ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

on the

Forest Plan Amendments for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the Kootenai, Idaho Panhandle, and Lolo National Forests

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the U.S. Forest Service's proposal to amend the Land and Resource Management Plan (LRMP) for the Kootenai National Forest (KNF), Idaho Panhandle National Forest (IPNF), and Lolo National Forest (LNF) (hereafter collectively referred to as the "Forests") to address motorized access management within the Selkirk Mountains and Cabinet-Yaak grizzly bear recovery zones and some adjacent areas (hereafter referred to as the *Access Amendment*) and its potential effects on the threatened grizzly bear (*Ursus arctos horribilis*) and the threatened bull trout (*Salvelinus confluentus*) and its critical habitat. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 et seq.).

We received your request for formal consultation on December 21, 2010. Pursuant to the requirements for initiating formal consultation at 50 CFR 402.14(c), we subsequently requested corrections, clarifications, and additional information from the Forests. We received the Forests' complete response to our request on February 9, 2011 at which time formal consultation was initiated. However, additional corrections and clarifications were submitted by the Forests and received by the Service after that date; see Consultation History section below.

Section 7(b)(3)(A) of the ESA requires that the Secretary of Interior issue biological opinions on federal agency actions that may adversely affect listed species or critical habitat. Biological opinions determine if the action proposed by the action agency is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Section 7(b)(3) (A) of the ESA also requires the Secretary to suggest reasonable and prudent alternatives to any action that is found likely to result in jeopardy or adverse modification of critical habitat, if any has been designated. This biological opinion addresses only impacts to federally listed species and does not address the overall environmental acceptability of the proposed action.

This biological opinion is on information provided in the Forests' biological assessment (BA) (U.S. Forest Service 2010) for the proposed action, supplemental information to the BA (BA supplement 2011), related Environmental Impact Statements, personal communications with researchers and experts, and scientific literature, unpublished reports, field investigations, and other sources of information cited herein. The complete project file for this consultation is found at the Service's Helena, Montana Field Office.

CONSULTATION HISTORY

The history of ESA section 7 consultation on the proposed action is summarized chronologically in Table 1.

Table 1. Summary of the consultation between the Kootenai, Idaho Panhandle, and Lolo National Forests (Forests) and the U.S. Fish and Wildlife Service (USFWS) on the "Access Amendment" from 2002 to 2010.

DATE	Event
May 10, 2002	The Forests submitted the BA to the USFWS with a request for formal consultation. The USFWS Helena, Montana field office received the request on 5/16/02. This consultation was subsequently assigned to the USFWS Spokane field office, which received the BA on 6/27/03.
June 24, 2002	USFWS requested clarification of various aspects of the BA. (meeting notes), and advised the Forests that we could not commit to meeting the 135-day time frame for issuance of a biological opinion due to staffing and workload constraints.
July 1, 2002	USFWS contacted the Idaho Panhandle National Forest (IPNF) about missing information in Appendix B of the BA regarding threats to bull trout populations at the 4th code HUC level, and sediment and cobble embeddedness information at the 6th code HUC level for bull trout-occupied streams in BMUs not meeting standards. The USFWS wanted this information for purposes of characterizing, in part, the Environmental Baseline for the bull trout in the action area.
July 19, 2002	The Forests provided clarification in response to the Service's 6/24/02 request. That clarification addressed 13 major points in the BA; provided updated access management (2001) values for every BMU (30 total), and identified potential changes to 2001 habitat values from possible cumulative effect-related projects.
August, 2002 (2nd week)	The IPNF e-mailed draft information to the USFWS in response to our July 1 request. In response to that email, the Service indicated that more information was needed. The IPNF and the Service arranged to meet on August 27 to further discuss this matter but that meeting was postponed due to a fire.
August 27, 2002	USFWS and the IPNF met to determine the level of information necessary to complete an Environmental Baseline analysis for the bull trout. Agreement was reached that the following information would be provided by the IPNF: • Characterizations of the affected 4th-code HUC watersheds (there are 4 of them); • Descriptions of bull trout populations within the action area and major threats to those populations at the 4th-code HUC level; • Characterizations of the affected 6th-code HUC watersheds (there are approximately 35) • Status of bull trout populations at the 6th-code HUC level, with supporting data and documentation. • Current condition of sediment and substrate embeddedness at the 6th-code HUC level, including data and documentation. • Determinations of whether the affected bull trout populations and substrate conditions are functioning appropriately, functioning at risk, or functioning at unacceptable risk.

Table 1. Continued

DATE	Event
Oct. 1, 2002	USFWS requested via a phone call additional information on grizzly bear status (distribution outside recovery zone and baseline habitat conditions) from the KNF.
Nov. 18, 2002	The Kootenai National Forest (KNF) provided additional information in response to the Service's 10/1/02 request, including data on grizzly bear detections outside of recovery zones. These data included estimates of bear numbers, and analyses of: habitat conditions relative to linear open and total road densities on 8 very large use areas; food attractant and storage problems in each analysis area; and conflicts between grizzly bears and livestock grazing in each area. The analysis also identified all steps being implemented by the Forests to minimize the impacts of take of grizzly bears, based on existing management direction.
Dec. 3, 2002	USFWS formally requested additional information on bull trout habitat conditions and population data from the IPNF and on grizzly bear distribution outside recovery zones and baseline habitat conditions for grizzly bears from the KNF, IPNF and LNF.
Jan. 22, 2003	The Forests provided additional information on the bull trout in response to the Service's 12/3/2002. This information included detailed analyses on existing bull trout habitat conditions at the 4th code watershed level and populations at the 6th code watershed level.
Feb. 24, 2003	USFWS requested additional information on lynx status within the action area, including current habitat conditions within each Lynx Analysis Unit (LAU) on the KNF and the IPNF, and those LAUs on the Lolo NF in the Selkirk-Cabinet Yaak grizzly recovery zone (RZ) relative to three parameters (% of the RZ area containing lynx denning habitat, % of the RZ area containing unsuitable habitat for the lynx, and the % change in lynx denning habitat (?) within the RZ over time) identified in the Lynx Conservation Assessment and Strategy (LCAS).
Mar. 14, 2003	Forests provide updated information on grizzly bears outside recovery zone in response to 12/3/2002 request. Each Forest had to determine estimate of bear numbers, analyze habitat conditions relative to linear open and total road densities on eight very large analysis areas, analyze food attractant and storage problems in each analysis area, and evaluate conflicts between grizzly bear and livestock grazing in each area. In addition, the analysis had to display all steps to minimize take, based on existing management direction.
Mar. 27, 2003	Forests provide additional lynx information in response to 2/24/03 request. This involved three analyses (percent denning, percent unsuitable, percent change) for each of 125 LAUs (47 on KNF, 73 on IPNF and 5 on Lolo NF).
April 1 & 2, 2003	USFWS reps and IPNF fisheries biologists met to answer additional questions related to information USFWS felt was needed to complete Environmental Baseline for bull trout on IPNF. USFWS requested a copy of an Excel spreadsheet with physical data. By meeting's end, USFWS declared they had enough information to complete the Environmental Baseline.
April 3, 2003	Excel spreadsheet requested at April 1 & 2 meeting sent electronically to USFWS.
April 3, 2003	USFWS sent an electronic request for information on four Kootenai River tributaries outside of the action area but wanted for Environmental Baseline on bull trout.
April 7, 2003	Additional information on the four Kootenai River tributaries requested on 4/3 was sent electronically to USFWS.
April 7, 2003	USFWS sent an electronic request for clarification on how Equivalent Clear-cut Acres were calculated (regarding information in the Excel spreadsheet sent on 4/3), especially regarding Boulder Creek.

Table 1. Continued

DATE	Event
April 7, 2003	IPNF responded electronically regarding ECA calculations and conditions in Boulder Creek.
April 28 2003	USFWS requests additional information on grizzly bear (linear road densities in BMUs; Northern Continental Divide Grizzly recovery zone BMU habitat status) and lynx (Lolo NF – all lynx data per 2/24/03 request now wanted for all LAUs); and acknowledgement of use of LCAS as interim management for Lynx).
May 23, 2003	Forests provide additional information in response to 4/28/03 request. Provided Core, OMRD, TMRD for each NCDE BMU. Each forest provides a statement acknowledging use of LCAS. KNF provides historical data on linear vs. moving windows analysis of OMRD and TMRD. All three forests provide final lynx data package with the 3 LCAS parameters for each individual LAU (125 LAUs x 3 analyses = 375 analyses).
June 17, 2003	USFWS requests additional information on core for BMUs 3, 5, 10, & 13 via phone call.
June 30, 2003	Meeting with USFWS held to discuss and provide data in response to 6/17/03 request. Final data provided 7/3/03 as documented in meeting notes. BMUs 3, 5, 10, and 13 standards modified.
July 30, 2003	KNF discovers data error in Tables in 3/14/03 document. Provides corrected tables to FWS. All FWS requests for additional biological data now met.
Sept. 16,2003	Forests receives DRAFT Biological Opinion (BO)
Sept. 30, 2003	Conference call with USFWS and KNF and IPNF to discuss DRAFT BO
Oct. 6, 2003	Forests letter to USFWS with review comments on Draft BO
Oct. 14, 2003	USFWS and Forest representatives meet to discuss FS 10/6/03 letter to FWS on draft BO
Oct. 21, 2003	IPNF and FWS Bios meet to continue discussions on draft BO
Oct. 22, 2003	KNF and IPNF Bios met with USFWS Biologist to discuss final Terms and Conditions of BO
Oct. 29, 2003	Forest Supervisors meet with USFWS to finalize discussion on Terms and Conditions of BO
Nov. 4, 2003	KNF provides USFWS written comments per 10/29/2003 meeting
Nov. 18, 2003	IPNF provides USFWS written comments per 10/29/2003 meeting plus additional comments on BO
Dec. 2, 2003	Meeting between Forest Supervisors and USFWS to discuss comments from 11/4 and 11/18/03 FS written comments.
Feb. 9, 2004	USFWS releases the Access Amendment BO with Reasonable and Prudent Measures, Mandatory Terms and Conditions and Discretionary Conservation Recommendations.
Feb. 26, 2004	Wayne Johnson, KNF, provides direction for grizzly bear analysis outside the recovery zones per BO and identifies the road flexibility available for management activities.
March 24,2004	Access Amendment ROD with BO Terms and Conditions released to the public
Dec. 13, 2006	District Court (Molloy) releases lawsuit opinion setting aside as contrary to law the Access Amendment ROD and remands project back to USFS for further analysis.
May 17, 2007	USFWS withdraws their Feb. 9, 2004 B.O. due to District Court Decision and remanded ROD.
April 16, 2007	Letter to Susan Martin (USFWS, Spokane Office) notifying her of the Forests' intent to prepare a SEIS in response to the District Court's decision, that the previous access strategy was no longer in place, and that the Forests would consult with the USFWS prior to adoption of a final strategy.

Table 1. Continued

DATE	Event
April 16, 2007	Letter to Mark Wilson (USFWS, Helena Office) notifying him of the Forests' intent to prepare a SEIS in response to the District Court's decision, that the previous access strategy was no longer in place, and that the Forests would consult with the USFWS prior to adoption of a final strategy.
July 3, 2007	Biologists' Meeting with USFWS Ben Conard, USFWS Wayne Kasworm, USFWS Bryon Holt and IDFG Wayne Wakkinen regarding process for identifying road management opportunities to improve habitat conditions for grizzly bear, identify rationale for establishing the Core, OMRD and TMRD standards set in the Alternative E, and rationale why higher core and lower OMRD and TMRD standards cannot be set, or show proposed new standards where real opportunities exist.
Aug. 7, 2007	IDT Meeting with USFWS Wayne Kasworm, USFWS Bryon Holt and Wayne Wakkinen regarding review of BMU summary sheets and spreadsheets; decision whether or not to develop a new alternative.
Sept. 11, 2007	Conference Call with USFWS Ben Conard, USFWS Bryon Holt, USFWS Wayne Kasworm, and IDFG Wayne Wakkinen regarding mapping of core area and OMRD/TMRD standards
Feb. 14, 2008	Letter to USFWS offices (Mark Wilson, Susan Martin) providing update on the Draft SEIS Access Amendment progress to date, including issues raised in the District Court, Wakkinen and Kasworm's paper and development of a range of alternatives, including Alternative D.
Feb. 21, 2008	Letter to USFWS offices (Mark Wilson, Susan Martin) to update on project decision to analyze Alternative D Modified with Wakkinen and Kasworm's optimal habitat values of 72 percent Core, 17 percent OMRD and 14 percent TMRD; and to propose conference call date (March 14, 2008) for USFWS Mark Wilson, Susan Martin and consultation biologists.
Feb. 22, 2008	IPNF Supervisor Ranotta McNair meets with USFWS Susan Martin (Spokane Office) providing preliminary information for March 14 conference call. Paul Bradford calls USFWS Mark Wilson (Helena Office) with same information.
March 14, 2008	Conference call with USFWS discussing Alternative D Modified description, reasonably foreseeable actions, identification of lead USFWS office, communications, priorities and draft timeline
April 9, 2008	Letter from USFWS Spokane (Audet) to Ranotta McNair updating the Idaho Panhandle's bi-annual species list, to be addressed for the SEIS.
June 10, 2008	IDT Meeting with USFWS Wayne Kasworm and IDFG Wayne Wakkinen discussing extension of CYE bear year to November 30 based on known den entry/exit information. Wayne Wakkinen and Wayne Kasworm were asked to review their original recommendations on administrative use levels (Wakkinen and Kasworm letter to D. Wright, 5/14/1999) and how a change in the bear year might affect those levels. Also discussed DSEIS Alternatives D Modified and E Updated and inclusion of Terms and Conditions from the 2004 B.O., including the BORZ.
June 12, 2008	Wayne Kasworm (USFWS) e-mails Wayne Johnson with reply to June 10, 2008 request. He and Wayne Wakkinen recommend administrative use by season (spring 18 trips, summer 23 trips, fall 19 trips) totaling 60 trips, using the same process from their 1999 letter.
June 18, 2008	IDT Meeting with USFWS Wayne Kasworm, USFWS Ben Conard and USFWS Bryon Holt updating the Access Amendment progress/status, and discussing Alternative E Terms and Conditions and BMU standards, BORZ terminology, Bear year changes and administrative use, activity time limit in core area, timeframes to achieve standards, and display of Terms and Conditions. Alternative D was also reviewed.

Table 1. Continued

DATE	Event
June 21, 2008	Telephone conversation between Anne Vandehey and Mark Wilson (USFWS, Helena Office) and Wayne Johnson, (KNF) regarding the potential for a Likely to Adversely Affect project in the CYE to be conducted without jeopardizing grizzly bears.
June 19, 2008	Obtained the list of Threatened, Endangered and Candidate species to be addressed for the SEIS from the USFES Helena Office website for the KNF.
June 19, 2008	Obtained the list of Threatened, Endangered and Candidate species to be addressed for the SEIS from the USFES Helena Office website for the Lolo National Forest.
July 1, 2008	Phone conversation between Wayne Kasworm (USFWS) and Wayne Johnson (KNF) regarding grizzly bear movements between Recovery Zones.
July 2, 2008	IDT Meeting with USFWS Wayne Kasworm, USFWS Ben Conard and USFWS Bryon Holt discussing follow-up items from the June 18 meeting: bear year dates, BORZ baseline conditions, Core baseline conditions, 3-year activity time limit, timeframes to achieve standards and display of Terms and Conditions.
July 21, 2008	IDT Meeting with USFWS Wayne Kasworm, USFWS Ben Conard and USFWS Bryon Holt discussing bear year change, FS final Alternative D Modified and Alternative E Updated language for T&Cs, reviewed Alternative tables
August 8, 2008	Conference call between Paul Bradford, Ranotta McNair, Randy Hojem, Wayne Johnson, Alan Campbell, and Mark Wilson, Rich Torquemada, and Bryon Holt. Level 2 discussion concerning the access amendment's proposed action- specifically the scope of the analysis. Decision, amongst the three FS line officers, was that the scope of the analysis will continue to be consistent with the FEIS and ROD. The scope of the analysis for the FEIS/ROD is limited to wheeled, motorized access management. Future options for access management planning will occur during and/or after forest plan revision
May 12, 2009	IDT Meeting with USFWS Ben Conard, Lowell Whitney, Wayne Kasworm, Byron Holt and Anne Vandehey to introduce new biologists and review timelines for implementation and Design Elements (T&C) from April 2009 release of draft SEIS—including 3 year time limit in Core. Issues identified for further discussion between FWS biologists included entrance in core within a BMU "once every 10 years" as well as need for BORZ review.
August 20, 2009	IDT Meeting with USFWS Ben Conard, Wayne Kasworm and Bryon Holt to discuss BORZ delineation and associated data. Develop draft guidelines for recurring use areas for grizzly bears.
August 21, 2009	Day two of IDT Meeting with USFWS Ben Conard, Wayne Kasworm and Bryon Holt to discuss BORZ delineation and review Design Element language- especially in regards to core block areas and ability to enter "once every 10 years".
September 10, 2009	IDT Meeting with USFWS Ben Conard, Wayne Kasworm and Bryon Holt and IDFG biologist Wayne Wakkinen to discuss BORZ delineation and associated data for Idaho Panhandle SE and CYE.
September 12, 2009	IDT Meeting with USFWS Ben Conard, Wayne Kasworm and Bryon Holt to discuss BORZ delineation and associated data for KNF and LNF CYE.
March 1, 2010	IDT Team meeting with USFWS Wayne Kasworm and Ben Conard to finalize BORZ re-delineation and associated Design Element language.

Table 1. Continued

DATE	Event
April 26, 2010	Level II conference between Ranotta McNair (IPNF), Paul Bradford (KNF), Barb Beckes (LNF), Shanda Dekome (IPNF), Rich Torquemada (USFWS), Bryon Holt (USFWS), John Carlson (KNF), Mark Wilson (USFWS), Karl Dekome (IPNF), Anne Vandehey (USFWS). *Present by phone:* Lydia Allen (IPNF), Ben Conard (USFWS), Randy Hojem (LNF), Dave Wrobleski (LNF).Meeting was called to consider adjusting standards for 3 BMUs (Sullivan-Hughes, Blue Grass, and Keno) and discuss the use of a Single Standard versus No net loss of core and use of temporary loss of core.
July 1, 2010	Level I Meeting with USFWS Ben Conard and USFS Lydia Allen, Karl Dekome, Annie Dueker, John Carlson, Jeremy Anderson, Joe Madison, and Brett Lyndaker to finalized Design Elements.
July 22, 2010	Final Forest Service edits to Design Elements sent to USFWS Ben Conard and Bryon Holt for review and comment. (No comments in return)
Sep. 15, 2010	Forests FedEx CD containing DRAFT BA to USFWS Ben Conard
Nov. 8, 2010	USFWS Ben Conard sends USFS Lydia Allen comments on grizzly bear section of draft BA
Dec. 14, 2010	USFWS Bryon Holt emails USFWS Ben Conard that there are no additional comments from Northern Idaho Field Office on draft BA.
Dec. 15, 2010	USFWS Lowell Whitney sends USFS final comments on bull trout section of draft BA - requests additional information.
Dec. 21, 2010	Forests FedEx two CD's containing FINAL BA for the Access Amendment, dated Dec 15 and 16, 2010, by L. Allen, L. Hawdon and D. Bond.
2011	USFWS L. Whitney informs FS that final BA did not address USFWS comments on draft BA regarding bull trout. Identifies missing & inadequate information
Feb. 9, 2011	IPNF Ranotta McNair transmits (via email) letter and BA Supplement to USFWS Mark Wilson containing response to comments on draft BA and other updates, corrections, and clarifications.
Feb. 9, 2011	Statutory 135-day formal consultation timeline begins {50 CFR 402.14 (e-g)}
April 18, 2011	IPNF Allen transmits to USFWS Conard a draft unpublished report (Allen and Lyndaker 2011) regarding the use of the Wakkinen and Kasworm (1997) report.
May 12, 2011	IPNF Allen transmits to USFWS Conard additional supplemental information for the BA, including clarification points, updates, and corrections.

DESCRIPTION OF THE PROPOSED ACTION

Background

Based on direction from the Interagency Grizzly Bear Committee (IGBC) and consideration of information from research conducted by Wakkinen and Kasworm (1997), the Selkirk/Cabinet-Yaak Subcommittee of the IGBC approved an Interim Access Management Rule Set (Rule Set) in 1998 to manage motorized access within the Selkirk Mountains Ecosystem (SE) and the Cabinet-Yaak Ecosystem (CYE) recovery zones (IGBC Subcommittee 1998). The Rule Set was to be in place over a three-year period (1998-2000), or until the affected LRMPs were revised, or the Subcommittee determined a need to modify the direction.

The Rule Set outlined the following goals for each element of the direction: (1) no net loss of core area habitat, and the Forests would work to achieve a level of 55 percent core area habitat in Priority 1 Bear Management Units (BMUs); (2) no net loss of core area habitat in the remainder of the BMUs (41 percent of all BMUs) in the SE and CYE; and (3) no net increase in open and total road densities on National Forest System lands within these recovery zones.

The Rule Set addressed the issue of administrative use on restricted roads within BMUs by setting a standard of up to an average of one vehicle per day during the non-denning bear season (April 1 through November 15) for a total of up to 115 round trips on restricted roads within a BMU during the non-denning period. The Rule Set also allowed for a 30-day public use period on one restricted road per BMU per year. This 30-day public use period can only occur after coordination with the Service in Priority 1 BMUs containing 55 percent core area habitat and in Priority 2 and 3 BMUs that meet 70 percent habitat security requirements.

In the spring of 1999, the Alliance for the Wild Rockies filed a lawsuit challenging the KNF and IPNF's implementation of the Rule Set without amending their LRMPs. The KNF and IPNF settled the lawsuit in March 2001 and agreed to amend their respective LRMPs to address grizzly bear management. The LNF was not included in the lawsuit; however, they requested to be included in the amendment process so as to update their LRMP to provide consistent direction within the CYE.

In March of 2001, the Forests established an Interdisciplinary Team (ID Team) to begin the process of amending the above referenced LRMPs. The Service was invited to participate on the ID Team and, thus, began informal ESA section 7 consultation with the Forests through participation on this ID Team.

In April of 2001, the Service issued an amended biological opinion and incidental take statement (ITS) on the IPNF LRMP (U.S. Fish and Wildlife Service 2001). In general, the incidental take statement and terms and conditions relative to the grizzly bear adopted the Rule Set access parameters: open (open to public) motorized route density (OMRD) of one mile per square mile or more, in less than or equal to 33 percent of each BMU; total (all roads) motorized route density (TRMD) of two miles per square mile or more in less than or equal to 26 percent of each BMU; core area (areas without motorized routes) greater than or equal to 55 percent of each

BMU. These applied to BMUs with greater than 75 percent Federal ownership. It also defined timelines for implementation, administrative use, and reporting requirements.

In March 2002, the Forests issued a final Environmental Impact Statement (EIS) for amending motorized access standards to the LRMPs for the KNF, IPNF, and the LNF (i.e., the "Access Amendment") (U.S. Forest Service 2002a). In May 2002, a BA on the Access Amendment was sent to the Service (U.S. Forest Service 2002b) along with a request for formal consultation. The BA used 2000 data to characterize baseline information in individual BMUs.

In February 2004, the Service issued a final biological opinion on the Access Amendment. The biological opinion relied upon 2002 information provided by the KNF, IPNF, and the LNF to characterize the baseline conditions for affected BMUs.

In March of 2004, the Record of Decision (ROD) for the EIS was signed. This action officially amended the LRMPs for the KNF, IPNF, and the LNF.

Two subsequent lawsuits were filed against the Forests and the Service in November and December of 2004 relative to decision documents on the Access Amendment.

In August 2006, the Montana District Court ruled in favor of the Forests for one of the lawsuits (CV 04-216-M-DWM). However, the District Court ruled against the Forests in December 2006 on one issue and remanded the matter back to the Forests for preparation of a new environmental analysis (CV 04-236-M-DWM). That ruling effectively removed the habitat parameter standards established in the March 2004 Record of Decision. Consequently, the standards and analyses in place prior to this ROD (and the associated biological opinions) again became the prevailing rules. These standards and analyses remain in place until a new Access Amendment-related EIS, biological opinion, and ROD are completed. The Service subsequently withdrew its February 2004 biological opinion in May of 2007 (U.S. Fish and Wildlife Service 2007).

In April of 2009, the Forests released a revised Draft Supplemental EIS for Motorized Access Management within the SE and CYE (U.S. Forest Service 2009d) (a variation of which is the proposed action for this consultation). The proposed action considered in that document provides for different levels of OMRD, TMRD, and secure habitat (Core) to be set as standards for individual BMUs and in areas of known grizzly bear occupancy that are outside of the recovery zone boundaries (U.S. Forest Service 2009d). The Forests prepared a new BA for this proposed action in 2010 (BA 2010) and supplemented the BA in 2011 (BA Supplement 2011).

The new BA (BA 2010, BA Supplement 2011) for this consultation updates the original BA completed in 2002 using the latest available information. This includes the use of a 2009 road and trail layer, grizzly bear mortality information from 1982-2010, new designations of critical habitat for Canada lynx and the bull trout, as well as the most recent biological information for all listed threatened and endangered species within the action area.

Proposed Action

The proposed action (Alternative E Updated in the FEIS[1]) would amend the KNF, IPNF, and LNF LRMPs to include new, wheeled/motorized access standards for BMUs in the CYE and SE recovery zones along with administrative use levels[2], design elements, and timelines for implementation of the standards. Under Alternative E Updated, the existing LRMP standards for linear open road density and "habitat effectiveness" would be replaced with standards for OMRD, TRMD, and core area. In addition, Alternative E Updated sets standards for linear miles of open and total road densities for areas outside the recovery zones that are experiencing recurring use by grizzly bears; this situation is referred to below as "Bears Outside of Recovery Zones" or "BORZ."

The "design elements" of the proposed action include features that previously were "reasonable and prudent measures" and "terms and conditions" in the ITS for the 2004 biological opinion on the Access Amendment (U.S. Fish and Wildlife Service 2004).

The proposed action also allows for increases in OMRD, TRMD and decreases in percent core area within individual BMUs that exceed (are better than) these standards, but only after all BMUs within the respective recovery zones have met their individual access standards.

The proposed access standards for individual BMUs were developed to provide increased grizzly bear habitat security by reducing motorized route densities and increasing core to levels conducive to use by female bears, while allowing management flexibility in response to issues related to public and administrative access on the involved National Forests, economic costs, and providing access for potential development of private inholdings. These standards were developed in coordination with Service and grizzly bear research scientists, and reflect the unique biological features and social factors found within specific BMUs in the action area.

Design Elements

The following is largely excerpted from the Forests' 2010 BA:

I. The following access management standards apply to individual BMUs within the Selkirk recovery zone on the IPNF and Cabinet-Yaak Recovery zone on the KNF, IPNF and portion of the LNF:

   A. The following OMRD, TMRD, and Percent Core standards are established for the BMUs in the Cabinet-Yaak (Table 2) and Selkirk (Table 3) Grizzly Bear recovery zones:

[1] Please see the Final Environmental Impact Statement (pages 2-15 and 2-16, USFS 2002) for a synopsis of Alternative E.
[2] Administrative use is quantified according to the active Bear Year. Based on local grizzly bear research, the CYE Bear Year = April 1 – November 30; SYRZ Bear Year = April 1 – November 15, per Johnson et al. 2008.

Table 2. Proposed access standards for the CYE Recovery Zone on the Kootenai, Idaho Panhandle, and Lolo National Forests.

Bear Management Unit	Access Parameter	Alternative E-Updated Standard (percent of BMU)	Bear Management Unit	Access Parameter	Alternative E-Updated Standard (percent of BMU)
1 Cedar	OMRD	15	12 Newton	OMRD	45
	TMRD	15		TMRD	31
	CORE	80		CORE	55
2 Snowshoe	OMRD	20	13 Keno	OMRD	33
	TMRD	18		TMRD	26
	CORE	75		CORE	59
3 Spar	OMRD	33	14 NW Peaks	OMRD	31
	TMRD	26		TMRD	26
	CORE	59		CORE	55
4 Bull	OMRD	36	15 Garver	OMRD	33
	TMRD	26		TMRD	26
	CORE	63		CORE	55
5 St. Paul	OMRD	30	16 E Fork Yaak	OMRD	33
	TMRD	23		TMRD	26
	CORE	60		CORE	55
6 Wanless	OMRD	34	17 Big Creek	OMRD	33
	TMRD	32		TMRD	26
	CORE	55		CORE	55
7 Silver Butte-Fisher	OMRD	26	18 Boulder	OMRD	33
	TMRD	23		TMRD	29
	CORE	63		CORE	55
8 Vermillion	OMRD	32	19 Grouse (54% Federal)	OMRD	59
	TMRD	21		TMRD	55
	CORE	55		CORE	37
9 Callahan	OMRD	33	20 North Lightning	OMRD	35
	TMRD	26		TMRD	20
	CORE	55		CORE	61
10 Pulpit	OMRD	44	21 Scotchman	OMRD	34
	TMRD	34		TMRD	26
	CORE	52		CORE	62
11 Roderick	OMRD	28	22 Mt. Headley	OMRD	33
	TMRD	26		TMRD	35
	CORE	55		CORE	55

Table 3. Proposed access standards for the SE Recovery Zone on the Idaho Panhandle National Forests.

