the Pegram and Nounan management units. The black areas are often overlaid with red and therefore are not always discernable. This map was taken from the November 2007 BCTRWG data base which is updated annually.

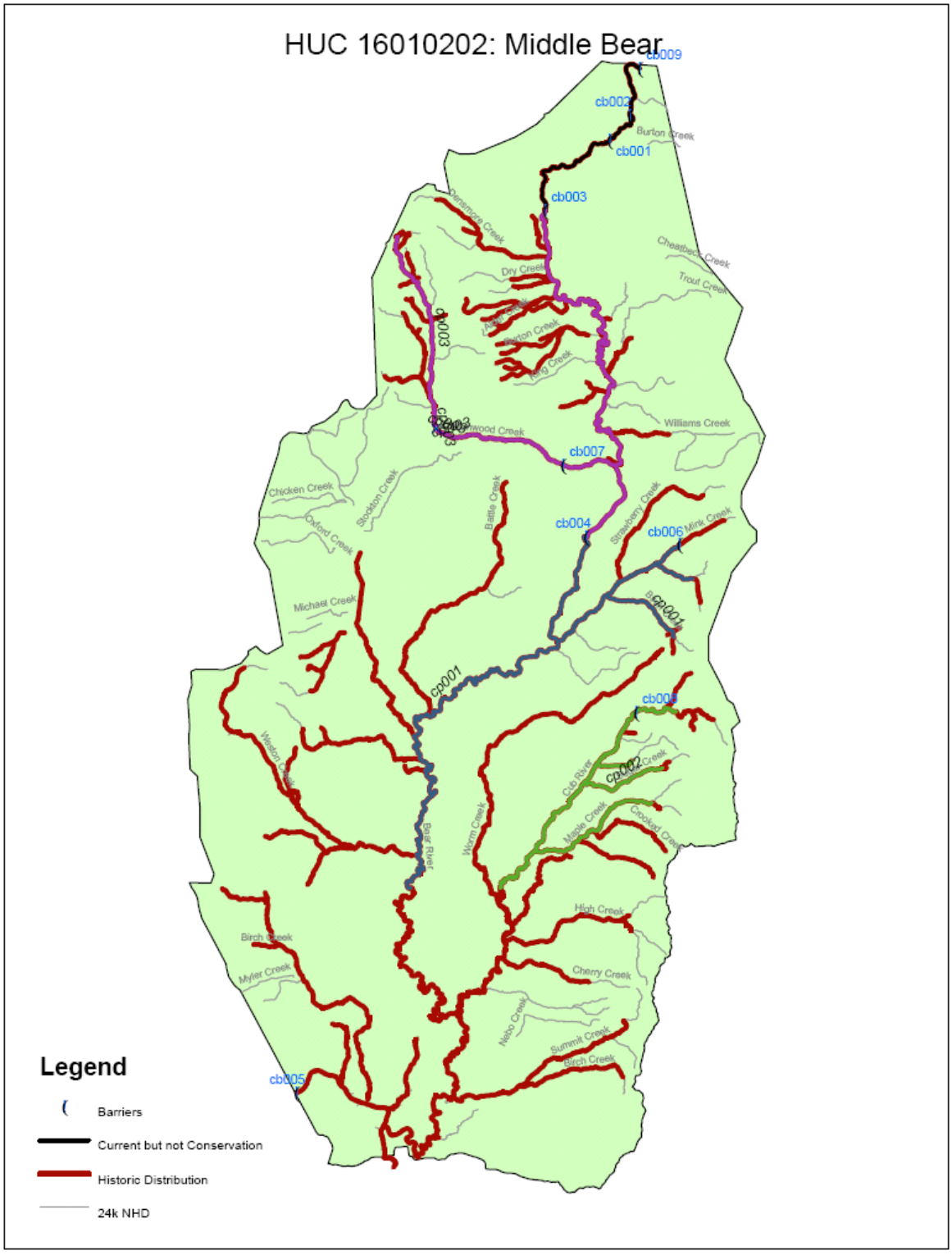

Figure 3.5-2. Map of the Middle Bear 8th field HUC showing barriers affecting BCT movement. This map includes the dam Complex, Gentile and Riverdale management units. This map was taken from the November 2007 BCTRWG data base which is updated annually.

4.0 PROGRAMMATIC ACTIONS

These are actions that are already identified in the Settlement Agreement and the Management Plan (Teuscher and Capurso 2007). These actions are included in this document to provide a full picture as to the measures that are required by the Settlement Agreement and new actions that are proposed in the next section.

4.1 Broodstock Development

The Bear River Settlement Agreement calls for IDFG to develop localized broodstocks of BCT for stocking in the Action Area linked to native protection and restoration. This action is to begin after the fourth anniversary of the FERC license (after December 22, 2007). This program will be funded by PacifiCorp on or about December 22, 2008 for three years (also see Section 6.3).

The original broodstock for the Daniels Fish Hatchery (Wyoming) came from Lake Alice and later from Raymond, Coantag, and Giraffe creeks (tributaries to the Thomas Fork of the Bear River) (Wyoming Game and Fish Department 2000). In 1979, young of the year (YOY) from Coantag and Upper Giraffe were added to the broodstock at Daniels Hatchery. Later, in 1987, six males were introduced from Sawmill Creek and in1989, six females and eight males from Water Canyon Creek were spawned and their eggs combined with Raymond Creek eggs. More recently in 1997, eight females and ten males from Water Creek Canyon were spawned at the Boulder Rearing Station and later transferred to Daniels Hatchery for broodstock.

Based on the most recent genetic analysis by IDFG (Campbell, et al. 2007), the Daniels broodstock could remain as a source for restoration in the Pegram and Nounan MUs but not for areas east of Soda Point. However, the HAP5 haplotype associated with Daniels Hatchery was a relatively minor haplotype in every sample except N. Pearl Creek. Consequently, IDFG will not be using fish from the Daniels Hatchery for restoration purposes in Idaho (pers. comm. D. Teuscher, IDFG). So some other broodstock source will need to be identified for the Nounan MU. For and the other management units, it appears from the genetic analysis that separate broodstocks should be developed to serve specific areas. Campbell et al. (2007) did not specifically identify broodstocks for use in this programmatic action. Decisions will need to be made for each management unit by the IDFG in cooperation with the ECC.

4.2 Conservation Hatchery

Hatchery production will be funded by PacifiCorp from the date the broodstock development program ends until the license expires. The annual funding amount of $100,000 is specified in the Settlement Agreement and will begin December 22, 2011 (also see Section 6.4). There is potential to spawn and rear BCT at the Grace Hatchery. This may mean reducing the current rainbow production in order to provide space for up to three different genetic groups. According to Grace Hatchery personnel, space is available and there seems to be an adequate water supply. However, the available space is limited and much would need to occur in order to be able to raise more than one strain of BCT.

4.3 Habitat Enhancement Fund

This element of the Settlement Agreement (also see Section 6.1) calls for actions to benefit and restore aquatic and riparian habitat for BCT and other fish and wildlife resources in the Action Area. This program extends from the first year of the FERC license until the license expires. Funding amounts for this project are specified in the Settlement Agreement. To date PacifiCorp has made available over $543,000 for habitat projects ranging from cattle exclusion fencing to fish passage facilities at the Cottonwood Creek and Cub River irrigation diversions. A subgroup of the ECC works together each year to review funding proposals and to recommend projects to the ECC for approval. Future prioritization of these dollars should take into account recommendations in this restoration plan.