Bear Management Unit	Access Parameter	Alternative E Updated Standard (percent of BMU)
Blue Grass	OMRD	33
	TMRD	26
	CORE	55
Long-Smith	OMRD	25
	TMRD	15
	CORE	67
Myrtle	OMRD	33
	TMRD	24
	CORE	56
Ball-Trout	OMRD	20
	TMRD	13
	CORE	69
Lakeshore	OMRD	82
	TMRD	56
	CORE	20
Kalispell-Granite	OMRD	33
	TMRD	26
	CORE	55
Sullivan-Hughes	OMRD	24
	TMRD	19
	CORE	61
Salmo-Priest	OMRD	33
	TMRD	26
	CORE	64

B. Parameters for establishing and managing "core areas" in all BMUs:

1. In accordance with IGBC (1998) and Selkirk/Cabinet-Yaak Grizzly Bear Subcommittee (1998) direction, "core areas" shall be established for the purpose of providing secure habitat for grizzly bears.

   a. Core areas[3] include high quality habitat within a BMU that contains no motorized travel routes or high use trails.

   b. Core areas do not include any gated or restricted roads but may contain roads that are impassable due to re-growth of vegetation, effective barriers other than gates, or placement of logging or forest debris so as to no longer function as a motorized route.

[3] Percent Core Area is the sum of individual "blocks" or polygons of Core Area that are separated spatially from other Core Areas with the BMU. Their distribution and tenure are dependent on the existing transportation system and the history of access management activities within the BMU (e.g. road closures and decommissioning and/or changes from motorized road to non-motorized trail).

c. When possible, core areas will be delineated by identifying and aggregating the full range of seasonal habitats that are available in the BMU.

d. The IGBC anticipated that minimum core area size might be determined for each recovery zone. For the Selkirk/Cabinet-Yaak grizzly bear recovery zones, no scientifically-based minimum effective size polygon for core area has been determined (Wakkinen and Kasworm 1997), though minimum block sizes of 2-8 mi^2 were suggested. Therefore, discounting small or narrow blocks of core area is not prudent at this time. Individual project analyses will disclose the percent and size of core areas in each BMU.

e. Once route closures to create core area are established and effective, these core areas should remain in place for at least 10 years. Therefore, except for emergencies[4] or other unforeseen circumstances[5] requiring independent section 7 consultation, newly created core area shall not be entered for at least 10 years after creation.

f. From the Record of Decision date forward, roads that are closed, decommissioned, or barriered to create core area will be put in a condition such that a need for motorized access for maintenance is not anticipated for at least 10 years. Until such closed roads are placed in the above described condition, they will not be considered as contributing to core area.

2. Entering core area blocks for road decommissioning or stabilization activities:

a. Without further section 7 consultation on grizzly bears, the Forest Service may affect underlying core area (i.e., any core habitat that is affected by the subject road and its buffer) within a BMU once per 10-year time frame, and not to exceed one bear year for the sole purpose of completing road decommissioning/stabilization activities on existing closed or barriered roads in core area habitat[6].

b. Subsequent needs to re-enter individual core areas within a BMU more frequently than once per decade for reasons other than emergencies shall be handled on a case-by-case basis through standard section 7 consultation procedures. The effects of additional entries will be analyzed pursuant to such project level consultation. Pending the outcome of each analysis,

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[4] "Emergencies" as defined by ESA regulations [50 CFR 402.05] and associated policy and handbook direction.

[5] "Unforeseen circumstances" means changes in the circumstances affecting the geographic area covered by the Access Amendment that could not reasonably have been anticipated by the ID Team. Unforeseen circumstances are not intended to include timber harvest; not even salvage harvest.

[6] Previous to this direction, some Core Areas were established containing impassable, closed, or barriered roads exhibiting hydrologically unstable conditions, such as undersized culverts. This creates a pending resource issue for watershed and fishery concerns. The intent of this Design Element is to respond to these resource threats and to improve the integrity of Core Areas so as not to require future management entry.

additional measures to minimize potential effects to grizzly bears may be required.

3. Routine forest management may be proposed in a core area block after 10-years of core area benefit. However, BMUs must remain at or above the percent core area standard. Therefore potential losses to existing core must be compensated with in-kind replacement concurrently or prior to incurring the losses. Such in-kind replacement of core will be established within the affected BMU in accordance with the direction in Part I.B.1. above. For exceptions, see specialized circumstances outlined in Part I.D. concerning BMUs that exceed standards. Following management, core areas must subsequently be managed undisturbed for 10 years.

C. Parameters for BMUs currently not meeting percent core area, OMRD, and/or TMRD standards:

1. These BMUs are anticipated to be brought up to standards in the following manner: 33 percent of those BMUs currently not meeting one or more standard within each ecosystem are estimated to meet all standards within *three* years of the amendment decision date; 66 percent of those BMUs currently not meeting one or more standard within each ecosystem are estimated to meet all standards within *five* years of the amendment decision date, and 100 percent of those BMUs currently not meeting one or more standard within each ecosystem are estimated to meet all standards within *eight* years of the amendment decision date.

D. For those BMUs currently meeting or exceeding (being better than) the standards for percent core area:

1. Except as provided above for road stabilization projects or emergencies, no reductions in percent core area without in-kind replacements will be proposed by the Forests [the IPNF, KNF and LNF] until all BMUs administered by the Forests in the respective ecosystems are up to standard (Tables 2 and 3; which do not include the LeClerc BMU or the Idaho State Lands BMU in the Selkirk recovery zone.)

2. Once all BMUs meet all standards, then subsequent projects which propose to permanently reduce percent core area by roads shall undergo independent section 7 formal consultation.

3. Reductions of core area within individual BMUs shall not reduce the percent core area below the standards for the affected BMU without compensating with in-kind replacement concurrently or prior to incurring the losses (see Part I.B.3.)

E. Road use associated with conducting administrative activities:

1. In the Selkirk Ecosystem (aka Selkirk recovery zone):

   a. Administrative use shall not exceed 57 vehicle round trips per active bear year per road, apportioned as follows: ≤19 round trips in spring (April 1 through June15); ≤23 round trips in summer (June 16 through September 15); and ≤15 round trips in fall (September 16 through November 15).

   b. If the number of trips exceeds 57 trips per active bear year in the Selkirk ecosystem, then that road will be considered "open" for analysis and reporting purposes. Likewise, if the number of trips exceeds the allowable ecosystem-specific *seasonal* (spring, summer, fall) vehicle round trips per road, then that road will be considered "open" for analysis and reporting purposes.

2. In the Cabinet-Yaak Ecosystem (aka Cabinet-Yaak recovery zone):

   a. Administrative use shall not exceed 60 vehicle round trips per active bear year per road, apportioned as follows: ≤18 round trips in spring (April 1 through June15); ≤23 round trips in summer (June 16 through September 15); and ≤19 round trips in fall (September 16 through November 30).

   b. If the number of trips exceeds 60 trips per active bear year in the CYE, then that road will be considered "open" for analysis and reporting purposes. Likewise, if the number of trips exceeds the allowable ecosystem-specific *seasonal* (spring, summer, fall) vehicle round trips per road, then that road will be considered "open" for analysis and reporting purposes.

II. The following access management applies to seven grizzly bear recurring use areas (i.e. BORZ areas) located <u>outside of the Cabinet-Yaak grizzly bear recovery zone (KNF and IPNF) and Selkirk grizzly bear recovery zone (IPNF)</u>:

A. The Forests shall ensure no increases in permanent linear miles of open road[7] on National Forest System lands in any individual BORZ, above the baseline conditions identified in Table 4, except in cases where the Forest Service lacks discretion to prevent road building across national forest lands due to legal or other obligations (examples include, but are not limited to, ANILCA claims, identification of RS2477 thoroughfares). Potential increases in linear miles of open roads must be compensated for with in-kind reductions in linear miles of open road concurrently with, or prior to, project implementation within the same BORZ.

[7] Open roads are roads that are open for all or part of the active bear year.

Temporary increases in linear miles of open roads are acceptable under the following conditions:

1. Roads that are closed[8] to public motorized use or roads created or reconstructed to facilitate land management activities that are otherwise closed to public use may be "opened" to the public immediately following completion of all mechanized harvest and post-harvest slash activities requiring use of the road, to allow motorized public use during the bear summer season prior to the fall bear hunt (i.e. June 16 – August 31) for activities such as personal firewood collection. This public access would only be provided in cases where the mechanized harvest and/or post-harvest slash activities occurred during the same active bear year.

B. The Forest shall ensure no net permanent increases in linear miles of total roads[9] in any individual BORZ area above the baseline conditions identified in Table 4, except in cases where the Forest Service lacks discretion to prevent road building across national forest lands due to legal or other obligations (examples include, but are not limited to, ANILCA claims, identification of RS2477 thoroughfares, etc.). Otherwise, potential increases in linear miles of total roads must be compensated for with in-kind reductions in linear total road miles concurrently with, or prior to, new road construction or reconstruction of currently bermed or barriered roads.

   Temporary increases (not off-set) in linear miles of total roads are acceptable under the following conditions:

   1. Newly constructed roads will be effectively gated and will be restricted with a CFR closure clarifying they are not open for public use.

      2. These roads[10] shall be closed immediately upon completion of activities requiring use of the road, except as described in Part II. A.1., above. Roads must be closed with a berm, guardrail or other measure that effectively prevents motorized access, and put in a condition such that a need for motorized access for maintenance is not anticipated for at least 10 years.

      3. Upon completion of a land management project, linear miles of total roads will be returned to or below the baseline levels contained in Table 4.

C. Timber harvest activities that will occur within multiple watersheds shall be scheduled such that disturbance of grizzly bears resulting from road use is minimized. The appropriate scale for scheduling harvest activities will be determined pursuant to project level consultation.

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[8] Closed with a closure order and/or some type of closure device such as a gate.
[9] Includes roads that do not have restrictions on motorized use and roads that are closed to public motorized use.
[10] Includes temporary roads built to facilitate the completion of the project and not intended to be left on the landscape—i.e. typically for 10 years or less) as well as the re-opening of existing bermed or barried road prisms.

III. To ensure the effective implementation of the open road density parameter, at least 30 percent of closure devices (gates and barriers) will be monitored annually within the respective ecosystems. Monitoring techniques may include visual checks as well as road counters.

Table 4. Existing motorized access conditions for Bears Outside of Recovery Zone (BORZ) areas situated on the Idaho Panhandle and Kootenai National Forests.

BORZ Name	Grizzly Bear Ecosystem	Total Size (Acres)	NFS[1] Lands (Acres)	Total Linear Miles of Roads on NFS Lands	Total Linear Miles of Open Roads on NFS Lands
Priest	Selkirk	80,733	75,793	316.4	314.4
Pack River	Selkirk	33,869	28,097	41.9	37.9
Mission-Moyie	Cabinet-Yaak	71,545	58,472	200.3	167.3
Clark Fork	Cabinet-Yaak	101,701	100,223	256.1	176.9
Cabinet Face	Cabinet-Yaak	27,140	26,177	164.1	128.0
West Kootenai	Cabinet-Yaak	173,122	169,705	615.3	315.9
Tobacco	Cabinet-Yaak	287,240	266,947	1,123.9	867.0

[1]National Forest System Lands

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

In accordance with policy and regulation, the jeopardy analyses in this biological opinion rely on four components: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) *Cumulative Effects*,

which evaluates the effects of future, non-Federal activities in the action area on the species. These four components are presented separately below for the grizzly bear (Part A of this document) and the bull trout (Part B).

In the case of the bull trout, interim recovery units were defined in the final listing rule for use in completing jeopardy analyses. Pursuant to Service policy, when an action impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, the biological opinion describes how the action affects not only the recovery unit's capability, but the relationship of the recovery unit to both the survival and recovery of the listed species as a whole.

The jeopardy analysis for the bull trout in this biological opinion uses the above approach and considers the relationship of the action area and core area (discussed below under the *Status of the Species* section) to the recovery unit and the relationship of the recovery unit to both the survival and recovery of the bull trout as a whole as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat for bull trout.

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the species in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for

the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the species.

In the case of the bull trout, the analysis in this biological opinion places an emphasis on using the intended range-wide recovery function of bull trout critical habitat, especially in terms of maintaining and/or restoring viable core areas, and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Other Listed Species

In addition to grizzly bears, other federally listed species that may be present in the project area include the threatened Canada lynx (*Lynx canadensis*) and designated Canada lynx critical habitat and the woodland caribou (*Rangifer tarandus caribou*). The Forests determined that the proposed action was not likely to adversely affect these species or critical habitat. We have addressed these species in a separate document.

PART A. EFFECTS TO GRIZZLY BEARS

Biological Opinion

on the

Forest Plan Amendments for
Motorized Access Management within the
Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the
Kootenai, Idaho Panhandle, and Lolo National Forests

October 2011

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PART A: GRIZZLY BEAR

STATUS OF THE SPECIES

ESA Listing Status

In 1975, the Service listed the grizzly bear as a threatened species in the contiguous United States (40 FR 31734-31736, July 28, 1975). The Service subsequently developed a grizzly bear recovery plan in 1982, and revised it in 1993 (U.S. Fish and Wildlife Service 1993).

Since the original listing of the grizzly bear, the Service has completed 3, 5-year status reviews (46 FR 14652, February 27, 1981; 52 FR 25523, July 7, 1987; 56 FR 56882, November 6, 1991). None of these reviews warranted a change in the listing status of the grizzly bear. Since then, the Service has undertaken a number of actions to review the status of individual grizzly bear populations.

On March 13, 1990, the Service received a petition requesting the grizzly bear in the North Cascades Ecosystem (NCE) be reclassified from threatened to endangered. We made a positive 90-day finding on the petition and initiated a status review of the North Cascades Ecosystem grizzly bear population (55 FR 32103, August 7, 1990). On January 28, 1991, we received a petition requesting that we reclassify the grizzly bear populations in the CYE, SE, and the Northern Continental Divide Ecosystem (NCDE) from "threatened" to "endangered." Then, on February 4, 1991, we received a petition requesting that grizzly bear populations in the SE, CYE, Yellowstone Grizzly Bear Ecosystem (YGBE) and NCDE recovery zones be reclassified from threatened to endangered. In 1992, we made a positive finding on these 2 petitions regarding the CYE and SE and initiated a status review for these 2 ecosystems (57 FR 14372, April 20, 1992). This same finding found that there was not substantial information presented about the YGBE or NCDE recovery zones and that the request to uplist the North Cascades Ecosystem population was already being addressed through initiation of a status review in 1990 (see 55 FR 32103, August 7, 1990).

In July 1991, the Service released a 12-month finding that reclassification of the population from threatened to endangered was warranted but precluded (56 FR 33892, July 24, 1991). In 1993, we published a 12-month finding that the grizzly bear population in the CYE was warranted for uplisting to endangered status while the population in the SE was not (58 FR 8250, February 12, 1993). This warranted status for the CYE, like the North Cascades Ecosystem population, was determined to be precluded by higher priority actions. In 1998, we re-affirmed this position, publishing a notice that the North Cascades population and the CYE populations are warranted for endangered status, but precluded by higher priority actions (63 FR 30453, June 4, 1998). In 1999, after a Court remanded our finding regarding the SE population back to the Service, we released a 12-month finding that both the CYE and the SE populations were warranted for endangered status but precluded by higher priority actions (64 FR 26725, May 17, 1999). Since then, the NCE, SE, and the CYE populations have remained warranted for reclassification from threatened to endangered status but precluded by higher priority actions (64 FR 57534, October 25, 1999; 66 FR 54808, October 30, 2001; 67 FR 40657, June 13, 2002; 69 FR 24876, May 4,

2004; 70 FR 24870, May 11, 2005; 71 FR 53756, September 12, 2006; 72 FR 69034, December 6, 2007; 73 FR 75176, December 10, 2008; 74 FR 57804, November 9, 2009)

Species Description, Life History, Population Dynamics

Much of the following information is summarized from the grizzly bear recovery plan (U.S. Fish and Wildlife Service 1993); more specific information can be obtained in that document.

Grizzly bears are large (averaging 400-600 lbs for males, and 250-350 lbs for females) and long-lived (up to 40 years old) (Storer and Tevis 1955), but usually no more than 15-25 years in the wild. Grizzly bears are omnivorous, opportunistic feeders that require caloric intake in excess of maintenance requirements, particularly in later summer and fall, in order build fat levels to survive denning.

Generally solitary, grizzly bears avoid one another, except during the mating season when male and female bears tolerate one another. Grizzly bears do not defend territories, but instead have home ranges they share with other grizzly bears, although social systems influence movements and interactions among resident bears. Home range sizes for adult female grizzlies vary from 50 to 150 square miles; an adult male can have a home range size as large as 600 square miles (Schwartz et al. 2003).

Grizzly bears in the contiguous United States spend 4 to 6 months in dens, typically beginning in October or November (Craighead and Craighead 1972; Nagy and Gunson 1990; Hellgren 1998). The bears hibernate for as long as 7 months. During this period, they do not eat, drink, urinate, or defecate. Over the course of the denning season, a bear may lose 30 percent of its body weight. All of this weight is stored as fat, which is acquired during the 2 to 4 months prior to entering dens. During the pre-denning period, bears increase their food intake dramatically and may gain as much as 3.64 pounds per day (Schwartz et al. 2003).

Mating occurs from May through July, and cubs are born inside the den in late January or early February. Cubs remain with their mother for 2 to 3 years (Foresman 2001). The age at which females produce their first litter varies from 3 to 8 years, with litter size varying from one to four cubs. Grizzly bears have one of the lowest reproductive rates among terrestrial mammals. Grizzly bear females cease breeding successfully some time in their mid to late 20s (Schwartz et al. 2003).

Grizzly bears are opportunistic omnivores and will eat fish, berries, grasses, leaves, insects, roots, carrion, small mammals, fungi, nuts, and ungulates. The bears are selective in their seasonal use of various kinds of forage and, therefore, move across the landscape as they follow the growth and abundance of preferred forage items (Blanchard 1983; Mace et al. 1996; Waller and Mace 1997; McLellan and Hovey 2001).

Habitat Requirements

Grizzly bears are habitat generalists. Basic habitat requirements include the availability of food, security (from humans and other bears), and den sites (Archibald et al. 1987; Heinrich et al. 1995; Mace et al. 1996, 1999; Linnell et al. 2000) (Table A1). While biologists agree that preferred habitats of grizzly bears are early seral, fire-successional types, the proximity of security cover is also an important variable that has been shown to influence the use of foraging habitat. Given equal foraging opportunities, under cover and in the open, bears prefer to feed under cover.

Grizzly bears are selective in their seasonal use of various kinds of forage and, therefore, move across the landscape as they follow the phenological development and abundance of their preferred forage items. As a result, the productivity of grizzly bear populations is likely more strongly influenced by the availability of high quality food resources than by density-dependent regulating factors (IGBC 1987, pp. 51-59). It has also been observed that grizzly bears of all ages will congregate readily at plentiful food sources and form a social hierarchy unique to that grouping of bears (U.S. Fish and Wildlife Service 1993).

Table A1. Grizzly bear habitat requirements and key habitats.

Habitat requirement	Key Habitats
Spring foraging[1]	Low-elevation mesic vegetation
Summer, autumn foraging[1]	Moderate- to high-elevation mesic vegetation
Security cover and isolation from humans[2,3]	Cover provided by vegetation and topographic breaks; absence or low density of roads and trails
Denning habitat[4]	Remote, high-elevation areas with slopes greater than 30 degrees; friable, deep soils; and snow accumulations

Sources:
[1] Mace et al. (1996); Mace et al. (1999); McLellan and Hovey (2001); Nielson et al. (2002); Waller and Mace (1997a).
[2] Archibald et al. (1987); Kasworm and Manley (1990); Mace et al. (1996); Mace et al. (1999); Mattson et al. (1987); McLellan and Shackleton (1988, 1989); Wielgus et al. (2002).
[3] Mace and Waller (1997); White et al. (1999); Graves (2002).
[4] Pearson (1975); Servheen (1981); Zager and Jonkel (1983); Podruzny et al. (2002).

With the exception of a few forest vegetation types, such as horsetail associations, the majority of vegetative food items preferred by grizzly bears occur in early seral communities where forest cover is absent or relatively sparse (Hamer and Herrero 1983). Foraging areas that are consistently described in the literature as favored by bears include avalanche chutes (Zager et al. 1980; Mace et al. 1996; Waller and Mace 1997a; Ramcharita and McLellan 2000; McLellan and Hovey 2001), fire-mediated shrub fields (Almack 1985, 1986; Hamer and Herrero 1987a, b; McLellan and Hovey 2001), and riparian areas (Servheen 1983; McLellan and Hovey 2001). Avalanche chutes may be used at any time of year, but seem to attract bears particularly in the spring. These areas are usually quite wet (due to deep snows that melt later than in other areas), and they contain both valuable forage species and a tangle of vegetation that provides visual screening. Fire-mediated shrub fields often contain soft-mast (e.g., berry) producing shrub species, an important food source for foraging bears in mid-summer and early fall. Riparian

areas are primarily used in spring and early summer when habitats at higher elevations are still covered with snow or plant growth is otherwise delayed. Grizzly bear foraging habitat associated with riparian areas and shrub fields is scattered throughout the action area.

When bears emerge from their dens in the spring, their fat stores have been severely depleted; therefore, foraging to rebuild energy reserves is their primary focus. It is important that bears have adequate spring foraging opportunities close to their dens, especially when cubs have been born, to build up fat stores quickly. In their study of radio-collared female grizzly bears, Mace et al. (1999) found that the upper elevation limit observed for habitat use in spring was 4,900 feet. Waller and Mace (1997) defined the spring period as the period from den exit to July 15 based on apparent changes in food habitats and behavior. In *Response to Peer Review of the A19 and Proposed Approach to Managing Access in Grizzly Bear Habitat*, prepared by the NCDE Technical Group (*under* U.S. Forest Service cover letter, unpubl. rep. Jan. 24, 2001), the authors acknowledge that the June 30 date used in that approach was an attempt to accommodate social concerns, but they felt justified in modifying the date to June 15 for two reasons. First, the most urgent concerns related to displacement from good habitat due to snow, mortality risk during black bear season, and vulnerability during the grizzly bear breeding season were all reduced or gone by the end of June. Second, the team acknowledged that there is no dramatic shift in elevation by bears after mid-June.

In addition to foraging habitat, security cover and isolation from humans and human-associated activities are necessary habitat components for grizzly bears (Archibald et al. 1987; Mattson et al. 1987; McLellan and Shackleton 1988, 1989; Kasworm and Manley 1990; Mace et al. 1996, 1999).

Human activities can result in direct mortality of bears, as well as indirect negative effects by displacing bears to less suitable habitats (Mace and Waller 1998; McLellan et al. 1999; Benn and Herrero 2002; Wakkinen and Kasworm 2004; Schwartz et al. 2006). The most effective way to minimize the risk of adverse interactions between humans and bears is to provide spatial separation between areas of human activity and areas of bear activity. In areas where such separation is not possible, providing large areas of secure habitat that include seasonal habitats may reduce the potential for contact and minimize risk of disturbance and illegal mortality (Mace and Waller 1998). Managing public motorized access to grizzly bear habitat is one of the most common and effective ways to maintain a level of separation between grizzly bears and humans. The sections of this opinion on “risk factors” and “effects” describe in more detail the scientific evidence about grizzly bear response to roads, and the strategies used in this proposal to manage motorized access.

While security cover allows grizzly bears to avoid contact with humans, the cover is sometimes necessary for bears to avoid contact with other bears. Strict territoriality among grizzly bears is not known, and intraspecific defense behavior generally tends to be limited to defense of limited food concentrations, defense of young, and surprise encounters (U.S. Fish and Wildlife Service 1993). Adult male bears are known to kill juveniles, and adults also occasionally kill other adults. Females with cubs require spatial separation from aggressive males. This is particularly true in spring, when cubs-of-the-year are most prone to attack. Data are insufficient to fully

assess the effects of predation on younger bears by adult bears (U.S. Fish and Wildlife Service 1993), particularly when considering potential indirect effects of various human activities that may displace a subadult bear into the home range of an aggressive adult bear. Sows with cubs often select rugged and isolated habitats for this reason (Russell et al. 1979; Reynolds and Hechtel 1980; Banci 1991). Shrub and tree cover, as well as topographic landscape features, are commonly used as security from humans or other bears (McLellan and Hovey 2001; Wielgus et al. 2002), and dispersing subadult bears may be forced to choose poor home ranges that may be equally dangerous to their survival (U.S. Fish and Wildlife Service 1993). There are no broadly accepted Service or IGBC standards related to grizzly bear cover. Cover is a habitat consideration addressed through a variety of standards and guidelines based on land management objectives of the landowner and location of their lands on the landscape.

Another key habitat requirement for grizzly bears is the presence of suitable denning habitat. Den site characteristics are variable, but several researchers have described dens located at high elevations in remote areas with slopes greater than 30 degrees, soils that are deep, and aspects where snow accumulates (Pearson 1975; Servheen 1981; Zager and Jonkel 1983; Podruzny et al. 2002). Sloped sites are often selected because they facilitate easier digging and are generally stabilized by trees, boulders, or root systems of herbaceous vegetation. In addition to excavating dens, grizzly bears den in natural caves and hollows under the roots of trees. While individual den sites are rarely reported to be used for more than one winter, numerous researchers have observed that dens rarely occur singly, but are concentrated in areas that apparently possess appropriate environmental conditions (Craighead and Craighead 1972).

The literature on disturbance and impacts to grizzly bears during denning (or immediately before or after denning) suggests that the greatest risk involves females with young cubs that have recently emerged from den sites (Mace and Waller 1997; Reinhart and Tyers 1999; Graves and Reams 2001). Cubs are still vulnerable at this age, and it has often been noted that these family groups will remain near dens for some time before heading for lower-elevation areas with better forage. Bears generally appear to tolerate motorized activities occurring more than 1 kilometer (0.6 mile) from the den (Linnell et al. 2000). There is some indication that close encounters with dens can cause physiological stress (Reynolds et al. 1986) or, in some cases, den abandonment (Swenson et al. 1997). Den abandonment, in turn, increases the likelihood of cub mortality.

Habitat Linkage

An important habitat component for wildlife is the presence of habitat linkage. Servheen et al. (2001) define habitat linkages as “the area between larger blocks of habitat where animals can live at certain seasons where they can find the security they need to successfully move between these larger blocks of habitat.” The importance of maintaining habitat linkage is an issue recognized by federal, state, and county governments; conservation organizations; and many others (Servheen et al. 2001). It is an issue encompassing not only wildlife conservation but also human safety and economics, since vehicle-wildlife collisions on highways result in many human fatalities and injuries each year and cost millions of dollars in property damage (Servheen et al. 2001). The main factors generally considered to affect the quality of linkage zones are

major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas (Servheen et al. 2001 and 2003;U.S. Forest Service 2005).

Habitat linkage and connectivity are important components of grizzly bear habitat (Servheen et al. 2001, 2003; U.S. Fish and Wildlife Service 1993). Maintaining linkage and connectivity between small, isolated grizzly bear populations can benefit grizzly bears in several ways, including (1) allowing immigrant grizzlies to bolster a resident population in an area that has been affected by catastrophic events or negative environmental conditions, and (2) preserving genetic diversity by reducing negative effects from inbreeding. Task 37 in the federal *Grizzly Bear Recovery Plan* (U.S. Fish and Service 1993) called for the evaluation of linkage potential between grizzly bear recovery zones.

Grizzly Bear Dispersal, Movements, and Genetic Health

Because grizzly bears live at relatively low population densities and are vulnerable to excessive human-caused mortality, human-caused fragmentation of historically contiguous populations into isolated "remnant" populations is a management reality on the current ecological landscape (Forman and Alexander 1996; Proctor et al. in review; Lindenmayer and Fischer 2006). It is a widely accepted tenet in conservation biology that extinction risk of isolated populations is reduced even through minimal levels of connectivity (Soule 1987). At greatest risk of extinction are small isolated populations with less than 100 individuals. Such populations are more susceptible to extinction through demographic processes such as human-caused mortality, natural mortality, and lower population growth rates as well as environmental processes such as poor food years, climate change, and habitat loss. While the Selkirk and Cabinet-Yaak grizzly bear populations (at issue in this biological opinion) contain less than 100 individuals each, they are not entirely isolated from Canadian populations. Small populations benefit greatly from both demographic rescue (i.e., the immigration of female bears) and to a lesser degree genetic rescue (i.e., immigration of male bears). Although reconnection of these isolated populations is challenging (Forman and Alexander 1996; Lindenmayer and Fischer 2006), metapopulation theory directs that connectivity is the best long-term conservation practice to increase the resiliency, redundancy, representation, and overall probability of persistence of remaining grizzly bear populations in the lower 48 States (Boyce 2000).

Proctor et al. (in review) compiled and analyzed all known genetic and movement data for grizzly bears in 10 different study areas. They assessed the current state of genetic fragmentation within and between these study areas and used genetic assignment testing and movement data from radio-collared animals to compile what is known about current levels of male and female movement.

Samples from coastal British Columbia and the Selkirk Mountains south of Canadian Highways 3 and 3A (i.e., the SE) have unique genetic material that is dissimilar to other grizzly bear populations in southern Canada and the northern U.S. In the Selkirks, this difference is most likely due to genetic drift acting on a small isolated population over several generations because of anthropogenic pressures (Proctor et al. in review).

Although there are differences in heterozygosity values among study areas and recovery zones, there have been no detectable consequences on grizzly bear morphology, physiology, ecology, or biology related to these differences in genetic diversity as evidenced by normal litter size, little evidence of disease, an equal sex ratio, and physical characteristics such as body size and weight (Wakkinen and Kasworm 2004; Schwartz et al. 2006a; Kasworm et al. 2008; Mace and Chilton 2008).

These genetic differences are not the result of natural selection in varying environments or indicative of historical conditions. Instead, they are artifacts of human pressures (Proctor et al. in review). Grizzly bears face high mortality risk when moving between secure blocks of habitat. This mortality risk and very low population sizes resulting from past range contraction and mortality have resulted in genetic fragmentation. Each of these fragmented populations may possess genetic material missing from other populations. Maintenance of this genetic material is important to the long-term ability of this region's grizzly bears to respond to environmental changes.

Because grizzly bears have low reproductive rates (Nowak and Paradiso 1983; Schwartz et al. 2003b), long generational times (i.e., 10 years), and are slow to disperse across landscapes (McLellan and Hovey 2001), there can be a lag time between fragmentation and resulting changes in genetic diversity. The genetic data collected by Proctor et al. (in review) reflect fragmentation occurring on the landscape in the recent past (i.e., last 30-60 years) and <u>may not reflect current, improved levels of connectivity and recent movement of grizzly bears between areas</u>. In other words, current grizzly bear populations may not be as isolated as the genetic data of this study suggest. Therefore, it is useful to supplement these genetic data with movement data to get a complete picture of current population connectivity.

Proctor et al. (in review) examined grizzly bear movements between ecosystems that displayed varying levels of genetic separation. These movement data were collected from 1985-2007 and represent a more recent picture of fragmentation than genetic data.

In general, Proctor et al. (in review) found males move more frequently and over longer distances than females. This result is expected based on what we know about female home range size and the dispersal process. Females usually establish smaller home ranges than males that overlap with their mother's (Waser and Jones 1983; LeFranc et al. 1987; Schwartz et al.2003b). In doing so, they generally disperse over much shorter distances than male grizzly bears (McLellan and Hovey 2001; Proctor et al. 2004a). The majority of migrants that moved from one study area to another were males (26) but a few females (4) were also observed moving between genetically fragmented populations (Proctor et al. in review).

Connectivity must be examined in a genetic (requires males only) and demographic (requires females) framework. While male movements can enhance genetic diversity and reduce genetic fragmentation (Miller and Waits 2003; Proctor et al. 2005), female movements are necessary to enhance a small population's growth rate (Proctor et al. in review). This concept is relevant to grizzly bear recovery in the NCE, SE, CYE, and Bitterroot Ecosystem recovery zones, all of

which contain small populations (if any) that are demographically and genetically isolated to varying degrees.

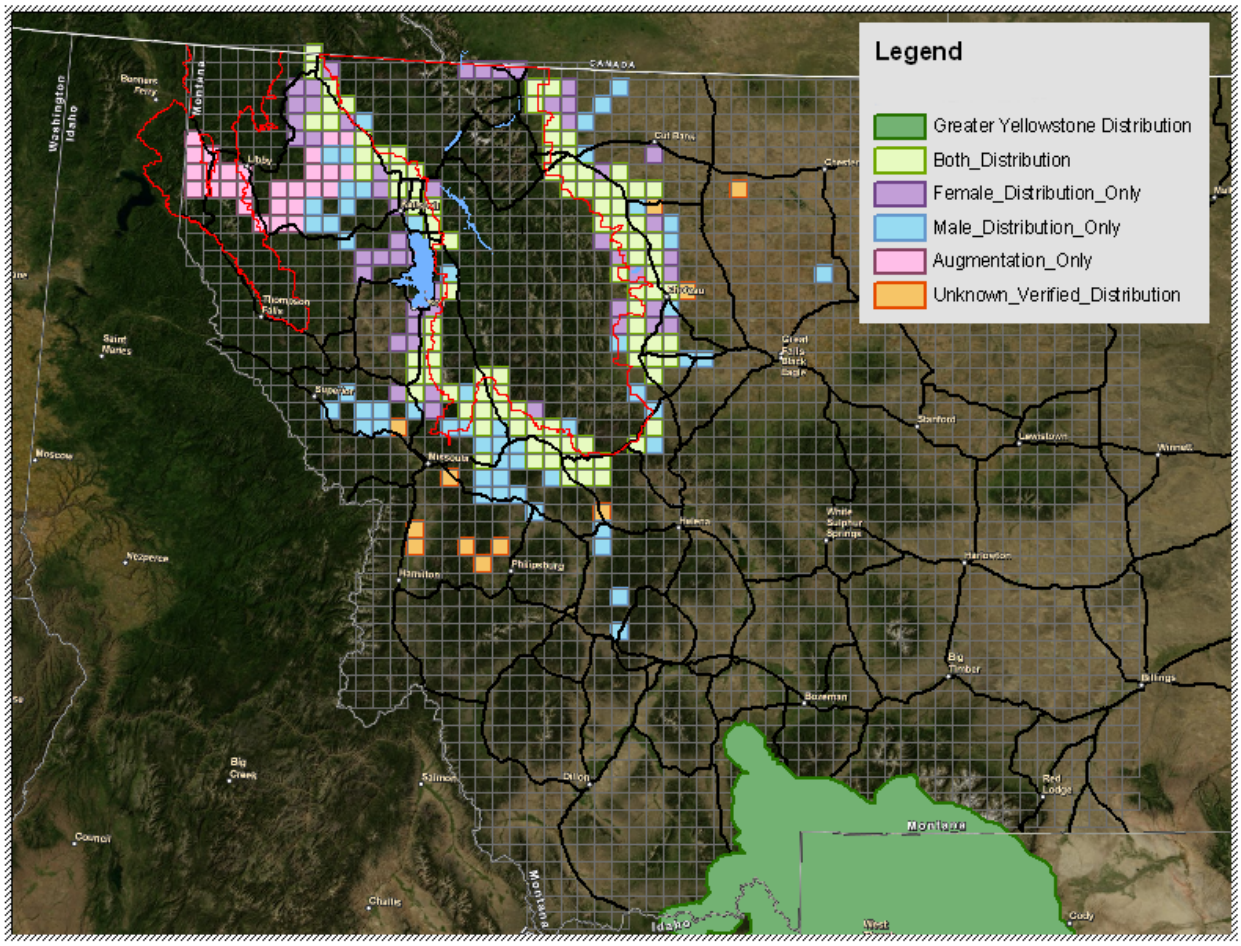
Proctor et al. (in review) documented increasing genetic and demographic fragmentation across Canada Highway 3. If allowed to continue, this fragmentation could lead to a loss of connectivity between U.S. and Canadian grizzlies. Canada Highway 3 is at least a partial barrier to population connectivity by minimizing female crossings (Proctor et al. 2005; Proctor et al. in review). Maintaining and increasing movements by females (i.e., demographic rescue) from Canadian populations into the small populations (NCE, SE, and CYE) is critical to the long-term conservation of these populations. Recovery could be accomplished via natural movements or translocating animals.

Another aspect of connectivity Proctor et al. (in review) examined was known habitat use by grizzly bears in intervening habitats between Service-identified recovery zones. This habitat use is relevant to understanding how and where grizzly bears in different ecosystems may be linked in the near future. Proctor et al. (in review) found 4 males and 1 female using habitat between the Selkirk and Purcell Mountains, although there was no evidence indicating any migration between these 2 mountain ranges.

Mace et al. (2011, unpubl rept. {figure below}) documented the distribution of grizzly bears in and adjacent to the NCDE recovery zone based on a compilation of telemetry data, mortality data, and DNA detections and found that both male and female grizzly bears are occupying habitat between the NCDE and CYE.

We have documented one female grizzly bear with a cub that regularly uses habitat between the NCDE and CYE. She and her offspring spend most of their summer in the Salish Mountains of Montana less than 2 miles east of the edge of the CYE while denning within the boundaries of the NCDE recovery zone (Kasworm et al. 2008). In fact, there have been several different grizzly bears with cubs documented using habitat west of Highway 93, since 2002 (U.S. Fish and Wildlife Service, unpubl. data 2011).

Figure A1. Distribution of grizzly bears in and adjacent to the NCDE federal recovery zone based on telemetry data, mortality data, and DNA detections in 2004 (from Kendall et al. 2009 *in* Mace and Roberts 2011*).



Occupancy was based on presence within 10 km2 grid cells. Note: 2010 telemetry data from Rocky Mountain Front was not available at time of printing.

Currently, it is not possible to tell if movements we are observing reflect an increase in bear movements or an increase in detection effort and technology (e.g., radio-transmitter collars; genetic techniques) (Proctor et al. in review). These promising detections of grizzly bear movements should be tempered by the idea that detected movement does not mean migrants are breeding successfully. If there is no successful reproduction, then there is no genetic or demographic rescue occurring. There seems to be high mortality risk associated with migrant bears (Proctor 2003, Proctor et al. in review). However, these data are helpful when considering how to most effectively manage and conserve the remaining grizzly bear populations in the lower 48 States. For example, these data emphasize the importance of maintaining demographic connectivity with Canadian populations and the small populations of the North Cascades ecosystem, SE, and CYE, while highlighting the importance of recovering these small populations so that they can provide genetic and demographic rescue for the Bitterroot

Ecosystem. Of relevance, the NCDE appears to be well connected to Canadian populations genetically and its large population size means female movements from Canada into the NCDE are not absolutely required for demographic health to be maintained, although such female movements are beneficial. Similarly, the GYA has a large enough population size that demographic rescue is not required. Instead, 1-2 male migrants every 10 years (i.e., genetic rescue) are adequate to maintain current levels of genetic diversity in the GYA (Miller and Waits 2003).

Range-wide Status

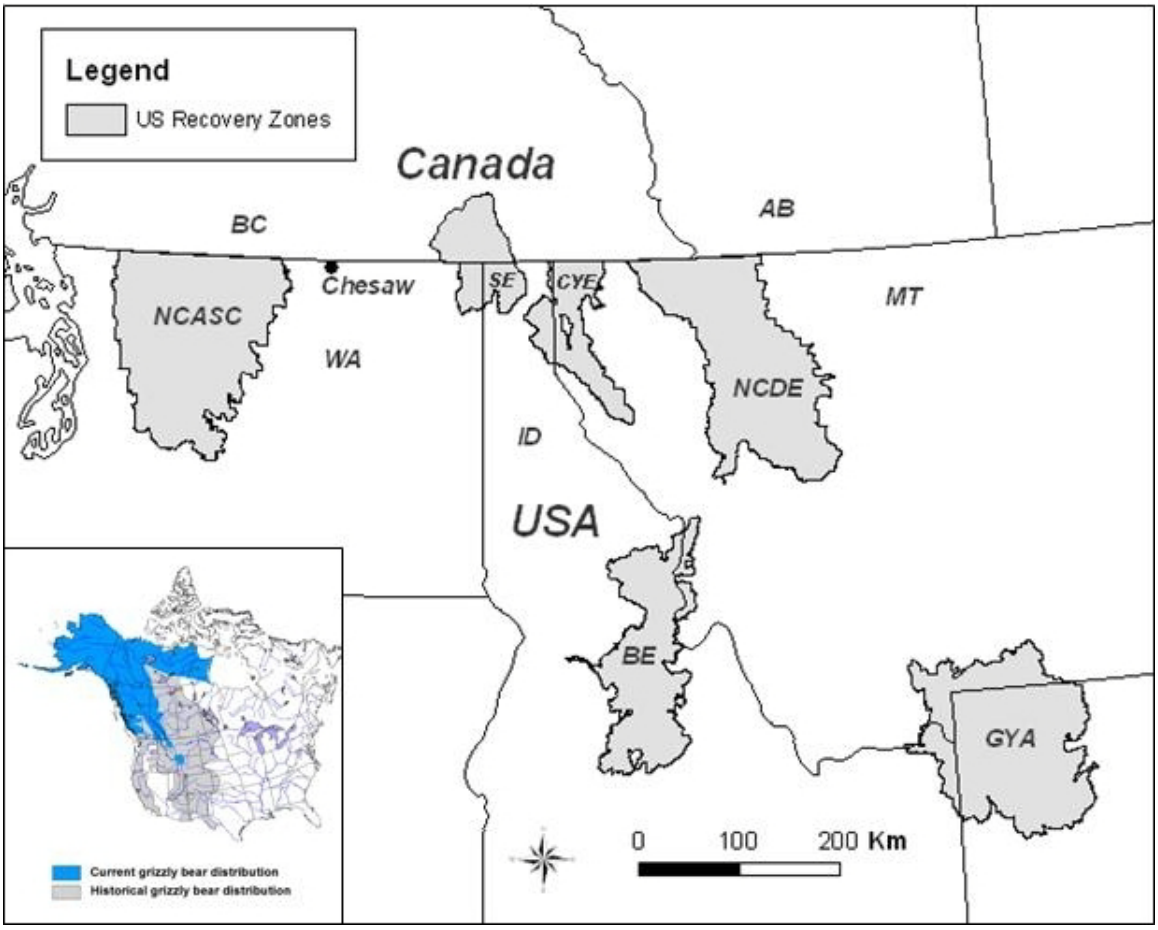
When grizzly bears in the lower 48 States were listed under the ESA in 1975, the vast reduction in range, increase in trail and road construction, increase in recreation, livestock use of National Forest lands, unsustainable human-caused mortality, lack of data regarding populations, and isolation were identified as factors affecting their conservation status (40 FR 31734, July 28, 1975). To date, all of these threats have been addressed to varying degrees in different areas.

New information regarding grizzly bear biology, current status, and threats has become available over the years since listing. This research and information has been valuable in addressing the impacts and management of roads, trails and recreation and livestock management. It has also indicated the need for public information and assistance programs, along with attractant storage, to limit human-caused mortality of grizzly bears. We have population data for the YGBE, NCDE, CYE and SE. Proctor et al. (in review) compiled and analyzed all known genetic and movement data for grizzly bears in southern Canada and the NCDE, CYE, SE, NCASC, and GYA populations. As discussed earlier, genetic data indicate population fragmentation in the recent past (Proctor et al. in review). Movement data demonstrated that males move more frequently and over longer distances than females (Proctor et al. in review).

The recovery plan prompted the identification of six grizzly bear recovery zones (Figure A1), defined as areas within which the population and habitat criteria for achievement of recovery will be measured (U.S. Fish and Wildlife Service 1993). Although there are six grizzly bear recovery zones, only five are occupied.

The current range and distribution of grizzly bears in the lower 48 States is fluid as dispersal is occurring and the specific distribution has not been quantified systematically across all ecosystems. Grizzly bear conflicts and mortalities have been documented in areas far outside of recovery zone boundaries.

Figure A2. Current grizzly bear recovery ecosystems (GYA = Greater Yellowstone Area; NCDE = Northern Continental Divide Ecosystem; CYE = Cabinet-Yaak Ecosystem; SE = Selkirk Ecosystem; BE = Bitterroot Ecosystem; NCASC = North Cascades Ecosystem. Inset map illustrates historic (grey shade) and current grizzly bear distribution (dark blue). Adapted from Proctor et al. (in review).



There are approximately 1,500 grizzly bears in the lower 48 States: 765 in the NCDE; 600 in the GYA; 45 in the CYE; 30 in the SE; and 10-20 in the North Cascades Ecosystem. The population in the GYA is increasing at 4-7 percent annually. The population in the NCDE is increasing by approximately 3 percent annually. The best available data indicate the CYE population is declining due to unsustainable levels of mortality. The SE grizzly bear population is slowly increasing at a rate of 1.9 percent annually (Wakkinen and Kasworm 2004). Subadult and adult female survival has the largest influence on population trend in all ecosystems (Mace and Waller 1998; Wakkinen and Kasworm 2004). Recent levels of human-caused mortality in the CYE do not appear to be sustainable.

Two of these recovery zones, the SE and the CYE, encompass the action area considered in this biological opinion, and so are discussed in more detail. The North Cascades, NCDE, Greater

Yellowstone (GYA), and Bitterroot Ecosystems' recovery zones are not affected by the proposed Access Amendment.

Grizzlies occur both within the formally designated recovery zones and in some adjacent habitat (Wittinger et al. 2002; U.S. Forest Service 2009c).

Following is a description of the six recovery zones and the status of the grizzly bear in each.

1. The GYA in northwest Wyoming, eastern Idaho, and southwest Montana (9,200 sq mi) has nearly 600 bears (Haroldson 2009). It is approximately 240 miles from the Bitterroot Ecosystem and at least 75 miles from the grizzly bear population in the NCDE. In 2008, the total population size for the GYA population was estimated at 596, with a 95 percent confidence interval between 535 and 656 in 2008 (Haroldson 2009). The GYA population is increasing in size approximately 4-7 percent annually (Haroldson 2009; Harris et al. 2006). For more details regarding GYA demographic features, please refer to the Yellowstone Final Rule (72 FR 14866, March 29, 2007), the latest Interagency Grizzly Bear Study Team Annual Reports (online at http://nrmsc.usgs.gov/products/IGBST), and Schwartz et al. (2006) (Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem - Wildlife Monographs).

2. The NCDE of north central Montana (9,600 square miles) has 765 bears (Kendall et al. 2009). It is approximately 45 miles from the BE and 15 miles from the CYE.

   The USGS conducted an extensive DNA-based study to estimate the grizzly bear population size in 7.8 million acres of occupied grizzly bear range in and around the NCDE recovery zone. The Northern Divide Grizzly Bear Project involved genetic analysis of noninvasive hair sampling collected during 2004. A final total grizzly bear population estimate of 765 grizzly bears was reported based on the 563 grizzly bears detected in 2004 (USGS 2008). Both the raw count of 563 grizzly bears and a total population estimate of 765 for 2004 illustrate the conservative nature of the recovery plan minimum population estimate of 304 grizzly bears in 2004. The DNA-based estimate is scientifically robust, and is more than two times the recovery plan estimate.

   In 2004, Montana Fish, Wildlife and Parks initiated a NCDE grizzly bear trend monitoring project (Mace and Chilton 2009). The purpose of this program is to estimate population trend by monitoring the survival and productive rates of radio-instrumented female grizzly bears. Thus far, a total of 104 individual females have been captured and monitored (Mace and Roberts 2011). Results reveal an annual growth of about 3 percent, indicative of an increasing grizzly bear population in the NCDE (Ibid.).

   Human-caused grizzly bear mortality levels were unusually high in 2004 (U.S Fish and Wildlife Service 2005). Many of the unprecedented number of conflicts in 2004 can be attributed to a dramatic huckleberry crop failure, and resulting conflicts arising from attractants on private lands luring bears onto private property. Much of the recent grizzly

bear mortality continues to be associated with conflicts arising from attractants on private lands. Notable is that annual human-caused grizzly bear mortality levels have decreased since 2004. The number of human-caused female mortalities was less than half of 2004 levels each year: 10, 4, 7, 7, 7, and 5 in 2005, 2006, 2007, 2008, 2009, and 2010, respectively (U.S. Fish and Wildlife Service 2010a).

3. The North Cascades Ecosystem of north central Washington (9,500 square miles) is estimated to contain less than 20 bears (Almack et al. 1993). The nearest population of grizzly bears is immediately north in Canada with an estimated 23 individuals but populations to the east and west of the Cascades in Canada are considered extirpated (North Cascades Grizzly Bear Recovery Team 2004).

4. The Bitterroot Ecosystem of east-central Idaho and western Montana (5,600 square miles) does not contain a grizzly bear population at this time (U.S. Fish and Wildlife Service 1996; 2000; 65 FR 69624, November 17, 2000).

The remaining two recovery zones - the SE and the CYE - are the focus of the proposed Access Amendment, subject to this consultation. Therefore, considerable more information is provided below for these recovery zones that for the previous four. First is a synopsis for each individual recovery zone {(5) and (6) below}, followed by a summary of how LRMPs are affecting the status of both the SE and the CYE grizzly bear recovery zones.

5. The SE is located primarily in northern Idaho but includes portions of Washington and Canada also. It encompasses (over 2,200 square miles) of the Selkirk Mountains of northeastern Washington, northern Idaho, and southern British Columbia. Approximately 47 percent of the recovery zone is in British Columbia with the remainder in the U.S. The 1993 Recovery Plan defined a portion of the SE within Canada so that it was at least 2,000 square miles in size. This size would promote the Recovery Plan's goal of establishing a population of 100 grizzly bears in the SE (U.S. Fish and Wildlife Service 1993) based on the known grizzly bear density in the GYA at the time of 1 bear per 20 square miles (Blanchard and Knight 1980). In Canada, land ownership is roughly 65 percent Crown (public) land and 35 percent private. In the U.S. portion of the SE, land ownership is approximately 80 percent Federal, 15 percent State, and 5 percent private lands. Within the SE, 3 percent (39,976 acres) is designated Wilderness Area.

Proctor et al. (in review) compiled data from multiple sources and conducted DNA-based population surveys (Proctor et al. 2007) to estimate a population size of 88 grizzly bears in the SE, with 30 in the U.S. and 58 in Canada (Proctor et al. in review). The estimate for the U.S. portion of the SE is based on expert opinion (Wakkinen 2010a). The IDFG is currently working on a population estimate for the U.S. portion of the SE that will present a more scientifically rigorous estimate. In 2004, it was estimated that the population of grizzly bears in the SE was slowly increasing at a rate of 1.9 percent annually (95 percent confidence interval = 0.922-1.098) (Table A2) (Wakkinen and

Kasworm 2004). As in the CYE, Wakkinen and Kasworm (2004) found that subadult female survival had the largest influence on overall population trend.

Table A2. Estimated grizzly bear population size and population growth rate by recovery zone.

Recovery Zone	Estimated Population Size	Trend (% change annually)
Greater Yellowstone Area	596[a]	+ 4-7 % [b]
Northern Continental Divide	765[c]	Unknown
Cabinet-Yaak	>/=42[d]	– 3.8 % [e]
Selkirk	80[f]	+ 1.9 % [g]
North Cascades	< 20	Unknown
Bitterroot	0	n/a

[a] Interagency Grizzly Bear Study Team 2009 Annual Report; [b] Harris et al. 2006; [c] Kendall et al. 2009; [d]Kasworm et al. 2010; [e] Kasworm unpubl. rept. 2010; [f] Proctor et al. in review; Wakkinen 2010; [g] Wakkinen and Kasworm 2004

The IPNF portion of the SE recovery zone is affected by the Access Amendment (under consultation in this biological opinion) and is described in more detail in the "Environmental Baseline" section. However, several portions of the SE are not affected by the Access Amendment, are not in the "action area," and thus not discussed in the environmental baseline section. These are:

- The LeClerc BMU. The majority of this BMU is situated on the Colville National Forest, which is not one of the Forests proposing this amendment. Stimson Lumber Company manages approximately 21,000 acres of the land within the LeClerc BMU and has entered into a Conservation Agreement with Colville National Forest and the Service to minimize adverse effects to grizzly bears (U.S. Fish and Wildlife Service 2001b). The Service's biological opinion (U.S. Fish and Wildlife Service 2001b) on that Conservation Agreement included an incidental take statement with terms and conditions providing for no net decrease in core area habitat or an increase in TMRD on affected Forest Service lands.

- The Idaho Department of Lands (IDL) BMU. The 160,000 square mile IDL BMU is situated east of Priest Lake and is under state jurisdiction. IDL received $563,000 from the Service in 2003 to develop a Habitat Conservation Plan (HCP) for this area (U.S. Fish and Wildlife Service 2003b). This HCP would take into consideration all threatened and endangered species that may occur in the area (ibid). This effort is currently underway (U.S. Fish and Wildlife Service 2008), with Idaho Fish and Game assisting IDL in efforts to quantify existing road status in 2010 (W. Wakkinen pers. comm. 2010a).

- British Columbia, Canada portions of the SE Recovery Zone.

There are 10 Bear Management Units (BMUs) in the SE recovery zone. Eight BMUs are in the action area of this consultation. As of 2009, 2 do not meet the proposed TMRD standards; and 3 do not meet the proposed standards for secure core habitat (BA 2010; BA supplement 2011; U.S. Forest Service 2009d). Five of the BMUs are in compliance with all 3 proposed standards. There is incomplete road and habitat security data available for the BMU outside of the action area that is administered by the IDL, and the proposed Access Amendment does not apply to this BMU.

According to the Forest Service (FSEIS), the changes in Open Motorized Routes from 2002 to 2009 have resulted in a decrease of 29 miles (533 - 504 = 29), which is a decrease of approximately 5 percent. The changes in Total Motorized Routes have resulted in a decrease of 16 miles (from 866 to 850 = 16), which is a decrease of approximately 2 percent.

The Service is in the process of updating the demographic recovery criteria in the 1993 recovery plan as there are new science and techniques available. This task has been completed for the GYA grizzly bear population (U.S. Fish and Wildlife Service 2007a). Following is 1993 demographic criteria and the mortality data in recent years for the SE.

The following demographic recovery criteria were developed to address overutilization and human-caused mortality (listing Factors B and C) within each recovery zone and a 10 mile surrounding buffer by ensuring a sufficient population size and distribution. These demographic recovery criteria include measures for population size, distribution, and sustainable mortality:

For the SE, the 1993 demographic criteria are: (1) six females with cubs over a running 6-year average both inside the recovery zone and within a 10 mile area immediately surrounding the recovery zone, *including* Canada; (2) 7 of 10 BMUs on the U.S. side occupied by females with young from a running 6-year sum of verified sightings and evidence; and (3) known human-caused mortality not to exceed 4 percent of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30 percent of this 4 percent mortality limit shall be females. These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. Presently, grizzly bear numbers are so small in this ecosystem that the mortality goal is zero human-caused mortality.

In the SE, none of the 1993 demographic recovery criteria have been met. Wakkinen et al. (2009), noted: "*that the ability to monitor the population has declined due to funding limitations and the reduction in trapping and radio collaring activities*" in the recovery area. The population goal of 6 females with cubs has not been met. In 2008, the 6-year running average was 0.5 females with cubs (Wakkinen et al. 2009). In 2009 the 6-year running average dropped to 0.3 females with cubs (Wakkinen 2010a) but there were no observations of family groups in the BMUs in 2009 due in part to the lack of radio-collared grizzly bears in the U.S. portion of the recovery zone. The distribution criterion has not been met with only 4 of 10 BMUs occupied by females with young (Wakkinen et

al. 2009). Demographic criteria for zero mortality have also not been met. The running 6-year average of total human caused mortality was 1.8 animals/year including 0.7 females each year (Wakkinen et al. 2009; Wakkinen 2010, BA 2010, 2011 supplement). The Service is in the process of updating the 1993 recovery plan as there are new science and techniques available.

Also in the SE recovery zone:

- On the Colville National Forest, there have been 23 miles of road constructed in recovery habitat since 1975 and 150 miles of road closed since 1975. In addition, any new roads constructed in recovery habitat on the Colville NF are closed to non-administrative motorized use. Both the number of acres affected and the volume of timber harvested have decreased since 1987 (U.S. Forest Service 2009d).

- The Colville National Forest published its first official Motor Vehicle Use Map in 2008. This is the culmination of a Travel Planning process and it means that motorized travel on the forest is now legally restricted to designated roads and trails identified on the Use Map. Off-road travel is prohibited except to access a campsite with 300 feet of a designated route. There are few open roads identified on the Use Map in recovery habitat and no motorized trails or areas identified in recovery habitat. The Colville National Forest has been educating the public about using the Motor Vehicle Use Map, and enforcing the travel restrictions on the map. Use of roads in recovery habitat has declined as a result. The IPNF has also completed a Travel Plan.