4.4 Land and Water Conservation Fund

The purpose of this fund is to take advantage of opportunities to purchase and manage land and water rights and conservation easements in accordance with Idaho water law and policy to benefit BCT and other fish and wildlife resources. A land trust organization has been established to manage this element of the Settlement Agreement. To date, PacifiCorp has made available over $983,000 for land and water conservation activities. Thus far, two major efforts have been completed and have resulted in establishment of conservation easements with four owners on the west bank of the Bear River in the Grace-Cove Reach and the fee acquisition of 165 acres on the east bank in the same reach. The east bank parcel has a perennial stream channel with potential for BCT spawning and rearing. Future prioritization of these dollars should take into account the recommendations in this restoration plan.

5.0 PROPOSED ACTIONS AND PRIORITIES BY MANAGEMENT UNIT

The Bonneville cutthroat trout persists in uncompromising habitat conditions. Nevertheless, anthropogenic effects have made their continued existence tenable. There are many objectives and actions that have been identified by the various regional plans and agreements. The Rangewide BCT Plan had the following suggestions for potential management actions related to the conservation and preservation of core populations:

1) Prevention of all non-native fish stocking having the potential to impact these populations;

2) Managing sport fishing and harvest;

3) Removal and protection from non-native competitors;

4) Habitat restoration and enhancement;

5) Removal of gametes and individuals for genetic founders in range expansion efforts; and,

6) Collection of gametes for broodstock development.

In order to be most effective, an approach recommended by Teuscher and Capurso (2007) supports restoring areas that have received the least amount of impacts and that still support a self-sustaining population of BCT. Restoring those areas first sets a higher baseline from which to work towards restoration of those streams more heavily impacted. Restoration activities should also be spatially oriented. For example, work to restore tributaries to the Cub River such as Maple and Sugar creeks to reduce impacts of non-native fishes, irrigation, and grazing. These two creeks have the greatest number of habitat miles to contribute to the Cub River sub-population. The next step would be to concentrate efforts on the other smaller tributaries until work is completed on the Cub system before moving on to adjacent watersheds. The restoration work spirals out from the initial projects to capture increasing amounts of habitat and restored conditions thus expanding the potential range of an existing sub-population in a contiguous manner. This section of the Plan will specifically propose actions by management unit and by stream reach. The attached matrix in the Appendix lists all the pertinent streams in the Action Area and groups them by 5^{th} or 6^{th} field hydrologic unit codes (HUCs). They are grouped in this manner to assure that actions are considered on a broader scale in order to prevent one action negatively affecting another in the same HUC.

There are two action items that are more global but need to be addressed for the entire Action Area. These global items relate to the Rangewide BCT Plan. The first one is about managing harvest. IDFG fishing regulations generally call for catch-and-release of cutthroat trout. In addition, some areas have gear restrictions. These management tools can have a profound effect on recovery.

The other issue is database information. The US Forest Service and IDFG have expended large amounts of effort to determine distribution and status of BCT (Teuscher and Capurso 2007). These efforts have been pivotal in determining areas that require special attention to habitat and population enhancement. Still, there are many areas where very little is known about BCT or other salmonids. It would be very valuable to put additional effort into presence/absence surveys in those unknown areas identified in the Status section of this document in order to have a clearer picture of the status of BCT.

The following are proposed action items, by management unit. These action items are closely tied to the Management Plan (Teuscher and Capurso 2007) but are more focused on the Action Area.

5.1 Nounan Valley MU

5.1.1 Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations (Management Plan Objective No. 7)

In the maps provided by BCTRWG, six conservation populations are identified in Ovid, Montpelier, Emigration, Stauffer (including Skinner Cr.), and Eightmile creeks. Since these creeks hold four different haplotypes (Table 3.1.1), every effort should be made to protect and enhance these populations which can provide diverse genetic material to the Bear River system. This will allow for eventual expansion as these fish respond to habitat improvements and harvest management. For the remainder of the discussion, these creeks containing conservation populations will be referred to as conservation habitats.

5.1.2 Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available (Management Plan Objective No. 5)

Montpelier Creek clearly has need for some relatively straight-forward habitat improvements. The three culverts identified by BCTRWG can and should be replaced with the proper design to allow BCT to move about freely. The diversion dam should be modified to allow fish passage to allow fish easy access to the upper watershed and safe passage downstream.

Ovid Creek and Emigration Creek are identified as having any significant barriers to fish passage according to BCTRWG. This is not entirely correct since there are passage concerns on lower Ovid Creek that need to be assessed. A bubbler screen was recently installed on North Creek that is relatively effective in providing bypass around the irrigation diversion. A internal-wheel drum screen was installed on Liberty Creek by the irrigation district that looks to be very effective. The status of the BCT population in Ovid Creek and its tributaries is uncertain. An assessment of the habitat and the BCT abundance and distribution would help to identify the risks to this population.

Stauffer Creek has a diversion at its mouth (identified by BCTRWG) that needs to be modified for fish passage. In addition, the need for riparian improvement and livestock exclusion fencing has been identified. The majority of land in the Stauffer drainage area is under private ownership and thus may require more work to obtain approval for improvements. Since the diversion screen and culvert replacement has occurred on Skinner Creek, it follows that other tributaries and diversions should be addressed in order to complete restoration efforts on this drainage.

Eightmile Creek has a substantial amount of habitat, half of which is in private ownership. No significant barriers to fish passage have been identified but an assessment should take place to determine the condition of the watershed. There is significant livestock grazing in the area that may call for riparian fencing.

Georgetown Creek is currently undergoing a major rennovation effort by the USFS. While there seems to be ample funding for road removal and relocation, there may be a need for additional funding to restore the riparian and instream habitat.

An effort should be initiated to investigate methods for improving flows and tempertures downstream of the Rainbow Canal.

5.1.3 Reduce impacts of non-native fish species by reducing hatchery-raised introductions and rehabilitating some key stream reaches for BCT in the Bear River Action Area (Management Plan Objective No. 2 and Objective No. 5)

Montpelier, Ovid and Eightmile creeks have either rainbow trout, brook trout or brown trout present. Some effort should be expended to determine whether or not these species are occupying the same habitat and if there is significant competition for food or space that has a deleterious effect on BCT at any life stage.

5.1.4 Link management actions and requirements to meet specific recreation objectives and fishing opportunities for BCT (Management Plan Objective No. 6)

Per the Management Plan, keep the public engaged in habitat enhancement and restoration efforts by providing angling opportunities for BCT where appropriate.

5.1.5 Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible (Management Plan Objective No. 1)

By promoting habitat improvements, reducing barriers to movement, and removing competitive species, the likely response will be dispersion of BCT as the population grows. Idaho Department of Fish and Game Managers believe improvements can be accomplished in this reach without supplementation (pers. comm. D. Teuscher, IDFG).

5.2 Dam Complex MU

5.2.1 Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations (Management Plan Objective No. 7)

There are no identified conservation populations within this management unit. There is, however, a provision in the Bear River Settlement Agreement to reconsider actions at the three dams if a change occurs in the BCT listing. Since spawning habitat does not exist in this management unit, there is no specific recommended action for preserving genetic integrity. Actions should focus primarily on habitat above and below the two dams, Soda and Grace. Measures to implement enhancement actions in this management unit should only be considered after all other actions are completed and/or BCT become listed by the USFWS.