- Within the entire SE recovery zone, there are 14 miles of groomed snowmobile trails and 11 miles of ungroomed routes in modeled grizzly bear denning habitat (U.S. Forest Service FSEIS). Off-route snowmobile use occurs on approximately 12 square miles within the recovery zone. Both on and off-route snowmobile travel combined occurs on about 6 percent of modeled denning habitat within the SE but use is not permitted after April 1 on a portion of these affected acres. Snowmobile use of recovery habitat on the Colville National Forest portion of the SE is relatively light and there is very little overlap with suitable grizzly bear denning habitat due to restrictions, topography, and vegetation. Also, there is an existing protective closure for woodland caribou (court order CV-05-0248-RHW) limiting motorized over-the-snow vehicle access (which coincides with the Selkirk grizzly bear ecosystem), until a Winter Travel Plan is completed.

- There is one Conservation agreement between the Service, the Colville National Forest, and Stimson Lumber Company regarding forest management in the LeClerc BMU, where there is checkerboard land ownership. This Conservation Agreement requires Stimson and the Colville to leave hiding cover within created openings, along open roads, and within riparian habitats. Stimson is also required to log during the winter in some areas to reduce disturbance and report logging

activities and road entries to the Colville National Forest annually. This Conservation Agreement is useful in the LeClerc BMU because Stimson is not required to conserve secure habitat or manage for TMRD or OMRD.

- Because the SE relies on connectivity with Canada for its long-term conservation, the cumulative effects of timber harvest, mining, recreation, and road building in British Columbia have the potential to affect the SE grizzly bear population. In general, there are few specific habitat management guidelines for grizzly bears in Canada. There are no designated BMUs. There is no measure of road density, road management, or secure habitat, etc. There is one cattle grazing allotment in the Boundary Lake area, south of Highway 3 within the SE recovery zone. There are active mining claims in the area but no large-scale mining operations. While snowmobile use in increasing, there are currently some Court-ordered restrictions on snowmobile use in the U.S. portion to protect mountain caribou habitat.

- The Nature Conservancy of Canada recently purchased 213 square miles of private land within the SE recovery zone in Canada. The location of these lands directly connects to an existing network of parks and wildlife management areas. Although many traditional uses will continue (e.g., timber harvest, snowmobile use), it will help create a contiguous area of more than 391 square miles, enough for wide-ranging animals like mountain caribou and grizzly bear to maintain connectivity with U.S. populations of these species.

6. The CYE Recovery Zone is approximately 2,609 square miles in size and is located primarily in northwestern Montana with small portions in northern Idaho. Land ownership in the CYE is approximately 90 percent Federal, 5 percent State, and 5 percent private lands. The Kootenai National Forest manages approximately 72 percent (see KNF 2009, p. 8) of lands within the CYE recovery zone, with the Idaho Panhandle and Lolo National Forests administering the remaining Federal lands within the recovery zone. All of the national forest lands within the Cabinet-Yaak recovery zone are part of the "action area" for this consultation and are described in more detail in the "Environmental Baseline" section. Major private land owners in the recovery zone include Plum Creek and Stimson Timber Companies.

   The relative distribution of grizzly bears across this ownership pattern is unknown, but is believed to be proportionate to land ownership (i.e., approximately 90 percent of the grizzly bear population lives on the 90 percent of public land within this recovery zone). In Canada, the portion of British Columbia directly north of the Cabinet-Yaak recovery zone is largely Crown land (public) with the exception of the Moyie and Kootenay River valleys. Within the CYE recovery zone, 5.6 percent (94,272 acres) is designated Wilderness Area.

   The CYE Recovery Zone was estimated to contain at least 42 grizzly bears during 2004-2009 (Kasworm et al. 2010). The Cabinet Mountains lie south of the Yaak River drainage and contain about 60 percent of the recovery zone. During 2004-2009, there

were approximately 16 individuals in the Cabinet Mountains and 26 individuals in the Yaak portion of the recovery zone (Kasworm et al. 2010). This population estimate of 42 grizzly bears is similar to our 1999 estimate of 30-40 in the CYE (64 FR 26725, May 17, 1999).

High rates of known mortality from 1999 to 2009 (3.36 mortalities per year) suggest the population has most likely been decreasing (Kasworm et al. 2010; Wakkinen pers. comm. January 2011 *in* 2011 BA supplement). However, improved subadult female and adult female survivorship has lessened the rate of decline since 2009.

Kasworm et al. (2010, pg. 29) reported the most recent CYE grizzly bear population trend estimate: Approximately 90 percent of the data used in population trend calculations came from bears monitored in the Yaak River portion of this population and the result is most indicative of that portion of the recovery area. The estimated finite rate of increase (λ) for 1983-2009 was 0.963 (95 percent C.I. 0.855-1.052). Subadult female survival and adult female survival accounted for most of the uncertainty in λ, with reproductive rate, yearling survival, cub survival, and age at first parturition contributing much smaller amounts. The sample sizes available to Kasworm et al. to calculate population trend were small and small samples sizes yield wide confidence intervals around any calculated trend estimate (λ). The probability that the population was declining was 78 percent.

Beginning in 1998, sample size allowed calculation of point estimates for cumulative annual rate of change. For the period from 1983-1998, calculated finite rates of increase ($\lambda = 1.067$) suggested an increasing population (Wakkinen and Kasworm 2004). Survival rates for adult and subadult females were 0.948 and 0.901 respectively, at that time.

Since 1999, there appears to have been an increase in the numbers of bears killed on private lands in the CYE recovery area. Since 1999, of total human-caused mortalities of collared grizzly bears in the CYE, human-caused mortality on private lands in the U.S. was 23 percent of trend mortality. Human-caused mortality on U.S. public lands was 14 percent of trend mortality. Human-caused mortality in British Columbia was 10 percent of trend mortality (see Kasworm, unpublished, below in *Detailed Analysis of Grizzly Bear Mortality in the CYE*).

In 2006, adult and subadult female survival rates declined to 0.926 and 0.740 respectively. The human-caused mortality in the U.S. and in British Columbia (detailed above) accounted for 47 percent of this decline and appears to be largely responsible for the decline in the rate of increase.

However, during 2009, adult female survival and subadult female survival had increased to 0.933 and 0.781 respectively and resulted in an improving population trend estimate since 2006. Improving survival by reducing human-caused mortality is crucial for recovery of this population (Proctor et al 2004).

Following are 1993 demographic criteria and the mortality data in recent years for the CYE (which will be updated with new science and techniques). The 1993 CYE demographic criteria are: (1) six females with cubs over a running 6-year average both inside the recovery zone and within a 10 mile area immediately surrounding the recovery zone, excluding Canada; (2) 18 of 22 BMUs occupied by females with young from a running 6-year sum of verified sightings and evidence; and (3) known human-caused mortality not to exceed 4 percent of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 1.2 percent of total human-caused mortality shall be females. These mortality limits cannot be exceeded during any two consecutive years for recovery to be achieved. Presently, grizzly bear numbers are low in this ecosystem therefore the goal for human-caused mortality is zero.

In the CYE, none of the 1993 demographic recovery criteria have been met (Kasworm et al. 2010). The population goal of 6 females with cubs has not been met. The 6-year running average was 2.0 females with cubs. The distribution criterion has not been met with only 11 of 22 BMUs occupied by females with young. Demographic criteria for zero mortality have also not been met. The running 6-year average (2004-09) of total human caused mortality was 1.2 animals/year including 0.7 females each year.

Also in the CYE Recovery Zone:

- In 2005, the MDFWP acquired almost 2 square miles in the Bull River Valley between the East and West Cabinet Mountains. A conservation easement on an adjacent one square mile was accepted from the Avista Company. The area, now known as the Bull River Wildlife Management Area, provides linkage of public land across the river valley and will have value for a number of species including bull trout, westslope cutthroat trout, grizzly bear, lynx, and bald eagle.

- From 1990-94 four female grizzly bears were captured in the Flathead River Valley of British Columbia and released in the Cabinet Mountains to augment the existing population. Twenty-two different grizzly bears were captured during 840 trap-nights, to obtain the 4 subadult females transplanted. One of the transplanted bears and her cub died of unknown causes a year after release (Kasworm et al. 1998). The remaining three bears were monitored until their collars fell off. The program was designed to determine if transplanted bears would remain in the target area and ultimately contribute to the population through reproduction. Three of four transplanted bears remained within the target area for more than one year. Though one of the transplanted bears produced a cub, the animal had likely bred prior to translocation and did not satisfy the criteria for reproduction with native males.

  In 2005, the MFWP began augmenting the grizzly bears in the Cabinet Mountains. In 2005 an adult female grizzly bear was captured in the North Fork of the Flathead River drainage by MFWP personnel and relocated to the Cabinet

Mountains. In 2006 a subadult female was captured in the South Fork of the Flathead River drainage and released in the Cabinet Mountains. No bears were transplanted in 2007 as no suitable females were captured. Two female grizzly bears were released during 2008. The first (4 year-old) came from the upper Stillwater drainage of the Whitefish Range and the second (3 year-old) came from Swan River drainage. In October 2008 both of these bears were killed. In September 2009 an adult female from the North Fork of the Flathead River drainage was released into the Cabinet Mountains. In July 2010 two subadult bears, a male and a female, were transplanted from the North Fork to the Cabinet Mountains. In 2011, an adult female and two males were moved into the Cabinet Mountains from the NCDE (Kasworm et al., 2011 in review).

- Because the CYE relies on connectivity with Canada for its long-term conservation, the cumulative effects of timber harvest, mining, recreation, and road building in British Columbia have the potential to affect the CYE grizzly bear population. In 1995, the British Columbia provincial government developed a grizzly bear conservation strategy (British Columbia Ministry of Environment, Lands, and Parks 1995). A major goal of the British Columbia Grizzly Bear Conservation Strategy is to ensure effective, enhanced protection and management of habitat through land use planning processes, new protected areas, and the Forest Practices Code. Many of these processes are ongoing, and have not had the opportunity to achieve the stated goals of grizzly bear habitat protection. Currently there is little access management occurring on lands being used for timber production directly north of the International border in the Yaak and Moyie River drainages. However, Gilnockie Provincial Park was established in 1995 just north of the international border in the upper Yaak River drainage. The 11 square mile park is managed similarly to United States wilderness areas with little road access.

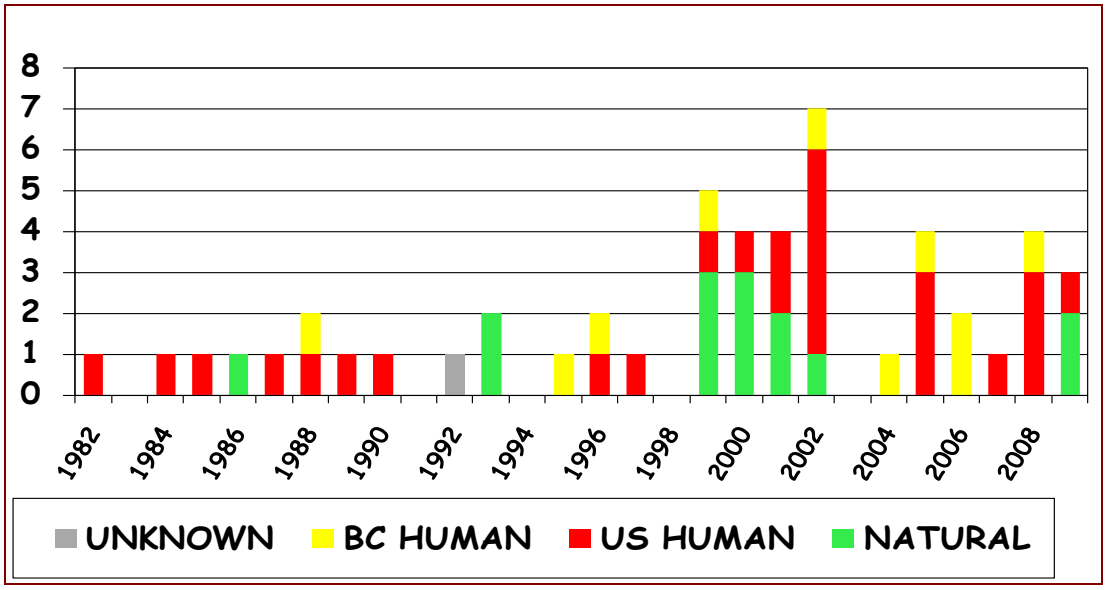
Detailed Analysis of Grizzly Bear Mortality in the CYE

In 2010, Wayne Kasworm, a Service grizzly bear researcher, prepared an unpublished synopsis regarding factors affecting the CYE grizzly bear population:

In two 2004 peer-reviewed journal papers we analyzed and described the needs for recovery in the Cabinet-Yaak recovery area (Proctor et al 2004, Wakkinen and Kasworm 2004). The three things directly related to grizzly bear population that we determined need to be done to achieve recovery were: 1) limit mortality (particularly females), 2) augment the Cabinet Mountains population with young female bears (but may now need to consider males for genetic purposes), and 3) enhance or maintain linkage areas for bears to move naturally between the Yaak River drainage and the Cabinet Mountains and between recovery areas (this would eliminate the need for augmentation in the longer term).

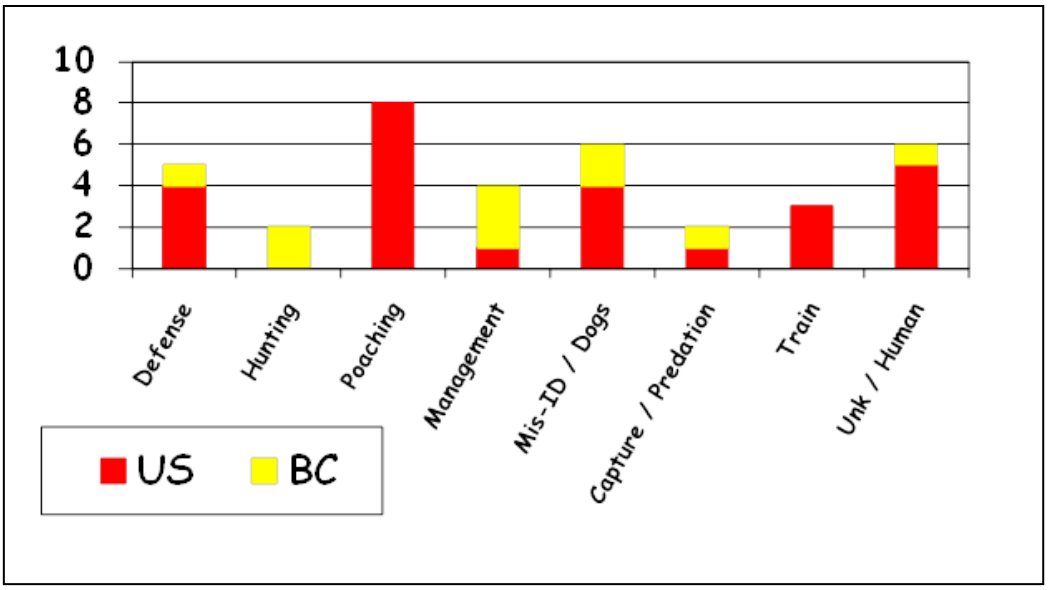
Known human-caused mortality in the CYE averaged about one animal per year from 1982-1998 (Figure A3). During 1999-2002, known mortality jumped substantially within both natural and human causes. Human-caused mortality increased to an average of five animals per year.

Figure A3. Known grizzly bear mortality in the CYE from 1982-2009.



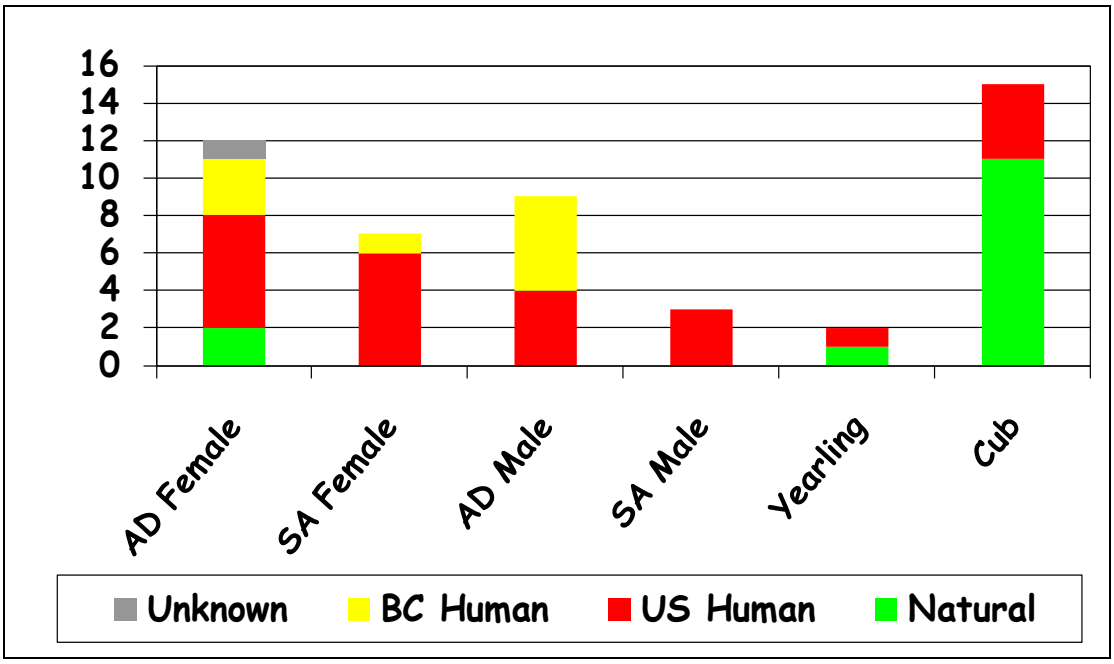
Causes of human related grizzly bear mortality are quite varied (Fig. A4). They include defense of life, grizzly bear hunting in British Columbia north of the recovery zone (though there have been hunting regulation changes in BC to reduce this), poaching, management removals, mistaken ID by hunters, capture and associated predation, train collision, and unknown but human-caused mortality. This last category represent bears that are found dead with a bullet, but exact cause is unknown and may be related to poaching, mistaken ID, or spiteful killing. Unfortunately much of the recent human-caused mortality has involved subadult females.

Figure A4. Types of human-caused grizzly bear mortality in the CYE from 1982-2009



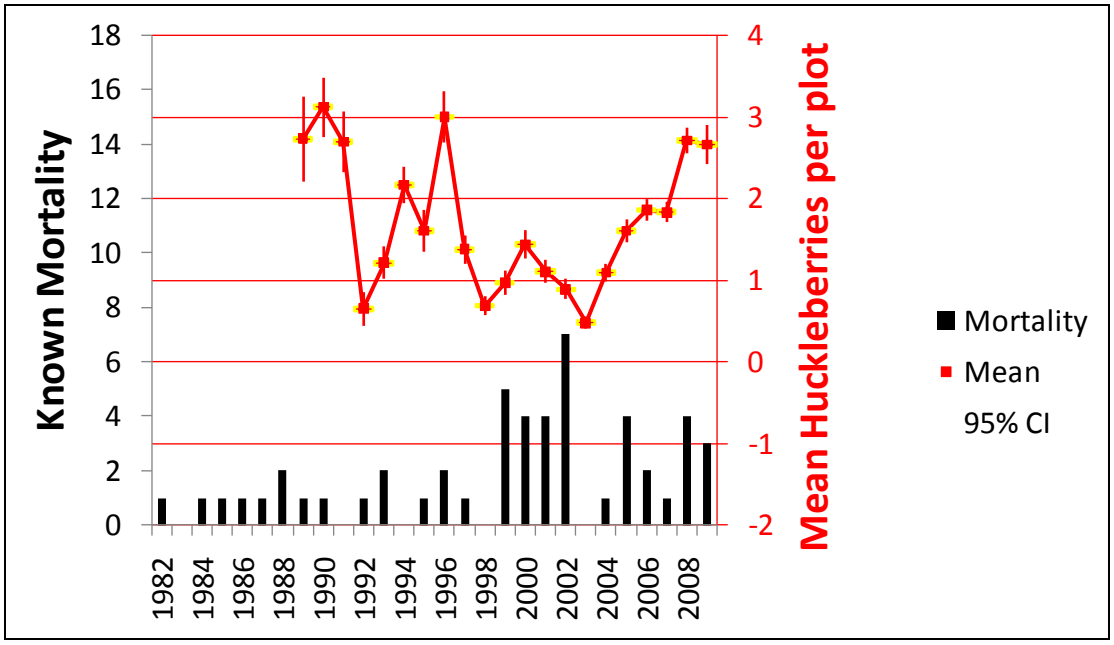
Analysis of the sex and age of mortality determined that much of the known natural mortality in this recovery zone has involved cubs while human caused mortality has been more prevalent among females than males (Fig. A5). Female mortality has been about 60 percent of total mortality among the adult and subadult age classes. The loss of these females affects the population's ability to grow.

Figure A5. Sex and age of grizzly bear mortalities in the CYE from 1982-2009.



Some of this increase in human-caused mortality may have been related to poor berry production from 1998 to 2003 (Fig. A6). There appears to be a strong relationship between poor huckleberry production and total mortality in this area. In particular, several years of poor food production appears to be associated with a larger number of mortalities. Food stress may increase not only natural mortality, but also human-caused mortality, as it may cause bears to approach human settlements while looking for food. Conflicts with people over unsecured food sources (garbage, pet or livestock foods, birdfeeders, etc.) may result in human-caused mortality.

Figure A6. Known grizzly bear mortality and huckleberry production in the CYE from 1982-2009.



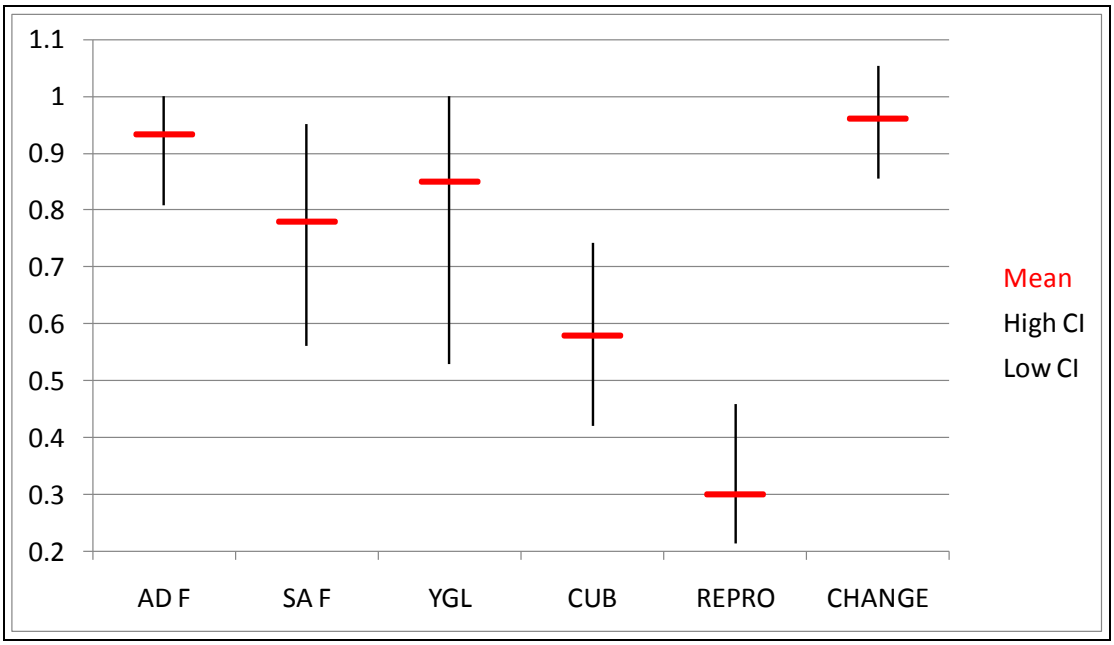
During 2003-2009, human-caused mortality has remained at elevated levels, but natural mortality has declined (Fig. A2). Average mortality has dropped to slightly more than two animals per year during this period.

Survival analysis and reproductive data is used to calculate a "rate of change" in the population. Only radio collared bears are used in this analysis because they typically have known fates. Furthermore, only female adults and subadults plus all yearlings and cubs are used in the calculation of trend. As long as there are sufficient males for breeding, males are not important to the ability of the population to increase. Subadults are bears aged 2-4 years.

Survival rates were calculated for radio collared bears in the CYE from 1982-2009. All Cabinet Mountain augmentation bears were removed from the sample and almost all of the remaining individuals were from the Yaak River portion of the population.

A survival rate of 1.0 means all bears in that category survived and there was no mortality. From 1982-2009, the survival rate for adult females in the CYE was 0.93, adult males 0.88, subadult females 0.78, subadult males 0.75, yearlings 0.85, and cubs 0.58 (Fig. A7).

Figure A7. Rates of grizzly bear survival, reproduction, and population change in the CYE from 1982-2009.



While cub survival is typically low, yearling survival is higher. It also appears that first time mothers are less successful at raising cubs than older, more experienced mothers. Subadult survival naturally decreases from yearling survival as bears are on their own without the protection of their mothers.

The observed rates of survival and reproduction are used to calculate a rate of change in the population (lambda). This calculation is essentially births - deaths = population change. This calculation only involves female adult and subadult survival plus all yearling and cub survivals.

Reproduction is a measure of female cubs produced per adult female per year and in the CYE area is 0.30 (Fig. A7). Sex ratio of observed cubs is assumed to be 50:50.

The point estimate of lambda for all data from 1982-2009 is 0.963. This equates to a declining population at an annual rate of -3.8 percent with a corresponding 95 percent confidence interval bounded by a decline of 12.1 percent to an increase of 5.2 percent. These confidence intervals are a product of small sample sizes inherent in sampling small populations.

This current data shows a 78 percent probability of a declining population. This is determined by looking at the distribution of the confidence interval for the point estimate of the annual rate of change in relation to a stable population (rate of change = 0). The point estimate is the -3.8 percent rate of change. It is the central value around which the confidence interval extends, analogous to a statistical mean or average.

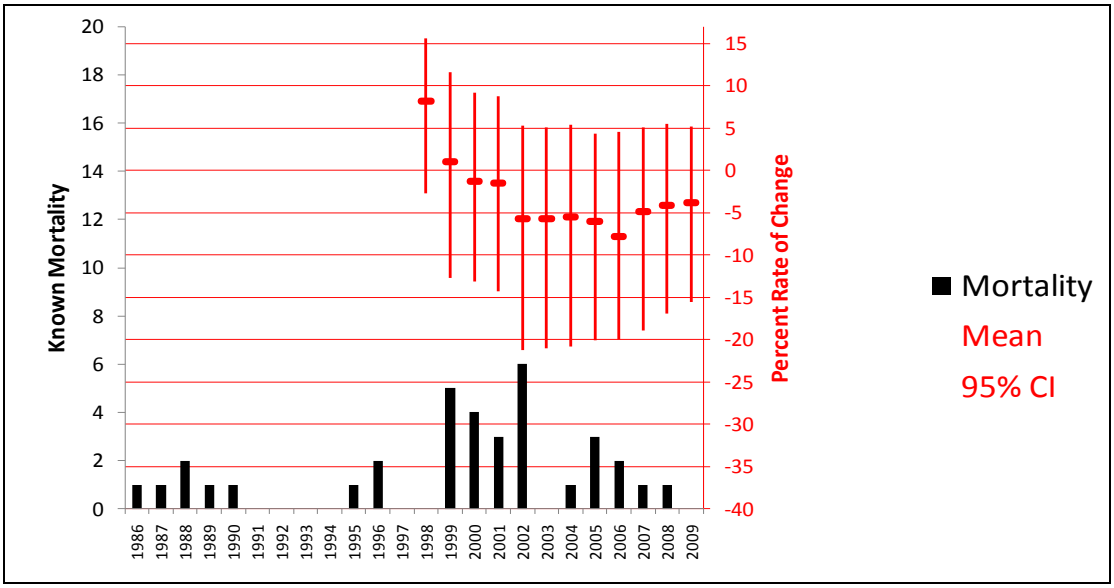
The probability of decline will vary over time based largely on the point estimate for the rate of change in relation to a stable population, but also on the confidence intervals associated with survival and reproduction.

The rate of population change (largely based on radio collared bears in the Yaak portion of the recovery zone) was calculated annually and plotted with total known mortality from the Yaak area to show how the trend calculation has varied over time.

Sample sizes, though small, became large enough to attempt this calculation at the end of 1998.

All indications from the trend and mortality data suggest an increasing population at the end of 1998 (based on the point estimate for the rate of change, Fig. A8).

Figure A8. Yaak River grizzly bear mortality and cumulative population rate of change 1986-2009.



Increasing mortality beginning in 1999 began to depress the point estimate for the rate of change calculation until 2006 (Fig. A8).

During 2007-2009, the point estimate for the rate of change has increased, largely because the survival rates of females have increased (Fig. A8).

Probability of decline reached its peak in 2006 and has since decreased to its current level of 78 percent.

Since probabilities of decline, including the current probability of decline of 78 percent, are probabilities, not rates, as the figures increase, it indicates more statistically rigorous evidence of the population trend for that calculation of the cumulative data. The larger numbers do not demonstrate higher rates of decline, or more imminent population extinction, but simply higher confidence in which direction the population was trending given the cumulative data. The point estimate of the rate of change is a better measure of the progress of the population and the point estimates have improved since 2006.

Since 1999, there appears to have been an increase in the numbers of bears killed on private lands in the CYE recovery area. To further quantify this issue, I calculated the mortality rates for all radio collared bears based on location of death (1.0 - survival rate = mortality rate).

Natural mortality on U.S. public lands in the CYE recovery area was 53 percent of trend mortality. Natural mortality can be deaths associated with starvation, predation, disease, or accidents such as drowning.

Human-caused mortality on private lands in the U.S. was 23 percent of trend mortality. Human-caused mortality on U.S. public lands was 14 percent of trend mortality. Human-caused mortality in British Columbia was 10 percent of trend mortality.

Mortality on private lands in the U.S. has become the largest source of human-caused mortality in the CYE (Fig. A9). Grizzly bears are now being killed by humans at disproportionately higher numbers on private lands than on Forest Service lands: the CYE is about 90 percent public land, yet human-caused mortality is only about 14 percent of the trend mortality.

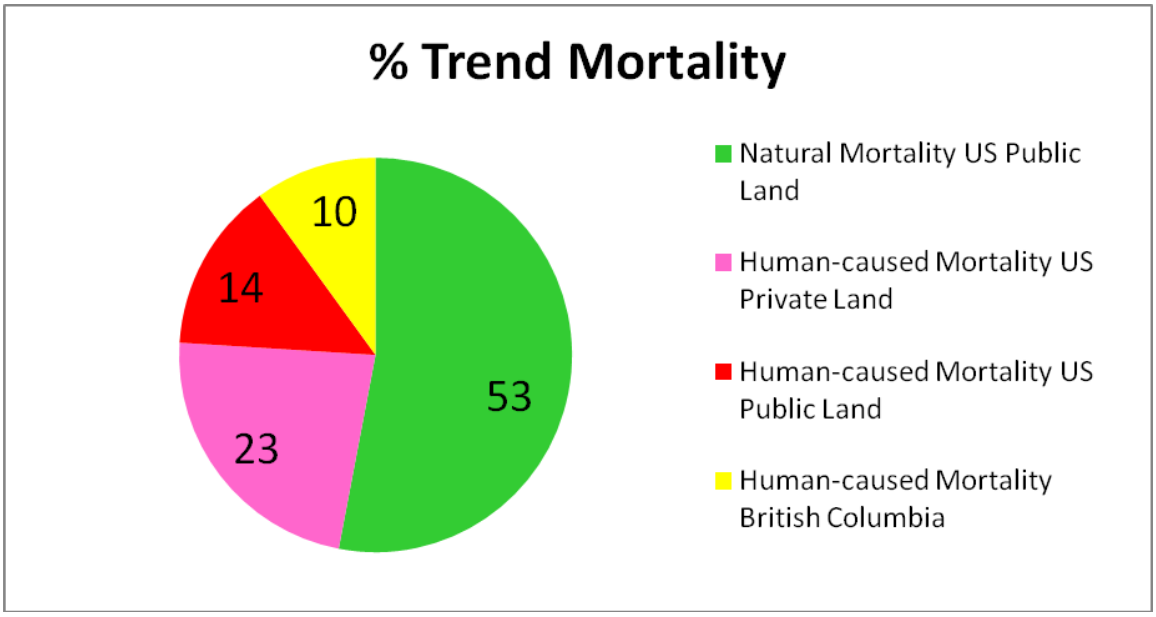
Therefore, mortality management through access controls on public lands is highly unlikely to eliminate all human-caused mortality.

The last grizzly bear killed in the Cabinet-Yaak during 2009 was an adult female killed in a self-defense incident in core area. The bear was killed approximately 0.6 miles from the nearest closed road and 1.2 miles from the nearest open road.

Implementation of the road density standards recommended by Wakkinen and Kasworm (1997) through timber sale or other project planning is expected to limit human-caused mortality on public lands. However these effects will require time to become evident because of the low reproductive rate and long term monitoring of the population is needed for verification of trends and adaptive management if required. Some level of human-caused mortality is likely to persist on public lands (as demonstrated by the 2009 mortality of an adult female in a core area). Therefore, to accomplish recovery of the

population in the CYE, greater efforts to reduce the high levels of human-caused mortality on private lands are necessary.

Figure A9. Location of CYE grizzly bear trend mortality by land ownership, 1982-2009.



General Causes of Grizzly Bear Mortality in Both the CYE and SE

In the entire SE from 1982 through October 14, 2011, there have been a total of 65 known grizzly bear mortalities from all forms, on all ownerships (including Canada) (Table A.3)(U.S. Fish and Wildlife Service 2004; BA 2010; BA supplement 2011; Wakkinen, pers. comm. June 2011; Allen and Wakkinen pers. comm. 2011).

In the entire CYE since 1982, there have been a total of 57 known grizzly bear mortalities from all forms, on all ownerships (including Canada) (Table A.3) (U.S. Fish and Wildlife Service 2004; BA 2010; BA supplement 2011; Allen and Wakkinen pers. comm. 2011).

Of the 122 total grizzly bear mortalities documented in both ecosystems (including Canada), 97 were human-caused, 22 were natural, and 3 were of unknown causes.

Sixty-five of the total 122 total mortalities were documented in the U.S. Of the 65 total bear mortalities in the U.S., 49 were human-caused, 14 were natural, and 2 were of unknown causes.

Focusing on known human-caused mortality in the U.S. (N=49), 30 were documented on national forest lands and 19 were documented on non-federal lands. This amounts to about 61 percent of human caused mortality on national forests lands and 39 percent on non-federal lands. However, the vast majority (87 percent) of the lands in the U.S. portion of these recovery zones are federal. Only 13 percent is non-federal.

Known human-caused grizzly bear mortality is occurring at a disproportionately higher rate on non-federal lands than on federal lands. There is 6.6 times more federal land than non-federal land in the U.S. portions of these ecosystems. Yet the human-caused mortality rate is 4.2 times higher on non-federal land (19 human-caused mortalities on 494 square miles = 0.038 mortalties per square mile) than federal land (30 human-caused mortalities on 3,281 square miles = 0.009 mortalities per square mile).

A significant number of human-caused mortalities were management removals; required when grizzly bears seek out and find unsecured anthropogenic attractants such as garbage, bird feeders and pet food near homes and businesses (i.e. sanitation) (see Table A3).

- Twenty-nine percent (28 of 97) of all human-caused mortalities were from management removals and sanitation on non-Forest Service lands.
- Nearly sixteen percent (15 of 97) were classified as poaching.
- Twenty-five percent (24 of 97) were unknown root cause.
- Three percent (3 of 97) were struck by trains.

Table A3. Number of known grizzly bear mortalities by cause from 1982 through June 2011 (K. Annis pers. comm. 2010; W. Kasworm pers. comm. 2010; W. Wakkinen et al. 2010; W. Wakkinen, pers comm. 2011) (modified and updated from BA).

	Cabinet-Yaak Ecosystem			Selkirk Ecosystem				
	Canada	United States		Canada	United States			
TYPE OF MORTALITY	BC	NF	Other	BC	IPNF	CNF	Other	Total
Natural – conspecific predation[5]	0	3	0	2	0	0	0	5
Natural - other	4	8	0	2	3	0	0	17
Subtotal (natural)	4	11	0	4	3	0	0	22
Human - poaching	0	2	6	2	1	3	1	15
Human – mistaken identity	0	4	1	0	3	0	0	8
Human – self defense	1	4	0	1	0	0	1	7
Human - management removal/sanitation	3	0	1	23	0	0	1	28
Human-legal hunting (BC only)	3	0	0	3	0	0	0	6
Human – trapping (for other spp)	2	0	0	0	0	0	0	2
Human-research	1	1	0	0	0	0	0	2
Human-train collision	0	0	3	0	0	0	0	3
Human-motor vehicle	0	0	0	2	0	0	0	2
Human-unknown	2	5	2	5	6	1	3	24
Subtotal (human)	12	16	13	36	10	4	6	97
Unknown	0	1	0	1	1	0	0	3
Total	16	28	13	41	14	4	6	122

Type of Mortality – some of these mortalities could be categorized into more than one type of human-caused mortality. See Appendix B for details.

The official CYE recovery zone is located in the United States only.

The official SE recovery zone includes habitat in the United States and British Columbia.

Other includes private, state, and railroad lands

Conspecific = grizzly bears killing grizzly bears

At least 42 percent of human-caused grizzly bear mortality involved the use of firearms; these include of 94 total, 15 were poaching cases, 9 were mistaken identity; 7 were self-defense; 9 were legal hunting in British Columbia (Table A3). Notable is the fact that about 45 percent of total gun-related mortalities occurred on national forest lands of the CYE and SE even though national forest lands account for nearly 90 percent of the recovery zones in the U.S.; therefore, gun-related mortalities are lower than would be expected on U.S. federal land.

Forest Plan Measures Affecting the Selkirk and Cabinet-Yaak Grizzly Bear Habitat Status:

Land ownership patterns in the Selkirk and Cabinet-Yaak grizzly bear recovery zones are dominated by national forest system lands. These lands are managed according to National Forest Plans (aka Land and Resource Management Plans or LRMPs). Forest Plans are programmatic documents for each national forest and are required under the National Forest Management Act of 1976 (P.L. 94-588). Each contains a myriad of resource management and protection direction, much of which provides incidental benefits to the grizzly bear even outside of recovery zones. Specific benefits derived from the plans of the IPNF, KNF, and Cabinet portion of the LNF are detailed in the BA (2010, Appendix G), and below:

The following goals, objectives, and standards, currently contained in the IPNF's LRMP (U.S. Forest Service 1987), provide some benefits to grizzly bears and their habitat within these areas of mapped grizzly bear residency outside of the recovery zone:

The goals and objectives of the LRMP set the framework for minimizing take:

- Roads will be developed and managed to the minimum standards and miles necessary to meet the objectives of the management area (MA).
- Manage vertebrate wildlife habitat to maintain viable populations of all species.
- Manage big game habitat toward achieving the goals of the Idaho Department of Fish and Game (IDFG).
- Grazing management will protect soil and water resources, riparian areas, and T&E plant and animal species. Grazing is permitted on less than two percent of the Forest with a majority of the forage use occurring on 7,500 acres.
- The needs of Threatened & Endangered (T&E), and sensitive plant and animal species have priority in managing existing range allotments. No new allotments will be established in areas where conflicts can be expected with T&E or sensitive species.
- Riparian resources will be managed to feature dependent resources (fish, water quality, natural channels, certain vegetation, and wildlife communities) while producing other resource outputs at levels compatible for the objective for dependent resources. (Also note, the IPNF amended the Forest Plan to incorporate the INFISH Guidelines that increase protection of riparian resources.)
- Management for elk habitat needs will emphasize road management to maintain adequate security and habitat potential on summer range.

Specific management standards and guidelines in place to achieve the forest goals:

- Forest-wide standard- Management of habitat and security needs for T&E species will be given priority in identified habitat. Results of research regarding habitat of T&E species will be incorporated into management direction as it becomes available.
- IPNF Management Area (MA) 2 & 3- "Road and trail restrictions may be necessary to reduce human/bear conflicts.
- IPNF MA 4 & 5- Within critical habitat components motorized recreation use may be restricted to provide needed wildlife security.
- IPNF MA 6- Special emphasis will be given to the maintenance, protection and enhancement of key habitat components (including security).
- IPNF MA 9- Existing local roads will generally be closed to vehicles over 40" wide. No local road construction is planned.
- IPNF MA10- Parker and Long Canyons are closed to motorized use.
- IPNF MA 11- Salmo-Priest Wilderness is to be managed as non-motorized. Within grizzly bear and caribou habitat, recreation use and access may be restricted to provide needed wildlife security during use periods. (Includes proposed wilderness i.e., Scotchman Peak and Selkirk Crest areas)
- IPNF MA 11- Proposed Wilderness- Motorized use may be permitted…, except within bounds of Mallard Larkins Pioneer Area, …
- IPNF MA12- Within the Upper Priest Wild River area, uses will be limited to non-motorized except on established roads.
- IPNF MA 16- Maintenance of natural channels and adequate streamside vegetation will have a high priority in range allotment plans and prescriptions. A specific objective for stream bank protection will be included in all allotment management plans where second order or larger streams are involved.
- IPNF MA 19 & 20- Motorized recreation activities will be allowed where they do not conflict with wildlife and other resource needs.
- IPNF has a long history if supporting information and education efforts and supported the IDFG I&E position since 1991.
- IPNF completed a forest-wide food storage order. And the Colville NF has had one in place since 1989.

The following goals, objectives, and standards, currently contained in the KNF and LNF LRMPs (U.S. Forest Service 2002a), provide some benefits to grizzly bears and their habitat within these areas of mapped grizzly bear residency outside of the this recovery zone:

Kootenai National Forest

The goals and objectives of the LRMP set the framework for minimizing take:

- Maintain diverse age classes of vegetation for viable populations of all existing native, vertebrate wildlife species (FP p. II-1 #7) (provides habitat diversity needed by grizzly).

- Protect the wilderness character of designated and recommended wilderness (FP p II-2 # 10) (provides security habitat).
- Maintain a natural appearing landscape adjacent to major travel corridors, around local communities, and around popular destinations such as campgrounds (FP p. II-2 #14) (provides connectivity for movement).
- Attempt to stop the spread and suppress the existing levels of noxious weeds through land management and weed suppression activities. (Maintains and restores native bear foods).
- Grazing management will insure protection of soil and water resources and riparian areas (FP- II-7, Range) (protects potential grizzly use areas – riparian).

Specific management standards and guidelines in place to achieve the forest goals:

- Riparian Area standards (FP II pp. 30-33): In addition to the LRMP standards, the Kootenai amended the FP (1995) to incorporate the "INFISH" guidelines that increased protection of riparian habitat.
- MA 2, 6-9, 13, 18-21, 24, 29 and 30- Livestock grazing is not permitted. This is more than half the MAs on the Forest. MA 5 allows only recreational pack stock. MA 13 allows grazing but, due to limited available forage, use is not anticipated.
- MA 14- Grazing opportunities for domestic livestock will be available unless there is a site-specific conflict with grizzly bear management…
- MA 3- Fencing for domestic livestock control may be allowed to prevent overuse in an area, eliminate competition for forage, or reduce conflicts with grizzly management" (FP p. III-9 – Range #3).
- MA 10-12, and 15-17 - Fencing may be constructed to control livestock unless it interferes with the natural movement patterns of wildlife.
- MA 12 and 14 - Establishes an open road density standard of 0.75 miles/sq.mile
- MA 15 - 18 - Establishes an open road density standard of 3.0 miles/sq.mile
- KNF plan standards and guidelines provide quality big game habitat conditions (including cover/forage ratio requirements, opening size limitations, maintaining movement corridors between openings) and hunting season security by using seasonal road closures.
- MA 23 - Any activity in the MA will be required to leave no trash or other grizzly attractant.

Off-highway vehicle restrictions adopted in 2001 limits OHV use to designated routes or areas, and prohibits motorized cross-country travel on the remainder of the Forest.

Lolo National Forest

- Forest wide standard: Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan. (p. II-17 #48)
- Roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs. (p. II-17 #49)

- Manage Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities. In most areas on the forest, this will involve closing some roads seasonally, and closing other roads on a permanent basis. (p. II-18 # 52)
- Plan (p. II-18 # 52-c) sets an open road density standard of 1.1 miles per square mile on highly productive big game summer range. All new roads, except arterials, will be closed year-round. In addition new roads will be closed to the public year-round in areas of moderate big game summer range.
- Plan (p. II-19 #52-d) in areas with high potential for walk-in hunting or fishing experiences will consider road closures. Open road density during the hunting season will remain the same as that now existing. (1984 Travel Plan)
- MA 20 - Road densities will be minimized using maximum spacing whenever possible. (p. III-97 2-a)
- MA 20a - Existing roads will be managed to minimize human-caused grizzly bear mortality. (p. III-101 C-5)
- MA 18 - 19, and 26 - Road densities will be minimized…

<u>Grizzly Bear Conservation Needs in the SE and CYE Recovery Zones</u>

The Service's Grizzly Bear Recovery Coordinator identified the six priority needs to achieve grizzly bear recovery in the SE and CYE grizzly bear recovery zones (Servheen pers comm. 2006):

1. Augment the Cabinet Mountains and Canadian Selkirks populations;
2. Limit human-caused mortality;
3. Enhance population linkage across Highways 2, 3, 200, 135, and 95;
4. Address the needs of bears outside the recovery zone line;
5. Inside the recovery zone, a) complete access management in most important areas and b) improve sanitation standards on public lands;
6. Increase outreach and public involvement.

Three of the six conservation needs are similar to those assessed in Proctor et al (2004b). Through population simulations, Proctor et al. (2004b) documented extinction risks for the CYE grizzly bear population, and the influence of three factors that could substantially reduce the likelihood of extinction of the grizzly bear population. Over the long-term (100-year period) mortality reduction had the largest effect, while augmentation had the largest positive effect on growth rate over the short-term (10 years). Population growth rates dramatically increased as a result of augmentation over 10 years; even low rates of augmentation (one female per year) reduced the probability of extinction by 33 percent over 25 years. Adding three females per year cut extinction rates in half. Increasing the age of those bears augmented and increasing a 10-year effort to 20-years both lowered the extinction risk slightly. However, mortality reduction had the greatest positive effect on growth rates over a 100-year period and equally strong reductions in extinction probabilities. Finally, linkage enhancement and mortality reduction combined had a larger effect on lowering the extinction probability than 10 years of augmentation.

The proposed Access Amendment is intended to address need 5a, and contribute toward achieving needs 4 and 2. Each of the other needs are beyond the scope of the proposed Access Amendment, but are currently being worked on by federal, state, and private entities (e.g., see Selkirk-Cabinet Yaak Subcommittee notes: May 19, 2010).

Summary of the Most Significant Factors Influencing the Condition of Grizzly Bears in each Grizzly Bear Recovery Zone

GYA: In the GYA, the District Court for the District of Montana determined that grizzly bears in the GYA remain threatened by a lack of adequate regulatory mechanisms and the potential impacts from the loss of whitebark pine in that ecosystem. The Service is currently appealing this decision to the 9th Circuit of Appeals.

NCDE: Access management has been effectively implemented by Glacier National Park and the Forests. The population trend is currently increasing, at three percent per year.

CYE: Threats to grizzlies in this recovery zone include incomplete habitat protection measures (motorized access management), unsustainable levels of human-caused mortality, small population size and associated risks (including stochastic or detrimental environmental effects), and population fragmentation that resulted in genetic isolation. The Service considers this population to be endangered due to continuing high levels of human caused mortality, a decreasing trend (Kasworm and Wakkinen 2004), genetic and demographic isolation, inadequate habitat protections, and increasing fragmentation both within the recovery zone (due to mines and private land development) and in intervening habitat with other grizzly bear populations.

SE: Threats to grizzlies in this recovery zone include incomplete habitat protection measures (motorized access management), inadequate regulatory mechanisms including a lack of food storage orders on some jurisdictions, human-caused mortality, small population size, and population fragmentation that resulted in genetic isolation. Although this population may be slowly increasing (Wakkinen and Kasworm 2004) and reconnecting with adjacent populations, high levels of human caused mortality and a lack of regulatory mechanisms, in British Columbia and the U.S., still threaten this population.

North Cascades Ecosystem: Threats to grizzlies in this recovery zone include very small population size, incomplete habitat protection measures (motorized access management), population fragmentation resulting in genetic isolation, and a lack of detailed data regarding population size, trend, survival, and reproductive rates. Data indicating the population in British Columbia is isolated from other populations limits the chance of natural recovery given the small population size. Population augmentation may be the only way to recover this population.

Bitterroot Ecosystem: The primary concern in the BE is the absence of a grizzly bear population. Most suitable habitat within the recovery zone is protected by the Wilderness Act but this ecosystem is far from recovery.

Climate Change

With respect to climate change, observations show that warming of the climate is occurring, and that human activities, i.e., both Federal and non-Federal, have led to large increases in heat-trapping gases over the past century (Karl et al. 2009). Human-induced emissions of heat-trapping gases come mainly from the burning of fossil fuels (coal, oil, and gas), with important contributions from the clearing of forests, agricultural practices, and other activities. The human-induced increases in heat-trapping gases from these activities have caused increases in global average temperatures, and changes in ocean heat content, precipitation, atmospheric moisture, and Arctic sea ice (Karl et al. 2009).

Climate changes have been characterized at the global, national, regional and local level and are expected to continue into the future (Karl et al. 2009; U.S. Fish and Wildlife Service and DNRC 2010). The best information indicates these changes are attributable to human activities, and the data suggests that some human activities are more likely than others to contribute heat-trapping gases. However, it is currently not possible to attribute proportions of the climate change trends to specific business or private action, or to specific categories of human activities, i.e., many human activities directly and indirectly contribute some proportion to heat-trapping gas emissions.

Future Conditions

Human activities in the future are expected to continue to contribute to climate change. There is high agreement and much evidence that with current climate change mitigation policies and related sustainable development practices, global greenhouse gas emissions will continue to grow over the next few decades (IPCC 2007). The rate will depend on the level of emissions of heat-trapping gases that continue to be created and the actions taken around the world to reduce emissions of heat-trapping gases. We assume, for purposes of this BO, the climate changes characterized above will continue through the foreseeable future. Thus, climate change will likely affect grizzly bear habitat throughout the duration of the current and amended Forest Plans.

Climate change trends in the Pacific Northwest region will be important to grizzly bears with respect to how these trends may affect denning behavior, foraging habitat availability, and fire-regimes.

Predicted decreases in snowpack levels may shorten the denning season as foods are available later in the fall and earlier in the spring. Spring and fall encounters between grizzly bears and hunters and/or recreationists would therefore likely increase; escalating the mortality risk to bears during these times.

An additional effect of climate change could be changes in the availability of and distribution of foraging areas due to increasing temperatures and seasonal changes in precipitation. The extent and rate to which plant species and communities would be affected is difficult to predict.

Changes in vegetative distributions may also influence other mammal distributions, including prey species like ungulates.

As described earlier, grizzly bears are opportunistic feeders and will consume almost any available food. Because grizzly bears are such successful omnivores, climate-induced vegetative changes may not have detectable, negative effects on grizzly bear populations in the lower 48 States.

An indirect effect of climate change may be an increase in wildfires that may result in reductions in forest cover and some types of foraging habitat, while potentially creating other types of foraging habitat, e.g. shrub, berry, and grassland forage areas. Increasing insect outbreaks may result in more decadence and die-outs of whitebark pine stands, thus, reducing a potential food source for grizzly bears. However, whitebark pine is not a key food source of grizzly bears in the SE or CYE.

Summary of climate change effects to grizzly bears

Grizzly bears are habitat generalists and opportunistic omnivores, able to find resources in a wide variety of habitat conditions. It is difficult to predict how this large, wide-ranging species would respond to environmental changes associated with climate change. At this time, the scope and scale of such changes are unknown, and the effects (positive or negative) on grizzly bears would likely be variable across the landscape.

Through the Forests' significant participation in the IGBC, the Forests are made aware of new findings relative to grizzly bears in the action area. If a causal relationship can be established between climate change and changes in habitat relationships that may be affected by motorized access in a manner not considered here, it may be addressed by future federal action or reinitiation of formal consultation in an effort to offset some of the effects of climate change.

ENVIRONMENTAL BASELINE

The environmental baseline section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat, if applicable), and ecosystem, within the "action area" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

The "environmental baseline" includes:

- the past and present impacts of all Federal, State, or private actions and other human activities in an "action area,"
- the anticipated impacts of all proposed Federal projects in an "action area" that have already undergone formal or early section 7 consultation,
- and the impact of State or private actions that are contemporaneous with the consultation in process.

The "action area" includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action [50 CFR §402.02]. The action area does not necessarily include all areas potentially frequented by far-ranging, or migrant, species (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998, pp 4-15 to 4-19).

This biological opinion addresses the effects on grizzly bears related to the amendment of the Forest Plans for the KNF, IPNF, and LNF. Therefore, the action area is the affected BMUs managed entirely or in part by the Forests, within the SE recovery zone and CYE recovery zone, and associated "BORZ" - adjacent areas on the Forests identified as having recurring use by grizzly bears outside of these recovery zones (BA 2010, and supplement) (see Appendix A.1: Figures 1 and 2).

The action area includes 30 BMUs (including 17 on the KNF, 10 BMUs on the IPNF, 1 BMU on the Lolo NF, and 2 shared by IPNF/KNF, and 2 shared by IPNF/CNF).

Not included in the action area, because they are not affected by the proposed action, are:

- The LeClerc BMU in the SE. The majority of this BMU is situated on the Colville National Forest.
- The Idaho Department of Lands (IDL) BMU in the SE. The 160,000 square mile Idaho Department of Lands (IDL) BMU is situated east of Priest Lake and is under state jurisdiction.
- British Columbia, Canada portions of the Selkirk Recovery Zone.
- The Northern Continental Divide portion of the Kootenai National Forest, east of Eureka, Montana, which is not subject to this Access Amendment.

Status of Grizzly Bears in the Action Area

Because the action area does not encompass the entire range of the grizzly bear, this analysis is a subset of the preceding range-wide status discussion. The purpose of this part of the jeopardy analysis is to characterize: the current condition of the grizzly bear in the action area, ideally, in terms of its reproduction, numbers, and distribution; the factors responsible for that condition; and, on the basis of those findings and the range-wide species' assessment, the grizzly bears' survival and recovery needs in the action area. As noted in the *Analytic Framework* section above, this information will provide essential context for evaluating the significance of any adverse or beneficial effects of the proposed action and any cumulative effects on the grizzly bear for purposes of the jeopardy analysis.

Grizzly Bear Status in the CYE Recovery Zone

The Cabinet-Yaak recovery zone was estimated to contain at least 42 grizzly bears during 2004-2009 (Kasworm et al. 2010). We have no information related to only those grizzly bears living in the action area in the CYE. Because most of the land in the CYE is National Forest, we assume most of the grizzly bears in the population live on the KNF, IPNF and LNF BMUs.

To summarize from the *Status of Species* section above:

All indications from the trend and mortality data suggest an increasing population at the end of 1998 (based on the point estimate for the rate of change, see Fig. A8).

Increasing mortality beginning in 1999 began to depress the point estimate for the rate of change calculation until 2006 (see Fig A8). Wakkinen and Kasworm (2004) documented a population declining at a rate of 3.6 percent annually in 2002 (95 percent confidence interval = 0.844–1.063).

During 2007-2009, the point estimate for the rate of change has increased (improved), largely because the survival rates of females have increased (see Fig.A8). Further, the *probability* of decline reached its peak in 2006 and has since decreased. Additional mortality and reproductive data were added to the trend calculation in 2008 and resulted in a 71-78 percent chance the CYE population is declining (Kasworm et al. 2009). This number does not demonstrate a higher *rate* of decline, or more imminent population extinction, but simply higher confidence in which direction the population was trending given the cumulative data. Kasworm et al. (2009) calculated the rate of decline to be between 2.7-4.1 percent of the population annually. The point estimate of the rate of change is a better measure of the progress of the population and the point estimates have improved since 2006 (see Fig. A8).

The trend calculation did not include the eight female grizzly bears augmented into the Cabinet Mountains; it appears that the Cabinet Mountains segment of this population has actually increased in size since the start of augmentation in 1990 (Kasworm et al. 2007). This increase is largely due to the reproductive output of a successful augmentation bear and her offspring which have also reproduced.

Grizzly Bear Status in the SE Recovery Zone

We have no information related to only those grizzly bears within the action area in the SE. The IPNF manages most of the land in the U.S. portion of the ecosystem, and so we assume most of the grizzly bears in the U.S. portion live on the IPNF within the action area. To review from the "Status of Species" section above, Proctor et al. (in review) estimated a population size of 88 grizzly bears in the Selkirk Ecosystem, with 30 grizzly bears in the U.S. and 58 in Canada. The estimate for the U.S. portion of the SE is based on expert opinion (Wakkinen 2010a). The IDFG is currently working on a population estimate for the U.S. portion of the SE that will present a more scientifically rigorous estimate. In 2004, it was estimated that the population of grizzly bears in the SE was slowly increasing at a rate of 1.9 percent annually (95 percent confidence interval = 0.922-1.098) (Wakkinen and Kasworm 2004).