5.2.2 Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available (Management Plan Objective No. 5)

No actions recommended presently.

5.2.3 Reduce impacts of non-native fish species by reducing hatchery-raised introductions and rehabilitating some key stream reaches for BCT in the Bear River Action Area (Management Plan Objective No. 2 and Objective No. 5)

Given that any fish planted within this MU can move downstream, IDFG is concerned and will be focusing on upstream illegal introductions of exotic species, such as walleye (*Sander vitreus*) and potential effects on BCT that might occur if the fish were to migrate downstream.

5.2.4 Link management actions and requirements to meet specific recreation objectives and fishing opportunities for BCT (Management Plan Objective No. 6)

Per the Management Plan, keep the public engaged in habitat enhancement and restoration efforts by providing angling opportunities for BCT where appropriate.

5.2.5 Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible (Management Plan Objective No. 1)

No actions recommended presently.

5.3 Gentile Valley MU

5.3.1 Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations (Management Plan Objective No. 7)

There appears to be only one identified conservation population in the Gentile Valley MU. That population resides in Cottonwood Creek. North Hoops Creek does, however, have a diverse grouping of haplotypes and is the only population in the Action Area that contains HAP06 and HAP18. Current genetic information (D. Teuscher – Pers com. 2008) shows about 30% introgression with

5.3.2 Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available (Management Plan Objective No. 5)

Recent activity has modified the main diversion on Cottonwood Creek to allow safe upstream and downstream passage. This action, funded by the ECC and implemented by Trout Unlimited is probably the most significant activity that could have occurred in this drainage area. Livestock exclusion fencing would provide additional significant improvements that would allow the Cottonwood Creek population to expand its range.

There has been discussion of making significant improvements to Trout Creek and Whiskey Creek. Trout Creek landowners have proposed a habitat improvement project that would reclaim a section of creek that is currently bypassed for irrigation. The plan involves restoring a meander to the channel and following up with riparian plantings.

Whiskey Creek currently receives the outfall from Grace Fish Hatchery. Effluent, along with rainbow trout escapees, enters Whiskey Creek and, eventually, the mainstem Bear River. Modifications to the effluent piping and creation of a water quality retention pond/bioswale could improve conditions dramatically for a potential BCT restoration site. Although Whiskey Creek is not very long (3.8 miles), the cool spring water could provide ideal conditions for a spawning/seeding area just off-channel from the mainstem Bear River. Upstream passage to Whiskey Creek would need to be provided in order to complete the life history expression in Whiskey Creek. Whiskey Creek could also serve as a seeding area for Trout Creek if its natural barrier were made passable. There is spawning potential in Kackley Springs if the confluence with the mainstem Bear is passable. Spawning potential should also be investigated in the unnamed tributary on the Harris parcel.

Finally, access to the Black Canyon Reach potential BCT spawning habitat has been restored since Cove Dam (shown as a barrier in the BCTRWG maps) was removed in 2006.

5.3.3 Reduce impacts of non-native fish species by reducing hatchery-raised introductions and rehabilitating some key stream reaches for BCT in the Bear River Action Area (Management Plan Objective No. 2 and Objective No. 5)

Coupled with improvements to Whiskey Creek, IDFG may want to investigate alternatives to the spawning and rearing program at Grace Hatchery. If a broodstock could be selected for the Gentile Valley MU (possibly Cottonwood Creek?) it may be advantageous to initiate a BCT brood program.

5.3.4 Link management actions and requirements to meet specific recreation objectives and fishing opportunities for BCT (Management Plan Objective No. 6)

Per the Management Plan, keep the public engaged in habitat enhancement and restoration efforts by providing angling opportunities for BCT where appropriate.

5.3.5 Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible (Management Plan Objective No. 1)

Actions to provide safe passage at the Cleveland Irrigation diversion on Cottonwood Creek extend towards meeting this Management Plan objective. Some effort should be expended to assess the North Hoops and South Hoops creeks to determine status and distribution since there appears to be significant genetic material in the BCT population. Also there should be an effort to create passage at the Gentile diversion to improve connectivity in the low flow periods.

5.4 Riverdale MU

5.4.1 Establish and enhance conservation populations to preserve the genetic integrity of the Bear River BCT populations (Management Plan Objective No. 7)

Conservation populations were identified in Mink Creek and the Cub River. Tributaries to the Cub River (Sugar and Maple creeks) were shown to contain the same mix of haplotypes, which may emphasize those two tributaries as the focus for conservation. The Cub River tributaries should be the focus of protection and enhancement actions.

5.4.2 Optimize habitat conditions for BCT through restoration and maintenance to allow conservation populations the opportunity for BCT to express the desired population characteristics and to seed new habitats as they become available (Management Plan Objective No. 5)

Tributaries to the Cub River have been identified in the Management Plan as needing riparian improvements in terms of fencing and plantings and a need to establish channel stability. Stability may come as a result of the former actions. In addition, connectivity with the mainstem Bear River was identified and would be critical for allowing conservation populations the opportunity to expand their range. Dispersed campsites were also identified as an issue that affects recovering the riparian area. This type of activity can be managed with access controls; designated, hardened campsites; and public awareness activities.

Work to restore streamside vegetation to improve shading to take advantage of the Berquist Springs inflow and thus lower stream temperatures.

5.4.3 Reduce impacts of non-native fish species by reducing hatchery-raised introductions and rehabilitating some key stream reaches for BCT in the Bear River Action Area (Management Plan Objective No. 2 and Objective No. 5)

The Management Plan identified brook trout as a target for removal in Mink Creek and its tributaries. Brook trout are also seen as a problem in the Cub River and its tributaries. Efforts should begin to affect removal of brook trout and to control recolonization. If BCT are afforded the chance to re-inhabit lost habitat, it may be that brook trout will have difficulty re-establishing. Idaho Fish and Game should consider limiting hatchery stocking in the areas where conservation populations and/or unique haplotypes have been identified in order to reduce competition with BCT and allow for potential range expansion.

5.4.4 Link management actions and requirements to meet specific recreation objectives and fishing opportunities for BCT (Management Plan Objective No. 6)

Per the Management Plan, keep the public engaged in habitat enhancement and restoration efforts by providing angling opportunities for BCT where appropriate.

5.4.5 Maintain current BCT distribution, and restore distribution in previously occupied areas, if warranted and feasible (Management Plan Objective No. 1)

Actions to provide BCT access to the mainstem Bear River would greatly improve conditions that would meet this Management Plan objective. Some effort should be expended to assess Battle, Deep, Fivemile, Weston, Gooseberry and Oxford creeks to determine status and distribution since there appears to be significant genetic material in this management unit.

5.5 Prioritization of Proposed Actions across the Action Area

All of the recommended actions are summarized in Table 5.5.1. Priority is applied first to those actions that protect the conservation populations and promote range expansion of populations already in existence. Second in priority, actions that fall under IDFG management strategies (water management, grazing, fish interactions, and harvest) are lower priority although efforts should be made to consider recommendations. Finally, actions should be implemented to reduce or remove non-native salmonids and to re-establish BCT where they have been reduced or extirpated.

Table 5.5.1. List of recommended actions for the Bear River by Management Unit. Restoration classifications are identified using Slaney and Zaldokas (1997).