Factors Affecting the Grizzly Bear's Environment within the Action Area

This analysis describes factors affecting the environment of the species or critical habitat in the action area. The baseline includes State, tribal, local, and private actions already affecting the species or that will occur contemporaneously with the consultation in

progress. Unrelated federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species or critical habitat. (U.S. Fish and Wildlife Service and NMFS 1998).

The Forests are the primary land managers in both the CYE and the SE. Conservation of suitable grizzly bear habitat is therefore dependent upon the Forests. Access management has long been recognized as a tool to improve habitat conditions for grizzly bears. In the late 1970s, the Forests began restricting motorized vehicle use on some roads within the CYE recovery zone. Most road restrictions were accomplished with gates or permanent barriers. Gates have been used in cases where restrictions are seasonal to protect specific habitat at critical times of the year or in areas that are scheduled for additional timber management.

In 1987, the KNF Forest Plan proposed that a minimum of 70 percent of each BMU would be "effective habitat" in the CYE (U.S. Forest Service 1987). Effective habitat is defined as an area greater than 0.25 miles away from open roads, active timber sales, or active mining operations (Christensen and Madel 1982). This standard was based on bear research from other recovery areas (Christensen and Madel 1982) and the habitat effectiveness metric was, in part, derived from extrapolating elk management guidelines (U.S. Fish and Wildlife Service, unpublished meeting notes, D. Harms, April 13, 1990). The IPNF required 70 square miles of secure habitat.

Beginning in 1994, standards for access management evolved through direction from the IGBC. This direction called for establishing BMU-specific levels for secure habitat ("core areas"), OMRD, and TMRD. The *Consultation History* section outlined the development of interim access management guidelines for the CYE and SE, based primarily on recommendations in Wakkinen and Kasworm (1997). As explained, a series of lawsuits ensued for various reasons; and the Forests are once again proposing to meet IGBC direction in this proposed action. However, the Forests have used the "best science" indices of OMRD, TMRD and core area to describe and analyze the impacts of road densities on grizzly bears - since 1995 on the KNF; and since 1998 on the IPNF and LNF - despite no formal direction added to the Forest Plan. The progress that the Forests have made without a "binding" access management strategy has benefitted grizzly bears. For the purposes of this consultation, the "environmental baseline" includes the on-the-ground conditions at this point in time, as well as various trends leading to current conditions.

Primary Factors Affecting Grizzly Bears in the CYE Portion of the Action Area

The majority (90 percent) of the CYE is under Federal ownership, with only 10 percent comprised of State and private lands. Ongoing activities occurring on State and private lands in the CYE have the potential to affect grizzly bears due to direct mortality, (illegal kills or mistaken identity), sanitation problems resulting in removal or killing of grizzly bears; habitat loss from rural home development, resorts and agricultural activities.

<u>Forest Service Management</u>: The Forests manages approximately 1,652,243 acres within the action area in the CYE.

Access Management. Habitat security on Forest land probably declined in the CYE recovery zone until the late 1980s when Forest Plans began to include access management with habitat security standards (Summerfield et al. 2004). The Forests developed criteria for road access within the CYE recovery zone's 22 BMUs.

The current condition and history of proposed grizzly bear habitat measures (OMRD, TMRD, and core area) through 2009 are summarized below (source: BA 2010) (Table A4.).

Indices for these parameters have been improving steadily in the action area since 1987, as documented by Summerfield et al. (2004), the Selkirk Cabinet-Yaak IGBC Subcommittee (1998), annual Forest Plan monitoring reports (U.S. Forest Service 1998, 1999, 2002, 2009a, 2010), and the annual monitoring reports sent to the Service since 2004 (U.S. Forest Service 2005, 2006, 2008, 2009b).

According to Service calculations (unpublished data, April 27, 2011) (which may differ slightly from USFS calculations), in the CYE portion of the action area, there was an increase of approximately 24,230 acres of core area from 2000 to 2010. This translates into an increase from about 56 percent of the CYE action area to more than 57 percent of the CYE action area providing core area habitat.

Overall, motorized route densities have been reduced and secure habitat has increased in the CYE since the grizzly was listed.

Table A4. Summary of changes in access parameters for the Cabinet-Yaak Recovery Zone, 2002-2010, compared to the proposed standards (from U.S. Forest Service 2010)

BMU	Access Standard Type	*Proposed Standards	YEAR 2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Cedar 56,818	OMRD	**15**	12	12	13	14	12	12	14	14	**15**
	TMRD	**15**	10	11	10	8	8	9	9	10	**11**
	CORE	**80**	83	83	84	85	85	83	83	83	**81**
	HE	NA	89	88	88		88	88	88	88	88
2 Snowshoe 65,241	OMRD	**20**	17	17	17	19	20	19	19	20	**20**
	TMRD	**18**	14	14	14	14	15	16	15	16	**16**
	CORE	**75**	77	78	78	77	77	76	76	76	**76**
	HE	NA	83	83	83		79	79	79	79	79
3 Spar 75,701	OMRD	**33**	27	24	25	26	27	27	27	27	**28**
	TMRD	**26**	26	26	24	24	24	27	27	26	**26**
	CORE	**59**	62	62	63	63	62	60	60	62	**62**
	HE	NA	70	70	70	Not	73	73	73	74	73
4 Bull 81,750	OMRD	**36**	36	36	37	37	36	37	37	37	**37**
	TMRD	**26**	26	26	26	26	26	26	26	29	**29**
	CORE	**63**	62	62	63	63	63	62	63	62	**62**
	HE	NA	65	65	65		64	64	64	62	62
5 St. Paul 70,210	OMRD	**30**	26	27	26	27	27	28	28	28	**27**
	TMRD	**23**	21	21	21	23	23	23	24	23	**23**
	CORE	**60**	63	60	60	59	60	58	60	58	**58**
	HE	NA	76	75	76		72	71	71	71	67
6 Wanless 64,148	OMRD	**34**	33	37	33	34	35	32	30	29	**33**
	TMRD	**32**	32	32	31	32	33	33	33	34	**34**
	CORE	**55**	55	54	56	54	54	53	54	53	**53**
	HE	NA	70	70	70		66	68	70	70	71
7 Silver Butte-Fisher 63,151	OMRD	**26**	23	23	23	24	23	25	27	32	**32**
	TMRD	**23**	20	20	20	20	21	23	23	23	**23**
	CORE	**63**	66	66	66	67	67	62	63	62	**63**
	HE	NA	80	80	80		77	76	75	71	71
8 Vermillion 68,567	OMRD	**32**	32	32	32	32	32	33	33	33	**33**
	TMRD	**21**	23	23	23	23	23	22	22	24	**24**
	CORE	**55**	56	56	56	56	56	54	55	55	**55**
	HE	NA	77	77	77		77	77	77	69	69
9 Callahan 85,617	OMRD	**33**	32	26	26	28	28	27	27	27	**27**
	TMRD	**26**	27	26	26	26	26	26	26	26	**26**
	CORE	**55**	57	59	60	59	58	58	59	59	**59**
	HE	NA	72	78	72		76	76	77	76	76
10 Pulpit 95,924	OMRD	**44**	41	41	41	42	41	44	44	44	**45**
	TMRD	**34**	32	30	31	29	28	28	28	29	**30**
	CORE	**52**	50	52	52	51	51	52	52	51	**51**
	HE	NA	65	65	65	Not	64	62	63	62	61
11 Roderick 77,746	OMRD	**28**	31	30	29	28	28	28	28	28	**28**
	TMRD	**26**	28	28	29	29	28	29	28	28	**28**
	CORE	**55**	54	53	53	53	52	52	54	54	**54**
	HE	NA	71	71	71	Not	75	74	74	74	74

Table A4. Continued

BMU	Access Standard Type	*Proposed Standards	YEAR 2002	2003	2004	2005	2006	2007	2008	2009	2010
12 Newton 51,562	OMRD	**45**	43	41	41	42	42	42	42	42	**42**
	TMRD	**31**	30	31	31	31	30	31	30	29	**29**
	CORE	**55**	57	56	56	56	56	56	57		**58**
	HE	NA	60	60	60		62	62	62	62	62
13 Keno 51,235	OMRD	**33**	33	33	33	34	34	34	34	34	**33**
	TMRD	**26**	24	24	23	24	25	25	25	25	**25**
	CORE	**59**	62	61	61	61	59	59	59	59	**59**
	HE	NA	72	72	72		64	71	71	71	72
14 NW Peak 83,027	OMRD	**31**	28	27	28	28	28	28	28	28	**28**
	TMRD	**26**	26	25	26	26	26	26	26	26	**26**
	CORE	**55**	56	57	57	56	55	55	56	56	**56**
	HE	NA	75	75	75		76	76	76	76	76
15 Garver 58,842	OMRD	**33**	31	31	29	33	30	30	29	29	**34**
	TMRD	**26**	30	29	29	34	33	32	25	25	**25**
	CORE	**55**	50	50	48	46	45	46	54	55	**55**
	HE	NA	70	70	70		71	71	72	72	68
16 E F Yaak 97,586	OMRD	**33**	29	28	31	28	28	29	31	29	**32**
	TMRD	**26**	38	30	25	26	26	27	27	27	**37**
	CORE	**55**	45	49	55	54	53	53	54	54	**54**
	HE	NA	72	72	72		73	73	71	73	71
17 Big Creek 83,724	OMRD	**33**	31	31	31	29	31	30	30	30	**30**
	TMRD	**26**	26	25	25	25	20	18	15	16	**16**
	CORE	**55**	50	50	50	49	54	55	59	58	**58**
	HE	NA	74	73	73	75	74	74	74	74	74
18 Boulder 62,379	OMRD	**33**	29	31	31	29	29	31	31	31	**33**
	TMRD	**29**	35	35	35	35	35	35	35	35	**35**
	CORE	**55**	49	49	49	49	50	50	50	50	**50**
	HE	NA	75					73	73	66	66
19 Grouse 65,086	OMRD	**59**	59	59	59	61	60	60	60	60	**61**
	TMRD	**55**	59	59	59	59	59	59	59	59	**59**
	CORE	**37**	32	32	32	32	32	32	32	32	**32**
	HE	NA	63					51	52	50	51
20 North Lightning 68,724	OMRD	**35**	38	38	39	39	40	37	36	36	**38**
	TMRD	**20**	20	20	20	21	21	19	20	20	**20**
	CORE	**61**	61	61	61	61	60	62	62	62	**61**
	HE	NA	71					72	72	73	71
21 Scotch-man 62,288	OMRD	**34**	35	35	35	35	35	35	35	35	**33**
	TMRD	**26**	27	27	26	26	26	27	27	27	**25**
	CORE	**62**	63	63	63	63	63	63	63	63	**67**
	HE	NA	67					67	67	67	68
22 Mt. Headley 162,917	OMRD	**33**	38.7	37.9	38	38	38	38	38	38	**38**
	TMRD	**35**	42.0	36.1	37	37	37	37	37	37	**37**
	CORE	**55**	46.8	51.6	51	51	51	51	51	51	**51**
	HE	NA	Not	Not	Not	Not	Not	Not	Not	Not	67

[1]Not Available—with the signing of the 2004 Record of Decision (USFS 2004) habitat effectiveness became obsolete until the decision was remanded in the winter of 2006.

*Proposed Standards as percent of BMU

Timber Harvest. Timber harvest on National Forest lands within the action area in the CYE has decreased since 1987 (U.S. Forest Service 2009d). On the Idaho Panhandle and Kootenai National Forests, the number of acres harvested has declined with the total volume of timber harvested declining at a faster rate (U.S. Forest Service 2009d). This trend is expected to remain stable or continue to decrease upon full implementation of the proposed Amendments for access management standards because less suitable timber will be accessible for harvest (see U.S. Forest Service 2002, p. 3-104; U.S. Forest Service 2009d, pp. 156-157).

Mining. There are no oil or gas leases within the CYE recovery zone. There are a number of commercial scale mining leases within or adjacent to the CYE. These mining leases all occur on the Kootenai National Forest. In 2006 the Service issued a biological opinion for the re-start of the Troy Silver mine (U.S. Fish and Wildlife Service 2006). This facility was not operational between 1993 and 2004 due to low mineral prices. It is now operating and extracting over 100,000 pounds of silver and 15.5 million pounds of copper annually (Revett 2009). Revett Silver Company's Rock Creek Mine proposal was approved in 2003 and a biological opinion was issued in 2003 (U.S. Fish and Wildlife Service 2003a). The Rock Creek mine would operate for about 30 years, extracting 10,000 tons of ore per day. The permit area for the mine would include a 1,560 acre staging area. The maximum number of people employed by the mine would be approximately 450 during various phases of construction, and about 340 during operation. The mitigation measures for the proposed mine would offset impacts of the project and are expected to improve habitat and population status for this population. The 2006 biological opinion on the mine was challenged in court, was upheld in the Federal District Court, and is now being reviewed by the U.S. 9th Circuit Court of Appeals.

Livestock Grazing. Livestock grazing on the Kootenai and Idaho Panhandle National Forests has decreased since 1987 (U.S. Fish and Wildlife Service 2006). Within the CYE action area, there are 2 cattle allotments on the Kootenai National Forest (Sullivan 2010). On the Lolo National Forest, there are currently 2 livestock grazing operations on the edge of BMU 22 in the CYE: 1) a special use permit for about 6 horses, and 2) an allotment for about 30 cow/calf pairs. To date, there have been no grizzly bear/livestock conflicts associated with livestock use of National Forests within the CYE and we do not consider this type of land-use at its current levels a threat to grizzly bears there.

Recreation. The KNF received 1.11 million visits by people recreating between October 2001 and September 2002 (U.S. Forest Service 2009d). Of the total number of visits, approximately 60 percent occurred within or adjacent to the SE or CYE recovery zones. Similarly, the Idaho Panhandle National Forest received an estimated 855,000 visits between October 2002 and September 2003 (U.S. Forest Service 2009d). Approximately half of these total visits occurred in the Forest's north zone, which includes the SE and CYE recovery zones. According to the Draft Supplemental EIS for motorized access management in the CYE and SE, high-use trails are counted against calculations of "percent core area." Because of this consideration of the effects of high use trails on grizzly security and the management of this security we do not consider the current levels of recreational use in the CYE and SE a threat to grizzlies at this time.

Within the CYE recovery zone, there are 59 miles of groomed snowmobile trails and 281 miles of ungroomed routes (U.S. Forest Service 2009d). Off-route use occurs on approximately 70 square miles within the recovery zone. Both on and off-route snowmobile travel combined occurs on about only 6-9 percent of modeled denning habitat within the CYE (U.S. Forest Service 2009d). Negative impacts on grizzly bears are primarily limited to the den emergence period (basically the month of April), particularly for female bears with cubs of that year. There is the potential of separating a mother and cub, which could result in cub mortality, although such effects have never been documented and there are no known scientific papers supporting this potential impact. Given the small population size of grizzly bears, the overlap of less than 10 percent of modeled denning habitat (U.S. Forest Service 2009d), and the seasonally-declining numbers of snowmobilers by April of each year, the probability of a snowmobile encountering a female with cubs using a particular patch of denning habitat is low. Neither the Kootenai nor the Idaho Panhandle National Forests have drafted a winter travel plan for snowmobile use in the CYE (U.S. Forest Service 2009d).

Land acquisition. Land acquisition and exchange has placed additional areas within this recovery zone in the public domain and may benefit the long term conservation of the species. There have been 2 major land exchanges in particular that have been beneficial to grizzly bear habitat within the CYE. In 1997 the Kootenai National Forest completed a land exchange in which 33 square miles of land owned by Plum Creek Timber Company were placed in public ownership. Almost all of this land was within the CYE grizzly bear recovery zone and is now under Forests management.

Grizzly Bear Mortality. As detailed in the *Status of the Species* section, in the entire CYE since 1982, there have been a total of 56 known grizzly bear mortalities from all forms, on all ownerships (including Canada) (U.S. Fish and Wildlife Service 2004; BA 2010; BA supplement 2011). Of the total mortalities, about 23 (41 percent) are known or suspected to involve guns. Some mortalities are still under investigation; at least 6 human-caused are undeterminable. Of the gun related mortalities, 14 (61 percent of gun mortalities) were non-malicious (mistaken identities, self-defense, and legal hunting in BC); but 9 (39 percent of gun mortalities) were deemed poaching. Of these occurring in the action area (National Forest lands) there were: 2 poaching cases, 3 mistaken identity cases, and 4 self-defense cases .

Attraction of grizzly bears to improperly stored food and garbage is identified as one of the principal causes of grizzly bear mortality, especially on private lands.
The Forests are currently implementing sanitation programs. In 2002, pursuant to guidance from the IGBC, the KNF and IPNF convened an Information and Education Workgroup to develop a comprehensive sanitation program, including a food storage order on public land to help reduce bear habituation to humans and to minimize the potential for bear/human conflicts. These programs are near full implementation and will include, among other things, public education, and a food storage orders on national forest system lands within and around the recovery zone. The KNF signed their food storage order on June 3, 2011; the IPNF reportedly will soon sign theirs (SCYE Grizzly Bear Subcommittee meeting notes, June 9, 2011), and the LNF signed a Forest-wide order in spring 2011 (*Ibid.*).

Augmentation. As mentioned earlier, since 1990, 11 female and 3 male grizzly bears have been augmented into the Cabinet Mountains to enhance the existing population. The MFWP will continue this effort.

Primary Factors Affecting Grizzly Bears in the SE Portion of the Action Area

Similar to the CYE, a very small portion of the action area in the SE is non-federal lands. In the U.S. portion of the SE, land ownership is approximately 80 percent Federal, 15 percent State, and 5 percent private lands. Ongoing activities occurring on State and private lands in the SE have the potential to affect grizzly bears due to direct mortality, (illegal kills or mistaken identity), sanitation problems resulting in removal or killing of grizzly bears; habitat loss from rural home development, resorts and agricultural activities .

Forest Service Management: The IPNF manages approximately 513,686 acres within the action area in the SE.

Access Management. Similar to the CYE, indices for linear road densities and then OMRD, TMRD, and core area have also been improving steadily in SE portion of the action area since 1987 (U.S. Forest Service 1998, 1999, 2002, 2009a, 2010; and 2005, 2006, 2008, 2009b, 2011; BA 2010).

In the SE portion of the action area, there was an increase of approximately 13,032 acres of core area from 2000 to 2010. This translates into an increase from 58.1 to nearly 61 percent of IPNF lands in core area from 2000 to 2010 (which includes eight BMUs managed by the IPNF). (Recall: the action area portion of the Selkirk recovery zone does not include the LeClerc BMU on the Colville National Forest, the Idaho Department of State Lands BMU, or the 48 percent of the remaining recovery zone located in British Columbia, Canada.)

Timber Harvest. Overall, there have been decreases in the amount of road construction and timber harvest in the SE action area. Both the number of acres affected and the volume of timber harvested have decreased since 1987 (U.S. Forest Service 2009d). The volume of timber harvested has decreased at a faster rate than the number of acres harvested due to changes in management direction and silvicultural prescriptions (U.S. Forest Service 2009d).

Land Management Activities. There are no known oil or gas reserves within the SE recovery zone and there are currently no oil or gas leases on these IPNF lands. Similarly, there are no mining claims or plans of operation within the SE recovery zone.

Livestock Grazing. There are currently two cattle allotments in the action area within the SE There are no sheep allotments. The 2 cattle allotments on the IPNF affect roughly 3 percent of the SE recovery zone (Allen 2010).

Recreation. Motorized over-the-snow vehicle use is occurring in the Selkirks (see project record). When this use occurs during the active bear year (April 1 to November 15 or November 30 - depending on recovery zone), grizzly bears may be disturbed and potentially displaced from

preferred habitats. Negative impacts on grizzly bears are primarily limited to the den emergence period (basically the month of April), particularly for female bears with cubs of that year. There is the potential of separating a mother and cub, which could result in cub mortality, although such effects have never been documented and there are no known scientific papers supporting this potential impact.

Within the Selkirk recovery zones, winter motorized activity currently occurs on 14 miles of groomed routes, respectively, and on 11 miles of ungroomed routes, respectively, across modeled den habitat. Off-route use occurs on approximately 7,438 acres in the Selkirk Recovery Zone. Within the recovery zone, on and off-route use occurs on about six percent of modeled den habitat. However, in the Selkirk Recovery Zone, use is not permitted during the post-den period (after April 1) on a portion of those acres. Given this restriction, the low number of adult female grizzly bears with cubs, the overlap of less than 10 percent of modeled denning habitat, and the seasonally-declining numbers of snowmobilers by April of each year, the probability of a snowmobile encountering a female with cubs using a particular patch of denning habitat is low.

The IPNFs is in the process of completing a *Winter Travel Plan* that addresses the Selkirk Mountain Range. There is an existing protective closure for woodland caribou (court order CV-05-0248-RHW) limiting motorized over-the-snow vehicle access within the Selkirk Recovery Zone, until a Winter Travel Plan is completed.

Grizzly Bear Mortality. As detailed earlier in the *Status of the Species* section, in the entire SRZ (including lands outside the action area) since 1982, there have been a total of 62 known grizzly bear mortalities from all forms, on all ownerships (including Canada) (U.S. Fish and Wildlife Service 2004; BA 2010; BA supplement 2011). Of the total mortalities, about 18 (29 percent) are known or suspected to involve guns. Some mortalities are still under investigation; 13 human-caused are undeterminable. Of the gun related mortalities, 11 (65 percent of gun mortalities) were non-malicious (mistaken identities, self-defense, and legal hunting in BC); but 7 (39 percent of gun mortalities) were deemed poaching. In the action area (National Forest lands): 2 of the poaching cases occurred and 4 of the mistaken identity cases occurred (there have been no cases of self-defense). See the CYE section above for attractant storage.

Table A5. Summary of changes in access parameters for the SE Recovery Zone, 2002-2010, compared to the proposed standards (from U.S. Forest Service 2011).

BMU	Access Standard Type	Proposed Standards*	YEAR 2002	2003	2004	2005	2006	2007	2008	2009	2010
Blue Grass 57,325	OMRD	33	27	33	31	28	30	28	33	33	29
	TMRD	26	30	30	31	28	28	28	28	28	28
	CORE	55	50	50	51	51	50	50	50	50	50
	HE	NA	69					69	65	72	72
Long-Smith 65,735	OMRD	25	23	21	22	21	21	21	21	21	21
	TMRD	15	13	13	14	14	14	14	14	14	14
	CORE	67	73	73	73	73	73	73	73	73	73
	HE	NA	80					85	85	85	85
Ball-Trout 57,907	OMRD	20	18	17	17	17	17	17	17	17	17
	TMRD	13	11	11	11	11	11	11	11	11	11
	CORE	69	72	72	72	72	72	72	72	72	72
	HE	NA	76					77	77	77	77
Myrtle 63,781	OMRD	33	30	30	31	32	31	31	33	29	30
	TMRD	22	19	21	21	21	21	21	20	20	20
	CORE	56	60	57	58	58	58	58	60	60	60
	HE	NA	70					73	70	74	74
Salmo-Priest 87,115	OMRD	33	31	31	30	30	30	31	31	30	31
	TMRD	26	25	26	26	25	26	25	25	24	24
	CORE	64	65	65	65	66	66	66	66	66	67
	HE	NA	102					102	102	102	81
Sullivan-Hughes 78,210	OMRD	24	23	23	24	24	24	24	24	24	23
	TMRD	19	21	21	21	20	19	19	19	19	19
	CORE	61	59	59	59	59	61	61	61	61	64
	HE	NA	92								81
Kalispell-Granite 85,641	OMRD	33	31	28	29	29	29	29	32	31	33
	TMRD	26	29	27	27	27	27	29	29	28	28
	CORE	55	48	48	48	48	48	47	48	49	50
	HE	NA	100					102	99	100	98
Lakeshore 17,972	OMRD	82	78	78	80	81	79	82	82	82	83
	TMRD	56	50	50	51	51	51	54	54	54	54
	CORE	20	20	20	20	20	20	19	19	19	19
	HE	NA	8					9	9	9	9

[1]Not Available—with the signing of the 2004 Record of Decision (U.S. Forest Service 2004) habitat effectiveness became obsolete until the decision was remanded in the winter of 2006.
* Proposed Standards as percent of BMU

Conservation Needs of the Species within the Action Area. As mentioned earlier, the Service identified the six priority needs to achieve grizzly bear recovery in the SE and CYE grizzly bear recovery zones (Servheen pers comm. 10/01/2006), and they pertain to the action area as well:

1. Augment the Cabinet Mountains and Canadian Selkirks populations;
2. Limit human-caused mortality;
3. Enhance population linkage across Highways 2, 3, 200, 135, and 95;

4. Address the needs of bears outside the recovery zone line;
5. Inside the recovery zone, a) complete access management in most important areas and b) improve sanitation standards on public lands;
6. Increase outreach and public involvement.

EFFECTS OF THE ACTION

The effects of the action are considered along with the status of the species, the environmental baseline, and cumulative effects (defined below) for purposes of preparing a biological opinion on a proposed Federal action (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

"Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, and that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. [50 CFR §402.02]

General Factors to Consider – Motorized Access Management

In this consultation on the programmatic action of motorized access management, the fundamental effects to the grizzly bear under consideration are those resulting from the network of roads on the involved Forests. At the programmatic level, it is difficult to describe any site-specific effects of the proposed Access Amendment in terms of traditional project-level impact considerations, such as proximity of the effect, distribution, timing, nature of the effect, duration, disturbance frequency, disturbance intensity, or disturbance severity (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998, pages 4-23 to 4-26).

The Interagency Grizzly Bear Guidelines (IGBC 1982) indicated that a viable road and access management plan is "the most important factor influencing the long-term impacts on grizzly bears in habitat influenced by timber harvesting."

In 1993, the Grizzly Bear Recovery Plan (U.S. Fish and Wildlife Service 1993) stated that:

> *"Roads probably pose the most imminent threat to grizzly habitat today (Appendix B). The management of roads is one of the most powerful tools available to balance the needs of people with the needs of bears. It is strongly recommended that road management be given the highest priority within all recovery zones."*

In 1993, in response to this concern, the Interagency Grizzly Bear Committee (IGBC) tasked public land managers with developing road management regimes to help conserve and recover the grizzly bear. By 1994, the IGBC Taskforce Report provided standardized definitions for roads and recommended standardized methods to measure road densities and define analysis areas derived from grizzly bear research information on open and total motorized road densities and grizzly bear core areas; these were revised in 1998 (IGBC 1994, 1998). About the same time, grizzly bear researchers and the Selkirk/Cabinet-Yaak Grizzly Bear Subcommittee began working toward implementing the IGBC recommendations in their respective recovery zones (Wakkinen and Kasworm 1997; IGBC 1998 Sept. 23, 1998; IGBC S/C-Y Subcommittee, Dec. 1, 1998; U.S. Fish and Wildlife Service January 21, 1999 letter). The Service considers this body of work - and the research it was based on - as part of the best scientific and commercial information available with respect to the management of roads in grizzly bear habitat. Newer and emerging scientific information is, of course, taken into consideration.

The following section provides a general discussion of direct and indirect effects of roads, motorized access management, and human development on grizzly bears and their habitat. This section is followed by a section that analyzes the direct and indirect effects specific to the proposed action.

General Effects of Roads on Grizzly Bears

The presence of roads and human activity associated with roads creates some of the most pervasive and chronic effects on grizzly bears and their habitat.

Grizzly bears generally respond to (or are affected by) roads and human presence in four ways. First, they may be disturbed by human presence, responding with a relatively short term – short distance response. Second, they may be displaced from roaded areas, responding with a longer term avoidance response and movement to another area. When bears avoid roaded areas, they forgo the resources in these areas, which may result in under-use of key habitats. They may also be displaced into competition with other bears, or conflicts with humans. Third, grizzly bears may become habituated to human activities and roads but then expose themselves to a greater probability of encounter with humans. And fourth, roads facilitate human access into grizzly bear habitat, which directly or indirectly increases the risk of mortality to grizzly bears.

Roads and Grizzly Mortality Relationships

The presence of roads alone does not necessarily result in direct mortality of grizzly bears. However, the proximity of roads to human population centers, resulting in high numbers of people using roads, and dispersed recreation in habitat around roads can pose considerable risks to grizzly bears. Social values and attitudes also contribute to the level of mortality risk to grizzly bears. Incidental or accidental human-caused grizzly bear mortality, combined with a few individuals intent on illegally shooting grizzly bears, can collectively result in serious, detrimental effects to grizzly bear populations. Access management can be partially instrumental in reducing mortality risk to grizzly bears by managing the present and anticipated future road use-levels resulting from the increasing human population.