Management Unit/Restoration classification	Stream Name	Action No.	Description of Action	Conservation Population? (from the 2007 BCTRWG Annual Report)	Management Plan Priority	Spawning Location?
Nounan MU						
Nodal Habitat	Montpelier Cr.	5.1	Protect and Enhance Population	Yes	Secondary	Yes
		5.2	Modify diversion, remove or replace culverts; improve habitat	Yes	Secondary	Yes
		5.3	Reduce effects of natural non-native fishes on BCT	Yes	Secondary	Yes
Nodal Habitat	Ovid Cr.	5.4	Protect and Enhance Population	Yes	Tertiary	Unknown
		5.5	Habitat Assessment	Yes	Tertiary	Unknown
		5.6	Reduce effects of natural non-native fishes on BCT	Yes	Tertiary	Unknown
Nodal Habitat	Emigration Cr.	5.7	Protect and Enhance Population	Yes	Tertiary	Unknown
		5.8	Habitat Assessment	Yes	Tertiary	Unknown
Adjunct Habitat	Georgetown Cr.	5.9	Remove brook trout and rainbow trout; Reintroduce from donor stock; Protect and Enhance Population	No	**Primary**	Yes
Nodal Habitat	Stauffer Cr.	5.10	Protect and Enhance Population	Yes	**Primary**	Yes
		5.11	Modify diversion; exclusion fencing; riparian improvement	Yes	**Primary**	Yes
Nodal Habitat	Skinner Cr.	5.12	Protect and Enhance Population	No	**Primary**	Yes
Adjunct Habitat	Pearl Cr.	5.13	Improve riparian habitat; exclusion fencing if needed; assess connectivity with mainstem Bear River	No	Secondary	Yes
Adjunct habitat	N. Pearl Cr.	5.14	Improve riparian habitat; exclusion fencing if needed; assess connectivity with mainstem Bear River	No	Secondary	Yes
Nodal Habitat	Eightmile Cr.	5.15	Protect and Enhance Population	Yes	**Primary**	Yes
		5.16	Improve riparian habitat; exclusion fencing if needed; assess connectivity with mainstem Bear River	Yes	**Primary**	Yes
		5.17	Assess effects of non-native fishes on BCT	Yes	**Primary**	Yes
Adjunct Habitat	Bailey Cr.	5.18	Remove brook trout; Protect and Enhance Population	No	Secondary	Yes
	BR Mainstem Rainbow Canal	5.19	Investigate methods to improve minimum flow and temperature below canal diversion.	NA	Secondary	NA

Table 5.5.1. List of recommended actions for the Bear River by Management Unit. Restoration classifications are identified using Slaney and Zaldokas (1997).

Management Unit/Restoration classification	Stream Name	Action No.	Description of Action	Conservation Population? (from the 2007 BCTRWG Annual Report)	Management Plan Priority	Spawning Location?
Grubstake Habitat	Soda Cr.	5.20	Survey fish population	NA	Tertiary	Unknown
Gentile MU						
Focal Habitat	Bear River	5.21	Fish population survey; identify spawning and rearing areas	NA	**Primary**	Unknown
Critical Contributing area	Densmore Cr.	5.22	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Critical Contributing area	Dry Cr.	5.23	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Critical Contributing area	Smith Cr.	5.24	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Critical Contributing area	Alder Cr.	5.25	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Critical Contributing area	Burton Cr.	5.26	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Critical Contributing area	King Cr.	5.27	Fish population survey; identify spawning and rearing areas	NA	Tertiary	Unknown
Nodal Habitat	Cottonwood Cr.	5.28	Protect and Enhance Population. Investigate connectivity to Bear River.	Yes	**Primary**	Yes
	Cottonwood Cr.	5.29	Construct exclusion fencing	Yes	**Primary**	Yes
Grubstake Habitat	Trout Cr.	5.30	Investigate potential for re-introducing BCT	No	Secondary	Extirpated, spawning habitat available
	Trout Cr.	5.31	Restore bypassed creek bed; plant streamside vegetation	No	Secondary	Extirpated
Grubstake Habitat	Whiskey Cr.	5.32	Investigate potential for re-introducing BCT	No	Tertiary	Extirpated

Table 5.5.1. List of recommended actions for the Bear River by Management Unit. Restoration classifications are identified using Slaney and Zaldokas (1997).

Management Unit/Restoration classification	Stream Name	Action No.	Description of Action	Conservation Population? (from the 2007 BCTRWG Annual Report)	Management Plan Priority	Spawning Location?
Grubstake Habitat	Whiskey Cr.	5.33	Isolate Grace Hatchery effluent and treat. Improve channel; plant riparian vegetation.	No	Tertiary	Extirpated
Adjunct Habitat	Williams Cr.	5.34	Remove brook trout and rainbow trout Construct exclusion fencing. Investigate connectivity with Bear R. Investigate irrigation diversions for safe fish passage.	No	**Primary**	Yes
Riverdale MU						
Grubstake habitat	Oxford Cr.	5.35	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Grubstake habitat	Gooseberry Cr.	5.36	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Nodal Habitat	Mink Cr.	5.37	Protect and Enhance Population.	Yes	Tertiary	Yes
	Mink Cr	5.38	Remove Brook trout from Mink Cr. and its tributaries	Yes	Tertiary	Yes
Adjunct Habitat	Battle Cr.	5.39	Survey fish population	No	Tertiary	Unknown
	Battle Cr.	5.40	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Grubstake habitat	Fivemile Cr.	5.41	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Adjunct Habitat	Deep Cr.	5.42	Survey fish population	No	Tertiary	Unknown
	Deep Cr.	5.43	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Adjunct Habitat	Fivemile Cr.	5.44	Survey fish population	No	Tertiary	Unknown
Adjunct Habitat	Weston Cr.	5.45	Survey fish population	No	Tertiary	Unknown
	Weston Cr.	5.46	Assess connectivity to mainstem Bear and restore access if needed	No	Tertiary	Unknown
Focal Watershed	Cub River	5.47	Protect and Enhance Population. Reduce brook trout and	Yes	**Primary**	Yes

Table 5.5.1. List of recommended actions for the Bear River by Management Unit. Restoration classifications are identified using Slaney and Zaldokas (1997).

Management Unit/Restoration classification	Stream Name	Action No.	Description of Action	Conservation Population? (from the 2007 BCTRWG Annual Report)	Management Plan Priority	Spawning Location?
			monitor non-native trout populations. Protect and improve riparian habitat and reduce impacts of dispersed camping. Investigate connectivity with Bear R.			
Focal Watershed	Cub River	5.48	Work to restore streamside vegetation to improve shading to take advantage of the Berquist Springs inflow and thus lower stream temperatures.	Yes	**Primary**	Yes
	Cub River	5.49	Remove Brook trout from Cub R. and its tributaries	Yes	**Primary**	Yes
Nodal Habitat	Worm Cr.	5.50	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Yes
Nodal Habitat	Maple Cr.	5.51	Protect and Enhance Population. Improve riparian habitat.	Yes	**Primary**	Yes
	Maple Cr.	5.52	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Yes
Riverdale MU						
Nodal Habitat	Deep Cr.-CR	5.53	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Yes
Nodal Habitat	Sugar Cr.	5.54	Protect and Enhance Population. Improve riparian habitat.	Yes	**Primary**	Yes
	Sugar Cr.	5.55	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Yes
	Sugar Cr.	5.56	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Yes
Nodal Habitat	Foster Cr.	5.57	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	**Primary**	Unknown
Focal Watershed	Logan River	5.58	Protect and Enhance Population. Improve riparian habitat by reducing impacts of dispersed camping and livestock use. Investigate connectivity with Bear R.	Yes	Secondary	Yes
Nodal Habitat	Beaver Cr.-LR	5.59	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	Secondary	Yes
Nodal Habitat	Boss Cr.	5.60	Install fencing and plant riparian vegetation to improve stream	No	Secondary	Yes

Table 5.5.1. List of recommended actions for the Bear River by Management Unit. Restoration classifications are identified using Slaney and Zaldokas (1997).

Management Unit/Restoration classification	Stream Name	Action No.	Description of Action	Conservation Population? (from the 2007 BCTRWG Annual Report)	Management Plan Priority	Spawning Location?
			conditions and stabilize channel; manage dispersed campsites.			
Nodal Habitat	White Canyon Cr.	5.61	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	Secondary	Yes
Nodal Habitat	Hodge Nibley Cr.	5.62	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	Secondary	Yes
Nodal Habitat	Corral Hollow Cr.	5.63	Install fencing and plant riparian vegetation to improve stream conditions and stabilize channel; manage dispersed campsites.	No	Secondary	Unknown

6.0 FUNDING MECHANISMS

This section basically describes the types of funds that are available for the proposed projects and some idea of what the requirements might be for each funding mechanism.

6.1 Habitat Enhancement Fund

The Bear River Hydroelectric Project ECC's Habitat Enhancement Fund is allocated $167,000 annually from license year one to license expiration or from 2004 through 2033. There are specific requirements for proposed enhancement funding and an applicant-prepared form is used for approving and ranking the proposed projects (Appendix 8). These funds are available for water quality and habitat conservation projects on the Bear River and its tributaries from the border of Idaho and Utah to the confluence of the Outlet Canal and the Bear River.

6.2 Land and Water Conservation Fund

The Bear River Hydroelectric Project ECC Land and Water Conservation Fund is allocated $300,000 annually for the 30-year license period. These funds can be used in the same action area as the Habitat Enhancement Funds and like those funds are prioritized by the ECC for purchase of conservation easements, water rights and lands for the improvement of water quality and aquatic habitats.

6.3 Broodstock Development

Broodstock development begins December 22, 2008 for a period of 3 years. During that time PacifiCorp provides $100,000 annually to cover the costs associated with development and maintenance of broodstocks needed for the BCT Conservation Hatchery Program.

6.4 Hatchery Program

The Hatchery Program will begin in December 22, 2011, and will end in December 2033. The cost of this program will not exceed $100,000 annually. Any remaining funds will be carried over from year to year.

6.5 Other Sources of Funding and Strategies

There are a number of other conservation funding sources that are available for request by either PacifiCorp or any one of the Settlement Parties. For example, depending on whether or not a project occurs on National Forest lands, the US Forest Service (USFS) may be able to provide matching funds. In other cases, Trout Unlimited, The Nature Conservancy, or any number of other resource advocate groups can provide matching funds depending on the type of project and the proposed benefits to the resources. The U.S. Fish and Wildlife Service has grants available through the National Fish Passage Program and the Fisheries Restoration and Irrigation Mitigation Act (FRIMA) http://partners.fws.gov.

The Idaho NRCS offers Conservation Innovation Grants for resource protection related to agricultural production (http://www.id.nrcs.usda.gov/programs/cig/index.html). Idaho State Department of Agriculture and the USFS offer funding under the Cooperative Weed Management Area program (http://www.weedcenter.org/weed_mgmt_areas/DC06-VanBebber.pdf). The Environmental Protection Agency Idaho State Revolving Fund provides for a wide variety of water quality projects, including all types

of nonpoint source, source water protection and estuary management projects (http://sspa.boisestate.edu/efc/Tools_Services/ WatershedFunding/watershed_funding_resources.htm).

For Idaho, three additional grant providers offer a variety of funding possibilities and include:

A Territory Resource Foundation

A Territory Resource (ATR) is a public foundation that supports activist, community-based organizations working for social, economic, and environmental justice in Washington, Oregon, Idaho, Montana, and Wyoming.

Brainerd Foundation

The Brainerd Foundation's mission is to protect the environmental quality of the Pacific Northwest and to build broad citizen support for environmental protection. They accomplish this by making grants, providing value-added guidance and leveraging additional funds or encouraging collaborations within the philanthropic community. Washington, Oregon, Idaho, Montana, Alaska, British Columbia, and the Yukon Territory comprise their geographic funding region.

Bullitt Foundation

The mission of The Bullitt Foundation is to protect, restore, and maintain the natural physical environment of the Pacific Northwest for present and future generations. The Foundation invites proposals from nonprofit organizations that serve Washington, Oregon, Idaho, British Columbia, western Montana (including the Rocky Mountain range), and coastal Alaska from Cook Inlet to the Canadian border. Proposals are reviewed two times a year and must be received by May 1 and November 1. They do not use a Letter of Inquiry pre-screening process.

The One Plan Project in Idaho provides for numerous funding possibilities that cover many of the issues encountered in the Action Area and includes:

- Conservation Reserve Enhancement Program (CREP)
  An offspring of CRP, CREP is a voluntary program for agricultural landowners, providing incentive payments for establishing long-term, resource conserving covers on eligible land. A CREP project under development for the Eastern Snake River Plain, will help producers voluntarily idle up to 100,000 acres of southern Idaho farm land where ground water is over-appropriated.

- Conservation Reserve Program (CRP)
  Annual rental payments and cost sharing incentives encourage farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers.

- Conservation Security Program (CSP)
  In Farm Bill 2002. Three levels of payments are available for a broad range of conservation practices. This program is available to conservation minded land users in select watersheds in each state yearly.

- DEQ 319 Water Quality Grants
  Financial incentives may be available for implementing specific conservation practices. Check the local Soil Conservation District to see if these funds are available in your area.

- DEQ Water Quality Programs
  DEQ administers federal and state funds used to provide grants and low-interest loans to eligible entities to conduct specific activities designed to improve the quality of Idaho's water resources.

- Environmental Quality Incentives Program (EQIP)
  Farmers and ranchers may receive financial and technical help to install or implement structural and management conservation practices on eligible agricultural land.

- Farm and Ranch Lands Protection Program (FRPP)
  Helps farmers and ranchers keep their land in agriculture by assisting with the purchase of conservation easements or other interests in land.

- Grassland Reserve Program (GRP)
  The Natural Resources Conservation Service, Farm Service Agency and the Forest Service are coordinating implementation of this voluntary program to help landowners restore and protect grassland, rangeland, pastureland, shrub land and certain other lands, and to provide assistance for rehabilitating grasslands and to helping maintain viable ranching operations.

- Idaho Fish and Game
  Idaho Department of Fish and Game sponsor several programs in Idaho that provide financial and technical assistance to landowners to maintain, develop, or improve fish and wildlife habitat on their lands. State programs include the Habitat Improvement Program (HIP), Landowner Incentive Program (LIP), and State Wildlife Grants (SWG). Federal and nongovernmental programs are also available.