Grizzly bears are more vulnerable to illegal and legal harvest as a consequence of increased road access by humans in Montana (Mace et al. 1987) and in the Yellowstone region (Mattson et al. 1992). In southeastern British Columbia, McLellan and Shackleton (1988) reported roads increased access for legal hunters and poachers, the major source of adult grizzly mortality. McLellan (1989b) reported that 7 of 13 successful legal hunters interviewed had been on a road when they harvested their grizzly bear. McLellan and Mace (1985) found that a disproportionate number of mortalities occurred near roads. In the Yellowstone ecosystem, Mattson and Knight (1991) reported that areas influenced by secondary roads and major developments were most lethal to grizzly bears. Aune and Kasworm (1989) reported 63 percent of known, human-caused grizzly bear deaths on the east front of the Rocky Mountains occurred within 1 kilometer (0.6 miles) of roads, including 10 of 11 known female grizzly bear deaths. In Montana, Dood et al. (1986) reported that 48 percent of all known, non-hunting mortalities during the period of 1967 through 1986 occurred within 1 mile of roads.

Human-caused grizzly bear mortality occurs near roads, and but also away from roads and for a variety of reasons and circumstances.

In one study of grizzly bears in roaded environments of the NCDE, Mace and Waller (1998) found that bears with designated wilderness in their home range had higher rates of mortality (0.129) than bears that lived only in the Forests-administered "multiple use" roaded areas (0.009) and slightly lower rates of mortality than bears that used the private "rural" lands and "multiple use" public lands in their home range (0.176). Mortalities in the wilderness areas resulted from "mistaken identity" during the big game hunting season and human defense of life. In rural areas, mortalities resulted from malicious killing and the management removal of habituated or food-conditioned bears (*Ibid.*).

Similarly, in and around the CYE Recovery Zone, many of the human-caused grizzly bear mortalities from 1982-2007 occurred on private lands around the periphery of the recovery zone, especially since 1999 (Kasworm et al. 2008: pg. 64, Appendix Table 1, Table 13 {page 64}, Figure 63 {pg. 65}). In the recovery zone area, disproportionately more grizzly bears were killed on private land since 1999, which constitutes 10 percent of the CYE, than on public lands, which constitute 90 percent of the CYE.

On National Forest lands, grizzly bear mortality occurs both near roads and away from roads. From 1982 through 2009, Kasworm et al. (2010) reported 52 instances of known and probable grizzly bear mortalities from all causes inside and within about 10 miles of the CYE recovery zone (including Canada). Thirty-seven (of the 52) mortalities are classified as human-caused (Ibid.). Fourteen of those human-caused mortalities were documented on National Forest land, while 23 were off of National Forest (Ibid.). Of the 14 human caused mortalities on National Forest land, 9 were within 500 meters of an open road, while 5 were greater than 500 meters from an open road (Ibid.). Similarly, using much of the same data plus data from Idaho, the Forests (BA 2010, pg. 25) analyzed patterns of mortality in relation to roads and ownership and found that of the 90 total human-caused mortalities, 64 were within 500 meters of an open road, 13 were farther than 500 meters from an open road, and 13 were of an unknown distance from a

road. Of those 90 mortalities, 20 occurred on National Forest lands. On Forest lands, 15 were within 500 meters of an open road, 10 were farther than 500 meters from an open road, and 4 were of an unknown distance from a road.

Schwartz et al. (2010) reported similar patterns in the Yellowstone ecosystem as those observed in the NCDE (Mace and Waller 1998) and CYE (Kasworm et al. 2010): bears in the Schwartz study died at higher rates in less secure habitat, lower elevations, and zones of human development. Wayne Kasworm (U.S. Fish and Wildlife Service grizzly bear researcher in the CYE, pers comm. email 6/9/2010) reviewed Schwartz et al. (2010) and wrote the following:

> "I have reviewed the Schwartz et al (2010) paper 'Hazards affecting grizzly bear survival in the greater Yellowstone ecosystem.' Authors conclude that numerous factors affect grizzly bear survival in the Yellowstone area, specifically that secure area and elevation are associated with higher survival and that open road density, number of homes, and site developments were associated with lower survival. Furthermore they identified certain human activities, particularly rural home development and ungulate hunting, that negatively affected survival. Current efforts towards access controls on the public lands in northwest Montana are geared to improve survival by addressing many of the same issues identified in this paper. Access management seeks to place scientifically based standards for secure area and open road density on the public lands. These standards are designed to improve bear survival on public lands. Continued monitoring of the population is necessary to determine future success of these efforts. However, this paper also points towards rural home development as a significant factor affecting bear survival that will probably require more attention regarding not only where people build homes, but also how they live in those areas (sanitation and tolerance of bears). Recent increases in levels of mortality on private lands in northwest Montana point to the need to deal with this issue when considering improvement in bear survival. The development of the bear conflict management position in Libby is an important step towards dealing with that source of mortality through education and providing materials to home owners (bear resistant garbage cans, electric fencing, other deterrents)."

Occasionally, grizzly bears are struck and killed by motor vehicles on roads (Servheen unpubl. rept. December 15, 2010; Greer 1985, Knight et al. 1981, Palmisciano 1986). Anecdotally, these events typically occur on paved roads or high-standard unpaved roads, which allow relatively fast vehicle speeds and reduced time for driver reaction (as compared to most forest roads).

<u>Disturbance, Displacement, Habituation</u>

Some grizzly bears, particularly subadults, readily habituate to humans and consequently suffer increased mortality risk. However, many grizzly bears under-use or avoid otherwise preferred habitats that are frequented by people. Such under-use of preferred habitat can result in a significant change in normal grizzly bear behavior. Negative association with roads arises from the grizzly bears' wariness of people, vehicles, vehicle noise and other human-related noise around roads, human scent along roads, and hunting and shooting of bears along or from roads. Grizzly bears that experience and survive such negative consequences learn to avoid the

disturbance and annoyance generated by roads. Some may not change this resultant avoidance behavior for long periods after road closures. Even occasional human-related vehicle noise can result in annoying grizzly bears to the extent that they continue to avoid areas near roads.

All of the factors contributing to direct links between roads and displacement of grizzly bears from preferred habitat have not been quantified. As with mortality risk, the level of road-use by people is likely an important factor in assessing the potential displacement caused by any road. Contemporary research, however, indicates that grizzly bears consistently were displaced from roads and habitat surrounding roads, often despite relatively low levels of human use (Hamer and Herrero 1983; Mattson et al. 1987; McLellan and Shackleton 1988; 1989; Aune and Kasworm 1989; Nagy et al. 1989; Kasworm and Manley 1990; Mace and Manley 1993; Mattson 1993; Heinrich et al. 1995; Mace et al.1996; Wakkinen and Kasworm 1997).

Avoidance behavior is often strongest in adult grizzly bears, with males selecting for high quality habitats and absence of humans (Gibeau et al. 2002). Males that were found using high quality habitat near roads, did so during the night where hiding cover was available (*ibid*). However, adult females were more likely to avoid humans all together, rather than seek out the highest quality habitats. Mueller et al. (2004) reported all age and sex classes used habitats closer to high-use roads and development during the human inactive period. All bears showed a considerably greater avoidance of high-use roads and development during periods of high human activity. They did show, however, that regardless of the time of day, subadult bears were found closer to high-use roads than adult bears. Gibeau et al. (2002) also demonstrated that subadults were almost always closer to human activity than adults.

In Montana's Rocky Mountain Front, Aune and Stivers (1982) reported that grizzly bears avoided roads and adjacent corridors even when the area contained preferred habitat for breeding, feeding, shelter and reproduction. McLellan and Shackleton (1988) found that grizzly bears used areas near roads less than expected in southeastern British Columbia and estimated that 8.7 percent of the total area was rendered incompatible for grizzly bear use because of roads. In Yellowstone, Mattson et al. (1992) reported wary grizzly bears avoided areas within 2 kilometers (1.2 miles) of major roads and 4 kilometers (2.4 miles) of major developments or town sites.

In the South Fork of the Flathead River study area (NCDE, Montana), Mace and Manley (1993) reported use of habitat by all sex and age classes of grizzly bears was less than expected in habitats where total road densities (including open and closed roads) exceeded two miles per square mile (22 percent of the South Fork Study area exceeded two miles per square mile). Adult grizzly bears used habitats less than expected when open road density exceeded 1 mi/mi^2. Further, female grizzly bears in the South Fork Study area tended to use habitat more than 0.5 mile from roads or trails greater than expected. As traffic levels on roads increased, grizzly bear use of adjacent habitat decreased (Mace et al. 1996).

In the SE/CYE, Wakkinnen and Kasworm (1997) examined the relationship between the distribution of six female grizzly bears and the densities of motorized access routes. They found that, on average, habitats with total road density greater than 2 miles per square mile, and open

road densities greater than 1 mi/mi^2, were used less than expected (*Ibid.*). The amount of area within six female grizzly bears' home ranges with a total road density exceeding 2 miles per square mile averaged 26 percent. Home ranges averaged 33 percent open road density exceeding 1 mile per square mile, and on average, 55 percent of each home range was comprised of core area (*Ibid.*) (core area is discussed below).

Mace et al. (1996) and other researchers have used 500 meters as the zone of influence around roads. Waller and Servheen (2005) also demonstrated avoidance of areas within 500 meters of US-2. Benn and Herrero (2002) set zones of influence of 500 meters and 200 meters around roads and trails, respectively. They reported that all 95 human-caused grizzly bear mortalities with accurate or reasonable locations that occurred in Banff and Yoho National Parks between 1971 and 1998 occurred within these zones of influence along roads and trails or around human settlements. Gibeau and Stevens (2005) documented bears further from roads when these roads were distant from high quality grizzly bear habitat, indicating avoidance behavior.

Research suggests that grizzly bears benefit from road closures aimed at minimizing traffic on roads within important seasonal habitat, especially in low elevation habitats during the spring (Mace et al. 1999). When roads are located in important grizzly bear preferred habitats such as riparian zones, snowchutes and shrub fields, habitat loss through avoidance behavior can be significant. Mace et al. (1996) found that most of the roads within grizzly bear seasonal ranges were either closed to vehicles or used infrequently by humans. Some grizzly bears avoided areas with a high total road density even when the roads were closed to public travel. In the Swan Mountain study (Mace et al. 1996), female grizzly bear home range selection of unroaded cover types was greatest and as road densities increased, selection of these habitat areas by bears declined. Zager (1980) reported the underuse of areas near roads by females with cubs. Aune and Kasworm (1989) and McLellan (1989a) found that female cubs generally established their home range within or overlapping with their mother's home range, whereas males generally dispersed from their mother's home range. Long-term displacement of a female from a portion of her home range may result in long-term under-use of that area by female grizzly bears because cubs have limited potential to learn to use the area. In this way, learned avoidance behavior could persist for more than one generation of grizzly bears before grizzly bears again utilize habitat associated with closed roads. Thus, displacement from preferred habitats may significantly modify normal grizzly bear behavioral patterns.

Grizzly bears can also become conditioned to human activity and show a high level of tolerance especially if the location and nature of human use are predictable and do not result in overtly negative impacts for grizzly bears (Mattson 1993). In Glacier National Park, Jope (1985) suggested grizzly bears in parks habituate to high human use and showed less displacement, even in open habitats. Yonge (2001) found that grizzly bears near Cooke City, Montana, were willing to consistently forage in very close proximity to high levels of human use if cover was sufficient and energetically efficient feeding opportunities were present. Both Mattson (1993) and Yonge (2001) postulated that areas with higher levels of human activity might have a positive effect for bears by serving as a kind of refugia for weaker population cohorts (subadults and females with cubs) seeking to avoid intra-specific competition (adult males). However, Mattson qualified this observation by adding that the beneficial effects vary as to whether hunting is allowed, and how

closely the human population is regulated. Further, food-conditioned grizzly bears were much more likely to be killed by humans. Both Yonge (2001) and Mattson (1993) indicated that increases in human use levels can be deleterious if some human activities are unregulated, such as the use of firearms, the presence of attractants, and the nature and duration of human uses. Conversely, a level of coexistence between humans and grizzly bears can be achieved if such activities are controlled. Near Cooke City, Montana, the New World Mine reclamation project had minimal effects on grizzly bears, in part because reclamation activities were temporally and spatially predictable and people associated with the work were carefully regulated against carrying firearms or having attractants available to grizzly bears (Tyers, unpublished 2006).

In the Swan Valley of Montana, raw location data from a small number of collared grizzly bears show nocturnal use of highly roaded habitat (C. Servheen, U.S. Fish and Wildlife Service, pers. comm. 2005). The Swan Valley data have not been statistically analyzed; the study was not designed to determine the impact of roads on bears; the sample size is very small; and perhaps most importantly, mortality rates for these grizzly bears were not yet known. Additional anecdotal monitoring evidence from the area continues to show high levels of tolerance by some grizzly bears in relatively roaded and developed habitats, but not without some mortality issues (Hicks et al. unpubl. rept., February 2010). These data indicate that some grizzly bears can apparently habituate to relatively high levels of human activity.

In some cases, high road densities in low-elevation habitats may result in avoidance of or displacement from important spring seasonal habitat for some grizzly bears or high mortality risk for those individuals that venture into and attempt to exploit resources contained in these low-elevation areas. Low-elevation riparian habitats are of significant seasonal importance to grizzly bears. Grizzly bears typically use the lowest elevations possible for foraging during spring. Craighead et al. (1982) described the value of low-elevation habitats to grizzly bears. Montana Fish, Wildlife and Parks concluded that maximum numbers of grizzly bears can be maintained only if the species continues to have the opportunity to use both the temperate and subalpine climatic zones (Dood et al. 1986).

Research identified the following individual home-range selection patterns in local grizzly bear population segments: (1) some individual animals live almost exclusively (except for denning) in low elevation habitats; (2) other individuals maintain home ranges in more mountainous or remote locations; and (3) some individuals migrate elevationally on a seasonal basis (Servheen 1981, Aune and Stivers 1982).

Specific causes or factors involved in the selection or preferences for certain home ranges by grizzly bears are not well understood. Mace and Manley (1993) found that grizzly bear home ranges in the South Fork Study area included remote areas in high elevations. South Fork Study grizzly bear habitat-use data, road density analyses of the South Fork Study area, previous studies and CEM analysis (U.S. Forest Service 1994, Mace et al. 1999) suggested that low-elevation habitats were not freely available to grizzly bears because of high road densities and associated human use in these areas.

Security Habitat or “Core” Areas

The Service considers significant declines in expected use of preferred habitat by grizzly bears to be a serious consequence of high road densities. Significant declines in grizzly bear use of MS-1 habitat (habitat areas key to the survival of the grizzly bear where seasonal or year-long activity, under natural, free-ranging conditions is common), especially those habitat components with high seasonal values, indicate that habitat needed for survival and recovery is less available. Ideal grizzly bear habitat provides some areas isolated from excessive levels of human impact.

Because grizzly bears can conflict with humans and their land uses, grizzly bear populations require a level of safety from direct human-caused mortality and competitive use of habitat such as settlement, roading, recreation, excessive logging, mining and livestock grazing.

Analyses in the South Fork Study area by Mace and Manley (1993), and Mace et al. (1996) indicated the importance of unroaded habitat, especially for females with cubs. Mace and Manley (1993) reported adult females used habitat further than 0.5 mile from roads or trails more than expected; 21 percent of the composite home range had no trails or roads and 46 percent was unroaded (greater than 0.5 mile from a road). Substantive blocks of unroaded habitat were components of all adult female home ranges. Of the adult female locations within unroaded polygons, 83 percent occurred within 7 polygons that exceeded 2,260 acres in size.

Based on grizzly bear habitat use data from the Yellowstone ecosystem, Mattson (1993) recommended that micro-scale security areas in that region be an absolute minimum of 3.6 miles in diameter (or 10 square miles) and should be secure for a minimum period of 5, or preferably 10 years.

The IGBC Taskforce (IGBC 1994) recognized the importance of secure areas to grizzly bears. The Taskforce defined "core areas" as those areas with no motorized access (during the non-denning period) or heavily used foot/livestock trails, providing some level of secure habitat for grizzly bears. Motorized use, such as snowmobiling or that associated with timber harvest, could occur within core areas during the denning (winter) period. The Taskforce recommended the establishment of core areas in all subunits, the size of core area should depend on ecosystem-specific habitat conditions, and that a core area remain intact on the landscape for at least 10 years.

In the South Fork Study area of the NCDE, approximately 68 percent of the adult female composite home range was core area (U.S. Forest Service in litt. 1994, K. Ake, U.S. Forest Service, pers. comm. 2005).

In the SE and CYE, Wakkinen and Kasworm (1997) found that six female grizzly bears had an average of 55 percent core area in their home ranges, with some bears in the Yaak having as little as 44.1 percent core. No minimum core area size was determined, but the authors suggest that if a minimum occurs it would likely be between 2 and 8 square miles.

Habituation to Human Attractants

Continued exposure to human presence, activity, noise, and other elements can result in habituation of grizzly bears, which is essentially the loss of a grizzly bear's natural wariness of humans. High road densities and associated increases in human access into grizzly bear habitat can lead to the habituation of grizzly bears to humans. Habituation in turn increases the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or garbage and become involved in nuisance bear incidences, and/or threaten human life or property. Such grizzly bears generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions. Habituated grizzly bears are also more vulnerable to illegal killing because of their increased exposure to people. In the Yellowstone region, humans killed habituated grizzly bears over three times as often as non-habituated grizzly bears (Mattson et al. 1992).

Subadult grizzly bears are more often vulnerable to habituation and illegal killing or they conflict with people and are removed through management action. Subadult grizzly bears frequently traverse long distances or unknown territory, increasing the likelihood of encountering roads, human residences or other developments where human food or other attractants are available, increasing the potential for habituation and/or conflicts with people. Between 1988 and 1993, six of seven grizzly bear management removals from the Flathead National Forest and surrounding area involved subadults (U.S. Forest Service 1994). In the Yellowstone ecosystem, roads impacted individual age and sex classes of grizzly bears differently. Subadults and females with young were most often located near roads, perhaps displaced into roaded, marginal habitat by dominant grizzly bears (Mattson et al. 1987, Mattson et al. 1992).

Effects on Grizzly Bears Specific to the Proposed Action

The proposed Access Amendment does the following:

- Amends the Forest Plans of the KNF, IPNF, and the LNF to include new wheeled motorized access standards within the affected BMUs of the SE and CYE recovery zones.
- Removes the existing Forest Plan standards regarding linear open road density and habitat effectiveness and replaces these with standards for open motorized route density (OMRD), total motorized route density (TRMD), and core area (security).
- Establishes core area standards for 20 of 22 BMUs in the CYE and 7 of 8 BMUs in the SE (27 of 30 BMUs overall) that meet or exceed (are better than) the benchmarks that research suggests provide conditions necessary to support the home range use and habitat needs of an average adult female grizzly bear;
- Establishes OMRD standards for 15 of 22 BMUs in the CYE and 7 of 8 in the SE (22 of 30 BMUs) that meet or are better than the research benchmark.
- Establishes TMRD standards for 16 of 22 in the CYE and 7 of 8 in the SE (23 of 30 BMUs) that meet or are better than the research benchmark.
- Core area would increase from 15 to 20 (of 22) BMUs containing at least 55 percent core, in the CYE.

- Core area would increase from 5 to 7 (of 8) BMUs with at least 55 percent core area, in the SE.
- Establishes from now until 2019 as the timeframe within which to comply with the Access Amendment standards
- Sets "administrative use" limits on restricted roads.
- Except as provided for road stabilization projects or emergencies, prohibits reductions in percent core area without in-kind replacements until all BMUs administered by the Forests in the respective ecosystems are up to standard.
- Allows one-time entry into core areas for the sole purpose of completing road decommissioning and stabilization activities on existing closed or barriered roads in a core area (i.e., legacy roads that were closed to create core habitat before this issue was identified). Roads that are closed in the future will need to be hydrologically stable so as not to need such maintenance.
- Sets linear miles of open and total road standards, and other operational limits, for BORZ areas that receive recurring use by grizzly bears.
- Changes to dates of the "bear year" in the CYE.

Background

The proposed "design elements" of the proposed action (see above: *Description of the Proposed Action*, page 8) include measures to minimize the adverse impacts of motorized access on the grizzly bear by, for example, defining timelines and goals for achieving specific standards, and by defining the sideboards for stabilizing roads within core areas. These design elements include many of the "reasonable and prudent measures" and "terms and conditions" (50 CFR 402.02; 402.14) previously included in the ITS for the 2004 biological opinion on the Access Amendment (U.S. Fish and Wildlife Service 2004) to minimize the adverse impacts of grizzly bear take caused by motorized access.

In 2004 proposed Access Amendment, the Federal District Court upheld the Service's no-jeopardy biological opinion on the then proposed Access Amendment. The proposed action considered herein is similar to the 2004 action proposed by the Forests, and includes additional elements that further consider the conservation needs of the grizzly bear.

For example, in the 2004 proposed Access Amendment, core habitat could be impacted on a project-by-project basis, without additional formal consultation. The new proposal requires that projects which impact core area are recognized as "likely to adversely affect" grizzly bears and would be subject to formal consultation (except for some limited hydrologic stabilization projects).

In the 2004 proposed Access Amendment, Forest actions that resulted in short-term losses in core habitat (e.g. use of roads for projects) were allowed in BMUs that, at the time, exceeded proposed core area standards so long as the "net" (post-project) core amount was re-established at pre-project levels.

Under the proposed action, the standard is no net loss of core area. In other words, in BMUs that exceed (have more than) proposed standards for core, any short-term loss of core area would have to be replaced in-kind within the affected BMU concurrently or prior to the short-term impact (with the exception of limited hydrologic stabilization projects), until all the BMUs are up to the core area standard in the respective recovery zone. Once all BMUs within a recovery zone meet proposed standards (which will likely not be complete until eight years), the proposed action would allow reductions of core to levels specified in the standard. However, none of these reductions would result in less than 55 percent core within any BMU. Further, the Forests would propose and evaluate such proposals on a site specific basis, including section 7 consultation, to determine the effects on grizzly bears at that time.

In contrast, previously under the 2004 Access Amendment proposal, some individual BMUs were allowed to have reductions in core area even though the respective recovery zones were not up to even minimum core area standards as a whole.

Analysis of the Proposed Standards

The access standards for individual BMUs were developed to provide areas of relatively freely available habitat (i.e. secure habitat: core) for grizzly bears, along with moderately roaded habitat elsewhere. The goal was to provide this mix of motorized and non-motorized use area at levels that ensure the food and shelter resource needs of grizzly bears, including females with cubs, were met. The objective was to provide sufficient levels of available habitat for grizzly bears while allowing other authorized uses of national forest system lands. These standards were determined through consultation between the Service, the involved Forests, and grizzly bear research scientists, and reflect the unique biological features and social factors found within specific BMUs. This tailored approach is exactly what was envisioned by the IGBC (July 21, 1994; July 29, 1998; September 23, 1998); and the Selkirk/Cabinet-Yaak Subcommittee (December 1, 1998) when they directed land managers to develop these standards.

The benchmark for the proposed standards was the average levels of access and secure habitat reported by Wakkinen and Kasworm (1997) to adequately support a female grizzly bear with cubs:

- On average, 26 percent of a female grizzly bear home range had TMRD greater than 2 miles per square mile.
- On average, 33 percent of a female grizzly bear home range had OMRD greater than 1 mile per square mile.
- On average, 55 percent of a female home range was comprised of core area (i.e., roadless area or areas with barriered roads).

The findings reported by Wakkinen and Kasworm (1997) are based on an average of motorized access conditions within a total of six female grizzly bear home ranges in the CYE and SE. These averages did not translate into definitive thresholds of grizzly bear tolerance for these parameters. Some bears successfully used habitat that was more developed (in terms of roads)

than the reported averages, some bears successfully used habitats that were more pristine (fewer roads) than the reported averages.

Subsequent to the above study, some bears died in "core area" habitat and some died in more developed habitat. There is no direct correlation, *per se*, between road density and rates of grizzly bear mortality; but grizzly bears tend to suffer higher rates of human-caused mortality in roaded habitats that have, or are near, human development (such as residences, outbuildings, campgrounds) due to a higher incidence of human contact and the availability of unnatural attractants (e.g., garbage).

In 2006, the United States District Court for the District of Montana upheld the Service's biological opinion on the Forests' 2004 access management proposal, concluding that the Service appropriately relied on Wakkinen and Kasworm (1997) to assess the impacts of access management on grizzly bear habitat (*Cabinet Resource Group v. U.S. Fish and Wildlife Service*, 465 F. Supp. 2d 1067, 1088). There is no subsequent research which would replace the continued reliance on Wakkinen and Kasworm (1997) as the scientific benchmark against which to analyze the Access Amendment. To emphasize this point, Allen et al. (unpublished report, April 2011) conducted a rigorous review of the Wakkinen and Kasworm (1997) report and concluded that it remains the best available science for the Selkirk and Cabinet-Yaak grizzly bear recovery zones.

As previously referenced in this document, the effects of roads on grizzly bear behavior and habitat use have been well documented in the scientific literature.

The current Forest Plans for the KNF, IPNF, and the LNF do not specifically require the Forests to manage for grizzly bear core areas, or open or total motorized route densities within individual BMUs in the SE and CYE. However, pursuant to IGBC recommendations and the aforementioned biological opinions issued to each of the Forests, the Forests have managed motorized access since about 1998 using the above research-based benchmark standards. These data were available to the Forests by about 1998 after the 1997 publication by Wakkinen and Kasworm. Based on this research information, interim standards for percent core area, and open and total motorized route densities were established. Within individual BMUs with more than 75 percent federal ownership, the Forests were to work toward: (1) attaining 55 percent of each BMU comprised of core area; (2) having no more than 33 percent of each BMU with OMRDs exceeding 1 mile per square miles; and (3) having no more than 26 percent of each BMU with TMRDs exceeding 2 miles per square mile. These interim standards were to be applied and achieved universally throughout each recovery zone within each individual BMU.

However, with current land ownership constraints (e.g., the amount of nonfederal land base within each BMU, and public, county, and private roads) within some BMUs in these ecosystems, achieving one, some, or all of the universally applied standards within each individual BMU was not pragmatically possible. Within a BMU, roads on both Forests and nonfederal lands (i.e., private or State) are included in the calculations for measuring access. Some BMUs comprised of a mix of nonfederal and federal ownerships currently exceed the recommended standards. The high road densities are in many cases due to roads over which the

Forests have no control. Absent an independent management agreement with the nonfederal landowners, maintaining the current percentages of core area, OMRD, and TMRD within these BMUs, relying solely on federal road management, is not possible.

Constraints affecting the Forests' ability to achieve specific levels of core area, OMRD and TMRD within BMUs include: (1) non-federal land, including corporate timber land, and private land contained within towns and municipalities; (2) public, county, and private roads; (3) some forest roads that function as "through" roads, and therefore, could not be closed without significantly increasing public travel distances between destination points, and popular recreational destinations; and (4) historically and culturally popular recreational destinations (e.g., campgrounds, concentrated fishing locations, etc.) with high human use.

Given these constraints, the Forests, in coordination with the Service and grizzly bear researchers familiar with each ecosystem, analyzed the inherent capability for individual BMUs to achieve or maintain maximum percentages of core area, and the lowest OMRDs and TMRDs within MS-1 and MS-2 lands (see below). The proposed Access Amendment sets most BMU standards at or above (better than) the average recommended values for percent core area, depending on site-specific capability of the BMUs and management needs.

Pursuant to IGBC guidelines (IGBC 1987), all Forests containing lands within ecosystems with grizzly bear populations classified their lands into management categories or "situations." Management situation designations are intended to distinguish areas where differing grizzly bear habitat and human use conditions occur and define appropriate management strategies for each. Many of the above identified constraints are located within areas identified as Management Situation (MS)-3. The guidelines for MS-1, MS-2, and MS-3 are as follows, based on the IGBC Guidelines:

1. MS-1 lands are those that contain grizzly population centers and/or habitat that are needed for the survival and recovery of the species. In those areas, the needs of the grizzly bear will be given priority over other management considerations. Land uses that can affect grizzly bears and/or their habitat will be made compatible with grizzly bear needs, or such uses will be disallowed or eliminated. Grizzly bear/human conflicts will be resolved in favor of grizzly bears unless the bear involved is determined to be a nuisance.

2. MS-2 lands are those areas that lack distinct grizzly population centers. Highly suitable habitat generally does not occur, but grizzly bears may occasionally be present, and the need for this habitat for survival of the grizzly bear is more uncertain. The status of such areas is subject to review. Management will at least maintain those habitat conditions that resulted in the area being classified as MS-2.

3. MS-3 lands are those where grizzly bears may occur infrequently, and human developments (such as campgrounds or resorts) may result in conditions that make grizzly bear presence untenable for humans and/or grizzly bears. On MS-3 designated

lands, the management focus is on human-bear conflict minimization rather than habitat maintenance and protection, and grizzly bear presence will be actively discouraged.

The Interagency Grizzly bear Committee (IGBC) approved the application of the Interagency Grizzly Bear Guidelines (IGBC 1986) on National Park Service, BLM, and U.S. Forest Service lands throughout grizzly bear ecosystems. These guidelines have been incorporated into Federal agency land management plans, and generally address grizzly bear habitat management. The Forests have incorporated the guidelines into the Forest Plans.