- Idaho Fish and Game Habitat Improvement Program
  Habitat holds the key to the future of upland game and waterfowl in Idaho. Creating and improving habitat is the goal of Idaho Fish and Game's Habitat Improvement Program. HIP applies to both public and private lands but Fish and Game recognizes the vital importance of private lands to Idaho's wildlife, especially to most upland game and many waterfowl populations. The program is designed primarily to help private landowners in their desire to improve their property to benefit game birds. This program is not directed to fish but there may be indirect linkage.

- Idaho Fish and Game Landowner Incentive Program
  The Landowner Incentive Program's purpose is to encourage landowners to think proactively about conservation on their own land, by improving existing habitat that hosts at-risk species, thereby assisting in species

recovery and/or pre-empting the listing of declining species. Idaho's LIP is designed to provide incentives to landowners desiring to implement voluntary conservation actions.

- Idaho Fish and Game State Wildlife Grant
  The Idaho Department of Fish and Game's Nongame Wildlife Program will provide State Wildlife Grant (SWG) funds to public and private individuals, groups, or organizations to support cooperative cost-share projects for the conservation of native fish and wildlife species designated as "Species of Greatest Conservation Need"

- Idaho Water Quality Program for Agriculture
  Provides financial incentives to owners and operators of agricultural lands in Idaho for applying conservation practices to protect and enhance water quality and fish and wildlife habitat.

- Idaho Water Resource Board Financial Programs
  The Idaho Water Resource Board Financial Program assists local governments, water and homeowners associations, non-profit water companies, canal companies and irrigation districts with funding for water system infrastructure projects. The Board has provided financial support to more than 380 water projects and studies around Idaho.

- Partners for Fish and Wildlife
  The Partners for Fish and Wildlife Program is the U.S. Fish and Wildlife Service's primary mechanism for delivering voluntary, on-the-ground, fish, wildlife and plant habitat conservation projects on private and Tribal lands. The program can provide cost-share funding for habitat conservation projects as well as technical assistance to landowners. Habitat conservation projects are intended to benefit migratory birds, threatened and endangered species, and other sensitive species.

- Resource Conservation and Rangeland Development Program (RCRDP)
  RCRDP provides long-term, low-interest loans to land owners. Management projects can be implemented on both private and public lands. In most instances, this program may be used in conjunction with Farm Bill program funding or other cost sharing programs.

- Wetlands Reserve Program
  Financial incentives are available to enhance wetlands in exchange for retiring marginal land from agriculture.

- Wildlife Habitat Incentives Program (WHIP)
  Encourages creation of high quality wildlife habitats by providing technical and financial assistance to landowners and others.

These are but a few of the grant programs that are available for matching or partnering projects that can benefit the natural resources in the Action Area.

7.0 REFERENCES

Campbell, M., C. Kozfkay, A. Boone, and D. Teuscher. 2007. Genetic investigations of Bonneville cutthroat trout in the Bear River drainage Idaho: Distribution of mitochondrial DNA diversity and rainbow trout hybridization and introgression. IDFG Report No. 07-36.

Doppelt, B., M. Scurlock, C. Frissell, and J. Karr. 1993. Entering the watershed: a new approach to save America's river ecosystems. Island Press, Cambridge, MA.

Lentsch, L.D., C.A. Toline, J. Kershner, J.M. Hudson, and J. Mizzi. 2000. Range-wide Conservation Agreement and Strategy for Bonneville cutthroat trout (*Oncorhynchus clarkii utah*). Publication Number 00-19. Utah Division of Wildlife Resources. Salt Lake City, Utah.

PacifiCorp and the Environmental Coordination Committee. 2004. Bonneville Cutthroat Trout Restoration Study Plan. PacifiCorp Energy. Portland, Oregon.

Slaney, P.A. and D. Zaldokas. 1997. Fish habitat rehabilitation principles. Watershed Restoration Technical Circular No. 9. Watershed Restoration Program, Ministry of Environment, Lands and Parks, Vancouver, BC.

Teuscher, D. and J. Capurso. 2007. Management plan for conservation of Bonneville cutthroat Trout in Idaho. Idaho Department of Fish and Game. Boise, Idaho.

UDWR (Utah Division of Wildlife Resources). 2000. Cutthroat trout management: a position paper, genetic considerations associated with cutthroat trout management. Publication No. 00-26, Utah Division of Wildlife Resources, Salt Lake City, UT.

Williams, JE, C.A. Wood, and M.P. Dombeck. 1997. Understanding Watershed-Scale Restoration. Pages 1-13 *in* J.E. Williams, C.A. Wood, and M.P. Dombeck, *editors*. Watershed restoration: principles and practices. American Fisheries Society, Bethesda, Maryland.

8.0 APPENDICES

Project Application Form
Bear River Environmental Coordination Committee

Applicant Contact Information		
Applicant Name		
Organization		
Address		
City, State and Zip		
Area Code and Phone	( ) Day	( ) Evening /Weekend
Email (optional)		

Please attach an updated project proposal to this project application submittal.

Project Information		
Project Name	Project Name	Date of Application
Project Location	Please attach a map and photos of the project area. List GPS coordinates, if possible.	
Amount Requested	**$** **Amount Requested from ECC**	$ Total Cost of Project
ECC Sponsor		

Expected Benefits from the Proposed Action	
Action to be Taken:	
Will Bonneville cutthroat trout or other native fish benefit from the implementation of this project? If so, please explain.	
What is the geographic extent of this benefit (e.g., watershed-wide, percentage of watershed)?	
Is the intent of the project to benefit stream channel, bank, cover, spawning/rearing habitat, and/or population connectivity?	

Expected Benefits from the Proposed Action
List other native aquatic and/or terrestrial species that would benefit from project implementation. Do any have special state or federal status?
Will the project protect/restore high quality critical/essential habitat for at-risk species or limited habitat important on a landscape scale? If not, will the project protect/restore high quality habitat limited in the local area?
Does the project address a symptom or a cause? State the original problem. Does the project solve this problem?
How long are the expected benefits from the project likely to last?
Are expected project benefits more than project costs?
Is there cost sharing (in-kind or financial) involved with this project? If so, how much?
Does the proposed project compliment other projects that have been or are being implemented? If so, how many?
Who will do the project permitting and compliance?
Is there an imminent threat of development on the project property that the proposed action will preclude? If so, please explain.

Project Proposal Form
Bear River Environmental Coordination Committee

Applicant Contact Information		
Applicant Name		
Organization		
Address		
City, State and Zip		
Area Code and Phone	( ) Day	( ) Evening /Weekend
Email (optional)		

Project Information		
Project Name	Project Name	Date of Proposal
Project Location	Please attach a map and photos of the project area. List GPS coordinates, if possible.	
Amount Requested	**$** **Amount Requested from ECC**	$ Total Cost of Project
ECC Sponsor		

Proposed Action	
Action to be Taken:	
What is the purpose of this project?	
Methods (How will the project be accomplished?):	
Time Frame (When would you like the project to be constructed/completed?)	
Do we have your permission to provide this project proposal to another group/agency in order to explore potential funding options?	

Revised June 2008

Bear River Environmental Coordination Committee
Approval and Ranking Criteria

Revised – June 2008

Project Name:

Project Proponent:

ECC Sponsor:

Amount Requested:

Date of Proposal:

Checklist

_____ Proposed project is consistent with BCT plans and/or other fishery management plans/land management plans/other species management plans.
_____ Proposed project is within the action area.

---

185 Possible Points

1) Fish species expected to benefit from proposed project (20 points):

BCT and other native species	20 points
BCT only	15 points
Other native species	10 points
No native species	0 points

TOTAL: ____

2) Project (on own merits) is expected to protect or increase distribution and numbers of target native fish species (20 points)

Greatly on a watershed scale (5^{th} field HUC)	20 points
Moderately in >2.0 miles of stream or >25% of watershed	15 points
Somewhat in 0.5-2.0 miles of stream or 10-25% of watershed	10 points
Limited in <0.5 miles of stream or <10% of watershed	5 points
Project is not expected to increase distribution/numbers	0 points

TOTAL: ____

3) Project will benefit target fish species by protecting, restoring, or enhancing (mark all that apply (15 points)

Stream channel	2 points
Stream banks	2 points
Spawning (2 pts.) and/or rearing (2 pts) habitat	4 points
Fish passage, connectivity	5 points
Bank and channel cover	2 points
	TOTAL: ____

4) Non-fish aquatic/terrestrial species expected to benefit from proposed project (10 points):

Benefit to non-fish native aquatic and/or terrestrial special designation species	10 points
Other non-fish native aquatic species	5 points
Little value to non-fish native aquatic/terrestrial species	0 points
	TOTAL: ____

5) Fish and wildlife aquatic and/or riparian habitat expected to benefit from proposed project (15 points)

Project will protect/restore high quality critical/essential habitat for at risk species or limited habitat important on a landscape scale (i.e., spring systems)	15 points
Project will protect/restore high quality habitat limited in the local area	10 points
Project will protect/restore common habitat in the local area	5 points
Project will do little to protect/restore habitat	0 points
	TOTAL: ____

6) Effectiveness of the project (15 points)

(ECC sponsor, state the problem this project would address. What are the project's merits at site?)

Project solves original problem	15 points
Project partially solves original problem, other problems are likely to be corrected	10 points
Project partially solves original problem, other problems are not likely to be corrected	5 points
Project does not deal with the cause of problem	0 points
	TOTAL: ____

7) Time frame for expected benefits (15 points)

Project benefits will last >25 years	15 points
Project benefits expected to last 5-25 years	10 points
Project benefits expected to last <5 years	5 points
Project benefits are minimal	0 points

TOTAL: ____

8) Expected ecological benefits relative to ECC cost (10 points)

Project benefits high relative to cost	10 points
Project benefits about equal to cost	5 points
Project cost exceeds benefits	0 points

TOTAL: ____

9) Cost sharing or in-kind services (percent of project funded from other sources) (15 points)

Financial and/or in-kind support exceeds 75% of project costs	20 points
Financial and/or in-kind support exceeds 50% of project costs	15 points
Financial and/or in-kind support exceeds 25% of project costs	10 points
Financial and/or in-kind support is less than 25% of project costs	5 points
No financial and/or in-kind support	0 points

TOTAL: ____

10) *Project compliments existing or proposed projects (15 points)*

Project complements two or more existing or proposed projects and/or significant resource problems	15 points
Project complements one other existing or proposed project and/or significant resource problem	10 points
No complimentary projects	0 points

TOTAL: ____

11) Project permitting/compliance responsibilities (10 points)

Project permitting/compliance responsibilities will lie with others, and not the ECC	10 points
No permitting/compliance responsibilities	10 points
Project permitting/compliance responsibilities assigned to the ECC	0 points

TOTAL: ____

12) *Development Threat (Likelihood that the property in question will be developed, based on physical aspects of the property as well as location) (20 points)*

Imminent (90% likelihood of development within 5 years)	20 points
Likely (90% likelihood of development within 10 years)	15 points
Possible (90% likelihood of development within 20 years)	10 points
Unlikely (likely to remain undeveloped for the life of the 30 year license)	5 points
Not applicable—property cannot be developed	0 points

TOTAL: ____

TOTAL POINTS: _____

Revised June 2008

Appendix Table 8-1. Nounan Management Unit 6th field HUCs. Each color represents a different 6th field HUC. Dark orange denotes a BCTRWG-identified conservation population.

Reach Name	6th Field HUC	Habitat in Miles Public	Private	Total	Habitat Issues Taken from Teuscher and Capurso (2006)	Water Diversions	Intakes	Fish Barriers	
Bear River	160102010305 160102010404 160102010405 160102010601 160102010602 160102010605 160102010606 160102010607 160102010608 160102010702 160102010701 160102010706	3.4	54.3	57.7					
Montpelier Creek	160102010402	14.7	9.4	24.1	RBT introgression, brook trout or RBT dominate fish community. Major diversion, some dewatering and/or loss of connectivity. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened	3 culverts	Nouna conser
Dry Creek	160102010402	0	0.6	0.6	Major diversion, some dewatering and/or loss of connectivity. Obvious grazing impact to riparian habitat.	Yes	Not screened	dam	
Home Canyon Creek	160102010402	1.6	0	1.6	RBT introgression, brook trout or RBT dominate fish community. Obvious grazing impact to riparian habitat.				
Snowslide Canyon Creek	160102010402	0.9	0	0.9	RBT introgression, brook trout or RBT dominate fish community. Obvious grazing impact to riparian habitat.				
Whiskey Cr. MC	160102010402	2.7	0	2.7	RBT introgression, brook trout or RBT dominate fish community. Obvious grazing impact to riparian habitat.				
Little Beaver Creek	160102010402	3.8	0	3.8	RBT introgression, brook trout or RBT dominate fish community. Obvious grazing impact to riparian habitat.				
Ovid Creek	160102010505 160102010504 160102010502	0	17.5	17.5	Brook trout/BCT present, Little or no introgression from RBT. Stream dewatered and complete fish barriers/no fish screens. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened	diversion	Nouna conser

Reach Name	6th Field HUC	Habitat in Miles			Habitat Issues Taken from Teuscher and Capurso (2006)	Water Diversions	Intakes	Fish Barriers	
		Public	Private	Total					
Mill Creek	160102010502	3	0	3	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	
Liberty Creek	160102010502	1.9	0	1.9	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	
North Canyon Creek	160102010503	5.9	6.9	12.8	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	
Emigration Creek	160102010503	2.8	2.2	5	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	Nouna conser
Copenhagen Creek	160102010503	3.4	0.5	3.9	Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	
Georgetown Creek	160102010605 160102010604	8.3	5.7	14	RBT introgression, brook trout or RBT dominate fish community. Minor grazing impacts to stream, fenced riparian area. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	1 submerged culvert	
Georgetown Left	160102010605	0.6	1.4	2	RBT introgression, brook trout or RBT dominate fish community. Minor grazing impacts to stream, fenced riparian area. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	
Stauffer Creek	160102010603	0	10.5	10.5	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish. Provide upstream passage at irrigation dam at mouth of Stauffer Creek.	Yes	screened	diversion	Nouna conser
Beaver Creek	160102010603	0.4	2	2.4	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			

Reach Name	6th Field HUC	Habitat in Miles			Habitat Issues Taken from Teuscher and Capurso (2006)	Water Diversions	Intakes	Fish Barriers	
		Public	Private	Total					
South Fork Stauffer	160102010603	2.7	0.3	3	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area. Provide upstream passage at irrigation dam at mouth of Stauffer Creek.	No			
North Fork Stauffer	160102010603	3.7	0.8	4.4	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area. Provide upstream passage at irrigation dam at mouth of Stauffer Creek.	No			
Co-op Creek	160102010603	3.7	3.6	7.3	Allopatric BCT. Major diversion, some dewatering and/or loss of connectivity. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened	dam	
Skinner Creek	160102010607	1.1	7.1	8.2	Brook trout and BCT in about equal densities. No diversion or irrigation withdrawal. Provide upstream passage at irrigation dam at mouth of Stauffer Creek. Obvious grazing impact to riparian habitat.	3 dams		1 culvert	
North Skinner Creek	160102010607	2.3	0	2.3	Allopatric BCT. No diversion or irrigation withdrawal. No grazing impacts noticeable. Need to address impacts from irrigation diversions and grazing as well as provide upstream passage at irrigation dam at mouth of Stauffer Creek.	No			
Pearl Creek	160102010607	1.4	4.5	5.9	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	
North Pearl Creek	160102010607	3.3	0.3	3.6	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	
Eightmile Creek	160102010609	7.3	7.7	15	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	Nouna conser
Sulphur Canyon	160102010701	2.6	0	2.6	Brook trout and BCT in about equal densities. No grazing impacts noticeable. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	
Bailey Creek	160102010701	3.2	3.4	6.6	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat.	Yes	Not screened	dam	

Reach Name	6th Field HUC	Habitat in Miles Public	Private	Total	Habitat Issues Taken from Teuscher and Capurso (2006)	Water Diversions	Intakes	Fish Barriers	
					Major diversion, some dewatering and/or loss of connectivity.				
Soda Creek	160102010705 160102010706	0	7.8	7.8	Brook trout and BCT in about equal densities. No grazing impacts noticeable. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	

Appendix Table 8-2. Gentile Valley Management Unit 6th field HUCs. Each color represents a different 6th field HUC. Dark orange denotes a conservation population.

Reach Name	5th Field HUC	Habitat in Miles			Habitat Issues	Water Diversions	Intakes	Fish Barriers	Con
		Public	Private	Total					
Bear River	1601020201	0	24.2	24.2	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dams	
Densmore Creek	1601020201	1.1	5.2	6.3	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Dry Creek	1601020201	1.1	3.6	4.7	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Smith Creek	1601020201	0	5	5	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
Alder Creek	1601020201	0.6	4.6	5.2	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
Burton Creek	1601020201	0	6.6	6.6	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
King Creek	1601020201	0	5.7	5.7	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
North Hoops Creek	1601020201	1.6	3.1	4.7	Allopatric BCT with some RBT introgression. Minor grazing impacts to stream, fenced riparian area. Stream dewatered and complete fish barriers/no fish screens.	Yes	Not screened		Genetically d population – conservation
South Hoops Creek	1601020201	0	2.5	2.5	Allopatric BCT with some RBT introgression. Minor grazing impacts to	Yes	Not screened		

Reach Name	5th Field HUC	Habitat in Miles Public	Private	Total	Habitat Issues	Water Diversions	Intakes	Fish Barriers	Con
					stream, fenced riparian area. Stream dewatered and complete fish barriers/no fish screens.				
Trout Creek	1601020201	0	12	12	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
Whiskey Creek	1601020201	0	3.8	3.8	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	Natural barrier	
Williams Creek	1601020201	0	4.3	4.3	RBT introgression, brook trout or RBT dominate fish community. Major diversion, some dewatering and/or loss of connectivity. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened		
Cottonwood Creek	160120202	16.5	2.4	18.9	Allopatric BCT with some RBT introgression. Minor grazing impacts to stream, fenced riparian area. Stream dewatered and complete fish barriers/no fish screens.	Yes	screened	dam	Gentile Valley conservation
Shingle Creek	160120202	1.2	2.6	3.8	Allopatric BCT. No grazing impacts noticeable. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
Jacobson Creek	160120202	0.8	1.3	2.1	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			

Appendix Table 8-3. Riverdale Management Unit 6th field HUCs. Each color represents a different 6th field HUC. Dark orange denotes a conservation population.

Reach Name	5th/6th Field HUC	Habitat in Miles			Habitat Issues	Water Diversions	Intakes	Fish Barriers	
		Public	Private	Total					
Bear River	1601020203 160102020603	2.3	28.9	31.1	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dams	
Mink Creek	1601020203	2.5	11.1	13.6	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		Riv con
Birch Creek	1601020203	3.9	2.7	6.5	Allopatric BCT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		Riv con
Dry Creek	1601020203	1.1	3.7	4.8	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Strawberry Creek	1601020203	3	0	3	Allopatric BCT. Obvious grazing impact to riparian habitat. No diversion or irrigation withdrawal.	No			
Battle Creek	1601020203	0	8.3	8.3	Brook trout and BCT in about equal densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		Riv con
Fivemile Creek	1601020203	3	6	9	Brook trout and BCT in about equal densities. Stream dewatered and complete fish barriers/no fish screens. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened		
Weston Creek	1601020203	1.6	3.2	4.7	Brook trout and BCT in about equal densities. Stream dewatered and complete fish barriers/no fish screens. Minor grazing impacts to stream, fenced riparian area.	Yes	Not screened		
Deep Creek	1601020203	0	10.8	10.8	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Stockton	1601020203	1.8	6.5	8.3	Brook trout and BCT in about equal	Yes	Not		

Reach Name	5th/6th Field HUC	Habitat in Miles Public	Private	Total	Habitat Issues	Water Diversions	Intakes	Fish Barriers	
Creek					densities. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.		screened		
Oxford Creek	1601020203	0.6	0	0.6	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Gooseberry Creek	1601020203	1.4	3.8	5.2	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened		
Cub River	160102020504	5.3	14.6	19.9	Brook trout/BCT present, Little or no introgression from RBT. Stream dewatered and complete fish barriers/no fish screens. Minor grazing impacts to stream, fenced riparian area.	Yes	screened	dam	Riv con
Sugar Creek	160102020504	3	3.6	6.6	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened	dam	Riv con
Foster Creek	160102020504	0.2	2	2.2	Brook trout/BCT present, Little or no introgression from RBT. Minor grazing impacts to stream, fenced riparian area. Minor irrigation-screened to protect fish.	Yes	screened	diversion	Riv con
Worm Creek	160102020503	3.5	0	3.5	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		
Maple Creek	160102020502	2.4	9.6	12	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. Major diversion, some dewatering and/or loss of connectivity.	Yes	Not screened		Riv con
Deep Creek	160102020502	0.8	2.1	2.9	Brook trout/BCT present, Little or no introgression from RBT. Obvious grazing impact to riparian habitat. No diversion or irrigation withdrawal.	No			

Reach Name	5th/6th Field HUC	Habitat in Miles Public	Private	Total	Habitat Issues	Water Diversions	Intakes	Fish Barriers	
Beaver Creek-LR	160102030301	6.6	0	6.6	Brook trout and BCT in about equal densities. Minor grazing impacts to stream, fenced riparian area. . No diversion or irrigation withdrawal.	No			
Logan River	160102030302	3.4	0	3.5	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			Riv con
Boss Creek	160102030302	3.3	0	3.3	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			
White Canyon Creek	160102030302	2.7	0	2.7	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			
Hodge Nibley Creek	160102030302	1.9	0	1.9	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			
Corral Hollow Creek	160102030302	1.7	0	1.7	Allopatric BCT. No diversion or irrigation withdrawal. Minor grazing impacts to stream, fenced riparian area.	No			