While the Service has no responsibility to determine whether or not a proposed action is consistent with the guidelines, we do note that the Service considers the effects of compliance or noncompliance with the guidelines in our analysis of the effects of a proposed action. The 50 CFR 402.14(d) states the "The Service must use the best scientific and commercial information available during the consultation for an adequate review of the effects that an action may have upon listed species or critical habitat." Our biological opinion takes into consideration the best scientific and commercial information available to analyze the effects of a proposed action on a species, in consideration of (1) the status of the species, (2) the environmental baseline for the action area, and (3) cumulative effects (see 50 CFR 402.02, and 402.14(g)(1)-(4)). Thus many factors, those that impart positive, benign, or negative impacts on grizzly bears are all part of our analysis. While the Service acknowledges that compliance with the guidelines benefits grizzly bears, and strongly supports the Forest's continued use of the guidelines, the guidelines are only one of many factors that are evaluated by us in our jeopardy analysis.

Effects of Proposed Core Area

The Forests propose specific core area standards for each BMU (see Tables 2 and 3 and Table A6).

In the CYE, the proposed Access Amendment would establish 2 of 22 BMUs at core area standards less than 55 percent (52 percent in Pulpit; and 37 percent in Grouse, which is <75% federal ownership), 11 BMUs at 55 percent, and nine of 22 BMUs at standards higher than 55 percent core area (Table A5).

Currently within the CYE, 15 of 22 BMUs contain at least 55 percent core area. Core area habitat within the CYE overall currently equates to about 945,869 acres (57.2 percent of the recovery zone) (U.S. Fish and Wildlife Service, unpubl. rep. 2011)).

The Access Amendment, as currently proposed, would eventually result in <u>20 of 22</u> BMUs with at least 55 percent core area, increasing core area habitat overall within the CYE by an additional 20756 acres to at least 966,625 acres (using calculations of U.S. Fish and Wildlife Service unpubl. rep. 4/27/2011). This represents an increase of core area since 2002 (the baseline considered in the 2004 biological opinion on the Access Amendment), to approximately 58.5 percent of the ecosystem (U.S. Fish and Wildlife Service, unpubl. rep. 2011). {note: Forest Service calculations may differ +/- a few tenths of a percent}.

In the IPNF portion of the SE, the proposed Access Amendment would set one of eight BMUs (Lakeshore) at a core area standard less than 55 percent (20 percent), 2 at 55 percent, and 5 of 8 BMUs at greater than 55 percent core area (Table A5).

Currently in the SE, 5 of 8 BMUs affected by the proposed action[11] contain at least 55 percent core area (BA 2010, BA Supplement 2011). Core area in action area BMUs currently equates to 307,452 acres or 60.6 percent of the action area within BMUs (U.S. Fish and Wildlife Service, unpubl. rep. 2011).

When the Access Amendment is fully implemented within 8 years, 7 of 8 affected BMUs would have at least 55 percent core area, increasing core area in the affected area by about 4,111 acres to 315,378 acres or 61.4 percent of the affected BMUs. This would represent an increase of 17,143 acres of core area since 2000 (U.S. Fish and Wildlife Service, unpubl. rep. 2011) {note: Forest Service calculations may differ +/- a few tenths of a percent}.

All BMUs in both recovery zones are expected to reach maximum core percentages in eight years (year 2019).

Two BMUs have proposed core standards for significantly less than 55 percent core area. The Grouse BMU lies within the CYE and is managed by the IPNF; it currently has approximately 32 percent core area. However, the BMU is comprised of only about 54 percent federal ownership; the other majority landowners are IDL and Forest Capital, a private corporation. Therefore, it would be impossible (due to co-owned roads and other easement issues) for the IPNF to achieve 55 percent core on its ownership alone. Accounting for the constraints identified earlier, the standard proposed is 37 percent core area.

The Lakeshore BMU within the SE is also managed by the IPNF. This BMU is extremely small (approximately 30 square miles) and has 86 percent federal ownership. Due to these factors, the full range of access management opportunities and options provided by larger BMUs is not available within this BMU. Because of the small size and juxtaposition of existing roads and topography, achieving 55 percent core area would be difficult, if not impossible. Accounting for the constraints identified earlier, the Forests decided to propose a standard of 20 percent core area.

[11] The SE also contains two other BMUs: LeClerc, which is 90% managed by the Colville National Forest; and the IDL BMU managed by the state of Idaho. These are not in the action area, but in 2008 the Service estimated that LeClerc BMU contained 26 percent core (20,570 acres); and IDL BMU contained 30 percent core (30,720 acres) (FWS 2010 11 17 unpubl. data). If these two BMUs remained constant, but the Forest fully implements the Access Amendment, the SE would support 356,090 core acres out of the 694,795 acre RZ; or about 51.3 percent cumulatively; and about 60 percent of Forest Service lands.

Table A6. Current, proposed, and potential core area percentage by BMU (from U.S. Forest Service 2011).

BMU	Current (2010) Core Area %	Proposed Standard for Core Area	Potential Core Area % at full implementation (approx. 2019)
Cabinet-Yaak Ecosystem			
1 Cedar	81%	80%	83%
2 Snowshoe	76%	75%	76%
3 Spar	62%	59%	62%
4 Bull	62%	63%	63%
5 St. Paul	58%	60%	60%
6 Wanless	53%	55%	55%
7 Silver Butte-Fisher	63%	63%	63%
8 Vermillion	55%	55%	55%
9 Callahan	59%	55%	59%
10 Pulpit	51%	**52%**	52%
11 Roderick	54%	55%	55%
12 Newton	58%	55%	58%
13 Keno	59%	59%	59%
14 NW Peaks	56%	55%	56%
15 Garver	55%	55%	55%
16 E Fk Yaak	54%	55%	55%
17 Big Creek	58%	55%	58%
18 Boulder	50%	55%	55%
19 Grouse	32%	**37%**	37%
20 North Lightning	61%	61%	62%
21 Scotchman	67%	62%	62%
22 Mt. Headley	51%	55%	55%
Selkirks Ecosystem			
Blue Grass	50%	55%	55%
Long-Smith	73%	67%	73%
Kalispell-Granite	50%	55%	55%
Salmo-Priest	67%	64%	66%
Sullivan-Hughes	64%	61%	61%
Myrtle	60%	56%	60%
Ball-Trout	72%	69%	72%
Lakeshore	19%	**20%**	20%

While the Lakeshore BMU was established primarily to provide a buffer between high human use areas along Priest Lake and adjacent BMUs to the west (primarily the Kalispell-Granite BMU), it contains important seasonal grizzly bear habitats, such as wet meadows (e.g., the 900-acre Bismark Meadows, mostly private land), riparian stream bottoms, blue huckleberry (*Vaccinium globulare*) and big huckleberry (*Vaccinium membranaceum*) shrubfields, and graminoid parks. Therefore, it is an important part of the SE. Relative to the Bismark Meadows area, grizzly bears are routinely documented using this area for foraging annually each spring from May through July. The area within this BMU also provides summer and fall foraging opportunities for grizzly bears.

Disruption of normal grizzly bear behavior can result in displacement of grizzly bears from key preferred habitat, such as wet low elevation meadows in the spring or berry-producing shrub fields in late summer. Providing areas that grizzly bears are familiar with and can rely on to be free of excessive human-related disturbance minimizes the effects of displacement from other areas of their home range that may occur as a result of human activities. The amount of core area proposed (55 percent core or more in BMUs, where possible) is based on research benchmarks for the average core area within female grizzly bear home ranges.

The proposed standard also requires core area to remain or be fixed in place for at least 10 years. This requirement is based on the premise that it takes about 10 years for a female grizzly bear to replace herself (i.e., generation time). Assuming a female grizzly bear initially breeds at approximately 4.5 years of age, and produces litters with a 50:50 sex ratio with 50 percent survival of young, she would be able to produce 2 litters in a 10-year period with one female surviving to reproductive age (U.S. Fish and Wildlife Service 1993). Maintaining undisturbed and secure habitat in place for ten years or longer provides an area of known security to grizzly bears, which they can utilize for foraging, breeding, and sheltering, should activities within other areas of their home range disrupt their normal activities.

It is important that core areas contain all seasonal habitats to the extent possible and available within each BMU. Within the recovery zones, even though rigorous seasonal habitat analysis has not been completed, it is generally believed that spring habitats are not as abundant or widely distributed and available to grizzly bears as are habitats providing summer and fall foraging opportunities. For this reason, it is particularly important to ensure that spring habitats are, to the extent possible, proportionally represented within core areas. Unfortunately, while spring habitats are distributed throughout the recovery zones, they generally occur in low-lying valley areas within proximity to human developments and activities. Consequently, spring habitats are often unavailable to grizzly bears and, thus are generally not currently well represented proportionally within the core areas. Outside core areas, the proposed action moderates OMRD and TMRD, which likely allows some use of limited spring habitat by grizzly bears in many areas.

Once each Forest's affected BMUs are collectively brought to at least minimum standards, the proposed Access Amendment would allow some decreases in core area. In the 12 BMUs that

contain greater than 55 percent core area, core may potentially be reduced to each BMUs' respective standard (see Table A6 above). However, the proposed decreases would in no cases go below the standard minimum of 55 percent core area (the research-derived benchmark); in most cases, only a 1-5 percent decrease is possible (see Table A6).

Further, in 13 of the 30 total BMUs, core would remain *above* 55 percent, ranging from 56 to 80 percent of the BMU, even if the allowable reduction occurred (see Table A6 and A8). Another 14 of the 30 BMUs would provide 55 percent core. As stated earlier, 27 of 30 BMUs will provide more than 55 percent core, even with the allowable reductions (under the proposed action) in core. Further, all BMUs are not likely to reach standards for eight years, and then any such decreases would be analyzed through site-specific Forest proposals, and include section 7 consultation.

This strategy ensures *at least* 57.5 percent core (950,569 acres) across Forest lands in the CYE, and at least 59.5 percent core (305,403 acres) across Forest lands in the SE (see Table A6) (USFWS unpubl. data 4/27/2011 and 10/14/2011){note: Forest Service calculations may differ +/- a few tenths of a percent}. The BMU boundaries are artificial and do not represent actual individual home ranges. Considering the amount of core area, these levels of core distributed across the landscape will be conducive to supporting female home ranges. Adult females impacted by new roads in core would likely find alternate suitable habitat within home ranges, and over time adjust habitat use patterns accordingly.

Until all standards are met (likely 2019), the proposed action includes very limited flexibility for Forest actions affecting grizzly bear core areas, allowing for only road stabilization projects through temporary and peripheral incursions into grizzly bear core areas. Notably, such temporary incursions may not reduce the percentage of core area below the established standards, and may occur only once per 10-year time-frame per each individual BMU, as proposed. Such activities are likely to be of short duration and limited to the road prism. Therefore, adverse effects to grizzly bears are not expected in most cases. If a specific actions were to result in adverse effects, we expect that in most cases there would be no significant impairment of the breeding, feeding or sheltering behavior of grizzly bears because of a) core areas over 55 percent in the BMU; and b) the short duration and spatially restricted (to the road prism) footprint of the activity (see also section below *Stabilizing Roads from Hydrological Risks*).

In summary, the proposed Access Amendment will result in overall increases in the extent of core area by 2019 within both of the affected grizzly bear recovery zones. Before any subsequent permanent reduction in core habitat can be proposed by the Forests, each respective recovery zone must reach at least the prescribed minimum core area standards within each BMU.

Only three BMUs within these recovery zones will not individually reach 55 percent core area (primarily due to private land constraints); 27 of 30 will provide at least 55 percent. Notably, 14 of the 30 will provide greater than 55 percent core. The highest level of core area is likely to reach nearly 58.5 percent of the CYE (all of the CYE BMUs are in the action area) when all

BMUs reach proposed standards for OMRD, TMRD and core. The highest level of core area is likely to reach approximately 61.4 percent of the SE across the action area.

Only through future federal actions subject to ESA section 7 consultation could core area in BMU's that currently exceed the proposed core area standard be *reduced* to the standard. This would only occur after each Forests' portion of the recovery zones are brought up to standard. Under the proposed action, a network of BMUs is likely to be established that, at a minimum, would provide for approximately 57.5 percent of the entire CYE to be in core area condition and 59.5 percent core area on IPNF lands in the SE (action area) (see Table A6)**.**

Adequate quantities of core area located within and distributed amongst BMUs is essential to ensure the capability of grizzly bear family groups to fully occupy and be distributed throughout each Recovery Zone. Given the proposed standards for core area, the proposed action is likely to result in adequate levels and distribution of core area within the action area. Based on the findings of Wakkinen and Kasworm (1997), and Allen et al. (2011), this level and distribution of core area is likely to provide levels of secure habitat for grizzly bears, including females, that provide for breeding, feeding, and sheltering activities.

Table A7. Core area percent and changes by year within the action area in the SE and CYE (U.S. Fish and Wildlife Service unpubl. rept. 4/27/2011 & 10/14/2011) {Forest Service calculations may differ slightly}.

Core Acres by Year	**SE (action area)**		**CYE (action area)**	
2000 core acres:		**298,235**		**921,639**
	% core	**net change**	**% core**	**net change**
2000	58.1	n/a	55.8	n/a
2001	59.4	6645	55.7	(472)
2002	59.2	(799)	55.9	2706
2003	58.8	(1913)	56.7	13243
2004	59.1	(1211)	57.2	7982
2005	59.2	871	56.7	(7073)
2006	59.4	991	56.6	(1603)
2007	59.2	(1036)	56.3	(6354)
2008	59.6	2132	57.2	16268
2009	59.6	0	57.1	(1971)
2010	**60.6**	4930	**57.2**	1307
2010 core acres:		**311,267**		**943,882**
Interim implementation period				
2019	**61.4**	4,111	**58.5**	20,851
		318,595		**966,625**
Post 2019: *Potential reductions allowed by amendment, requiring project- level formal consultation*				
worst case	**59.5**	(13,192)	**57.5**	16,056
worst case core acres		**305,403**		**950,569**

Effects of Proposed Open Motorized Route Density and Total Motorized Route Density

A similar assessment as that discussed above for percent core area was conducted for OMRD and TMRD, respectively, within individual BMUs. The research benchmark for OMRD is to have less than or equal to 33 percent of each BMU exceeding 1 mile per square mile of open road density (Wakkinen and Kasworm 1997; Allen et al., unpubl. rept. 2011). The benchmark for TMRD is to have less than or equal to 26 percent of each BMU exceeding 2 miles per square mile of total road density (Wakkinen and Kasworm 1997; Allen et al., unpubl. rept. 2011).

Currently, within the CYE, 8 of 22 BMUs exceed (i.e. are worse than) the OMRD research benchmark and 10 of 22 BMUs exceed the TMRD benchmark (see Table A6.) (U.S. Forest Service 2011, unpubl. rept.). Under the proposed action, the number of BMUs exceeding the OMRD research benchmark will decrease by 1 (to 7 of 22 BMUs), while the number of BMUs exceeding the TMRD benchmark will decrease to 6 of 22 BMUs (BA supplement 2011). Twelve of 22 BMUs will meet or be better than all three research benchmark parameters (see Table A6).

One of the ten BMUs that will not meet either the OMRD or TMRD benchmark is the Grouse BMU. As described previously, 46 percent of the Grouse BMU is state or private land, which makes it difficult for the Forests alone to manage for grizzly bear habitat at the scale of a BMU.

Two BMUs (North Lightening and Scotchman) in the CYE are proposed for an OMRD standard allowing up to 35- and 34-percent (respectively) of the BMU to exceed the OMRD benchmark (see Table 2 & 3 or A.8). However, both of these BMUs are on the southern periphery of the CYE, have low TMRD and have large blocks of core area (greater than 60 percent of the BMUs) that is connected to core areas in adjacent BMUs to the east

> In the Scotchman BMU, most of the roads are located in the southern quarter of the BMU and are associated with non-federal lands. Thus, grizzly bears may avoid the area of concentrated roads, and utilize the large blocks of core area on roadless Federal land during the course of their home range movements.
>
> In the North Lightening BMU, the open road density is due primarily to two major public routes (North Lightening and Trestle Creek roads) and the configuration and topography of the BMU, which requires a winding road course across the BMU. Similar to the Scotchman BMU, this BMU also has large blocks of core area on Federal land that grizzly bears would most likely utilize during home range movements while minimizing potential encounters with humans.

The OMRD standards within the North Lightening (34 percent) and Scotchman (35 percent) BMUs are only slightly above the research benchmarks (33 percent), and these BMUs have large blocks of core area (Table A.6) connected to core area within adjacent BMUs as well. The Service expects that both of these BMUs would support a grizzly bear's home range needs based on the findings of Wakkinen and Kasworm (1997), and Allen et al. (unpubl. rept. 2011).

Currently within the SE action area, 1 of 8 BMUs (Lakeshore) exceeds the OMRD benchmark, and 3 of 8 BMUs exceed the TMRD benchmark (U.S. Forest Service Feb. 13, 2011, unpubl. rept.) (Table A.8). The proposed Access Amendment will maintain the Lakeshore BMU as the only BMU in the SE action area exceeding the benchmarks for TMRD and OMRD. As discussed previously, due to its small size, achieving benchmark standards may be difficult within the Lakeshore BMU.

In summary, a total of 10 of 30 BMUs in the combined SE/CYE action area will not meet the recommended benchmarks for OMRD and/or TMRD (Table A8). However, 7 of these 10 BMUs currently have or are proposed to achieve at least or greater than 55 percent core area; three of which contain more than 60 percent core area (Bull, North Lightning, and Scotchman). Maintenance of good quality core areas within these BMUs may lessen the overall displacement impacts to grizzly bears related to the relatively high OMRD and TMRD outside the core by providing ample amounts of relatively secure habitat within home ranges.

Table A8. Current (2010) and proposed OMRD and TMRD conditions in both the CYE and SE. Shaded cells indicate BMU standards that would not meet research benchmarks for OMRD or TMRD; for these BMUs, green shaded proposed core area standards would achieve at least 55% core.

BMU	2010 OMRD Percent	Proposed OMRD Standards	2010 TMRD Percent	Proposed TMRD Standards	Proposed Core Standard
CYE action area					
1 Cedar	15.0%	15.0%	11.0%	15.0%	80%
2 Snowshoe	20.0%	20.0%	16.0%	18.0%	75%
3 Spar	28.0%	33.0%	26.0%	26.0%	59%
4 Bull	37.0%	36.0%	29.0%	26.0%	63%
5 St. Paul	27.0%	30.0%	23.0%	23.0%	60%
6 Wanless	33.0%	34.0%	34.0%	32.0%	55%
7 Silver Butte-Fisher	32.0%	26.0%	23.0%	23.0%	63%
8 Vermillion	33.0%	32.0%	24.0%	21.0%	55%
9 Callahan	27.0%	33.0%	26.0%	26.0%	55%
10 Pulpit	45.0%	44.0%	30.0%	34.0%	52%
11 Roderick	28.0%	28.0%	28.0%	26.0%	55%
12 Newton	42.0%	45.0%	29.0%	31.0%	55%
13 Keno	33.0%	33.0%	25.0%	26.0%	59%
14 NW Peaks	28.0%	31.0%	26.0%	26.0%	55%
15 Garver	34.0%	33.0%	25.0%	26.0%	55%
16 E Fk Yaak	32.0%	33.0%	27.0%	26.0%	55%
17 Big Creek	30.0%	33.0%	16.0%	26.0%	55%
18 Boulder	33.0%	33.0%	35.0%	29.0%	55%
19 Grouse	61.0%	59.0%	59.0%	55.0%	37%
20 North Lightning	38.0%	35.0%	20.0%	20.0%	61%
21 Scotchman	33.0%	34.0%	25.0%	26.0%	62%
22 Mt. Headley	38.0%	33.0%	37.0%	35.0%	55%
SE action area					
Blue Grass	33.0%	33.0%	28.0%	26.0%	55%
Long-Smith	21.0%	25.0%	14.0%	15.0%	67%
Kalispell-Granite	31.0%	33.0%	28.0%	26.0%	55%
Salmo-Priest	30.0%	33.0%	24.0%	26.0%	64%
Sullivan-Hughes	24.0%	24.0%	19.0%	19.0%	61%
Myrtle	29.0%	33.0%	20.0%	24.0%	56%
Ball-Trout	17.0%	20.0%	11.0%	13.0%	69%
Lakeshore	82.0%	82.0%	54.0%	56.0%	20%

Stabilizing Roads from Hydrological Risks

Several BMUs will require reductions in currently open and restricted roads to achieve the proposed standards for OMRD, TMRD, and core area. The proposed Access Amendment does not specify which roads within individual BMUs will be further restricted or closed to achieve the standards, and neither does it indicate by what method the roads will be restricted or closed. For example, under the current IGBC definition of core area, it is acceptable to have a road within a core area, as long as motorized use of the road is effectively prevented by a barrier, earthen berm, vegetation, etc. (IGBC 1998a).

The IGBC guidelines do not require the hydrologic stabilization of a road upon closure. Consequently, several roads on the KNF, IPNF, and LNF were either closed with earthen berms or barriers, or restricted with gates, and have now vegetated in. Thus, closure of the roads resulted in core areas for grizzly bears, but the roads are not hydrologically stable. Culverts have not been pulled and, thus, represent potential road failure and erosional points. Therefore, to prevent degradation of the watershed, the Forests may need to re-access these roads within core areas to put them into a hydrologically stable condition for long-term storage or decommission them entirely. This access, while important and necessary to prevent erosional impacts to watersheds, may be a source of short term disturbance to grizzly bears in areas in which they may have learned to rely on these closed roads as secure and free of disturbance. Thus, re-entering closed roads in core areas to perform hydrologic stabilization work on the road prism may temporarily reduce the ability of the area affected by the action to function as core area for grizzly bears.

The proposed Access Amendment allows for a one-time entry into core area on such roads for the sole purpose of hydrologically stabilizing the roads. To minimize the impact of such entry, the proposed Access Amendment requires that such work be completed in one bear season or less, and the road is not to be entered for at least 10 years. As noted earlier, core is to remain at 55 percent or more, the duration of activity is limited, and the activity is limited to the road prism. Therefore, we do not expect these activities to cause adverse effects to grizzly bears in most cases, although the potential cannot be ruled out entirely. We expect only female grizzly bears with cubs would be adversely affected, as they tend to be more sensitive to human disturbance. However these adverse effects would be short term only. Further, as stated, not all female grizzly bears affected by the one-time entries would be adversely affected, nor would all adverse effects rise to the level of significant impairment of breeding, feeding or sheltering. To prevent the need for such entries into core areas in the future, the proposed Access Amendment requires that roads that are closed to provide for core grizzly bear habitat be stabilized immediately and before the underlying habitat qualifies as core.

Abolishment of “Habitat Effectiveness” and Other Obsolete Measures from Forest Plans

In addition to controlling access into grizzly bear habitat, providing sufficient levels of functional grizzly bear habitat is an important element of grizzly bear conservation and recovery. “Habitat effectiveness” (HE) (i.e. security) is defined as the amount of secure grizzly bear habitat (habitat

at least one quarter mile from open roads, developments, and high levels of human activity at point sources) remaining within BMUs after impacted areas are subtracted from the total habitat in the BMUs. This management scheme was based on work conducted in 1982 by Christensen and Madel (1982). Current IPNF and KNF Plans require management for HE (i.e., functional grizzly bear habitat), at a scale of 70 square miles and 70 percent of a BMU, respectively. While the LNF's Plan does not specifically require management for HE, it does require management for displacement habitat (essentially defined in the LNF's Plan as areas free of disturbance within BMUs in which grizzly bears can seek to avoid other areas within the BMUs impacted by human activities).

The proposed Amendment replaces the grizzly bear "habitat effectiveness" (HE) standard in the Forests' Plans, as HE is no longer considered "best science" for analyzing motorized effects in grizzly bear habitat. In fact, some HE models were largely based on elk science and extrapolated to grizzly bears (U.S. Fish and Wildlife Service unpublished meeting notes, D. Harms, April 13, 1990). In lieu of the HE standard, the proposed Access Amendment would establish standards addressing TMRD, OMRD, and core area. Motorized access routes are one of, if not the major factor affecting grizzly bear use of habitat and habitat security. Motorized access routes are also a major factor influencing the number of people and places people use most often in a forest. Adequate motorized access management provides core area habitat where security from excessive human access into habitat is high, and curtails "point source" disturbances such as timber harvest, mining, etc., which typically require motorized access. Motorized access management also limits motorized route densities outside of core areas, allowing habitat use by grizzly bears across a BMU. Thus, establishing standards, based on grizzly bear research, controlling the densities of open and total motorized routes within BMUs is likely to contribute to providing adequate levels of functional grizzly bear habitat.

The proposed Access Amendment programmatically allows all traditional uses of national forests along open roads, and limits administrative use of restricted roads. Routine forest uses were part of the study area (Wakkinen and Kasworm 1997) when they developed their recommendations.

Apart from traditional routine uses along forest roads, there are other activities that might affect grizzly bears. These types of uses are not analyzed here and would undergo independent section 7 consultation (if necessary) in accordance with the ESA and its implementing regulations. These types of uses such as mining, livestock grazing, logging, and recreation can also affect the function of grizzly bear habitat, beyond the impacts of associated road uses. The Service's 1999 finding concluded that human intrusion into grizzly bear habitat is one of the factors contributing to the risk of grizzly bear extinction in the SE and CYE (U.S. Fish and Wildlife Service 1999a). Christensen and Madel (1982) determined that grizzly bears can be displaced from habitat impacted by high levels of human activity, such as mining, sustained helicopter flights, and high use recreational areas (i.e., campgrounds), and therefore, activities of this type must be considered when managing for functional grizzly bear habitat. A 1987 compendium of scientific research on grizzly bears documented that bears avoid, and can be displaced from, areas impacted by point-source disturbances.

Effects on "Bears Outside of Recovery Zones"

The proposed action also includes standards to conserve grizzly bear habitat in "BORZ" (or Bears Outside the Recovery Zone) polygons – or areas outside of the recovery zones identified as having recurring grizzly bear use (BA 2010; see also Appendix A1.). In summary, the standards include:

- No permanent increases in the total linear miles of "open roads" and "total roads" on National Forest System lands in any individual BORZ area above baseline conditions, except in cases where the Forests lacks discretion to prevent road building across national forest lands due to legal or other obligations (examples include, but are not limited to, ANILCA access claims, identification of RS2477 thoroughfares, etc.).

- Potential increases in linear miles of open or total roads must be compensated for with in-kind reductions concurrently or prior to such increases.

- There would be provisions for temporary increases in linear miles for projects but also measures to minimize the impacts of such increases, such as seasonal restrictions of public use to the June 16 – August 31 period.

- Scheduling considerations in future timber sale planning to avoid concurrent disturbance in multiple adjacent watersheds.

The current Forest Plans for the KNF, IPNF, and the LNF do not specifically require management for grizzly bears or their habitat outside of the recovery zones. However, the Forest Plans provide some benefits to grizzly bears occurring outside the recovery zones through standards pertaining to the management for other species and their habitats, such as elk, and the sensitive and indicator species listed above in the *Status of the Species* section of this biological opinion. Some of these standards control the type and intensity of activities (including road management) that may occur within the habitats of these sensitive and indicator species. Standards addressing management for these other species, while providing some benefits to grizzly bears occurring outside the recovery zones, may not provide the type of habitat that research indicates is needed for grizzly bears to support home ranges, and to reduce the occurrence of human-related mortality. Most often, other Forest Plan requirements do not require roads to be managed in a manner conducive to grizzly bear habitat needs.

Current access management standards related to grizzly bear habitat within the recovery zone are based on research using a Geographic Information System "moving windows" analysis technique. A moving windows analysis is a spatial analysis of road density distribution. Research has suggested that increasing densities of both open and restricted roads have correspondingly increased effects upon grizzly bear behavior and habitat use within their home range. The proposed action does not apply recovery zone standards to areas outside of the recovery zones. Therefore, the KNF, IPNF, and the LNF elected to not conduct a moving windows analysis in the areas of grizzly bear occupancy outside of the recovery zones. The

KNF, IPNF, and the LNF analyzed linear road densities within these areas and commit as part of the proposed action to not increase roads in these areas (see proposed action).

Linear road density information is not directly comparable to a moving windows analysis. The KNF, IPNF, and the LNF provided linear road density road information for BMUs within the recovery zones during the 2002-2004 consultation in an effort to determine whether there was a correlation between "linear" and "moving windows" analyses; and thus the potential for extrapolation to the areas outside of the recovery zones. We were unable to establish a relationship between linear road densities and moving windows road densities. There is no research documenting the potential effects of linear road densities on grizzly bears. Therefore, relative to the current moving window standards upon which benchmarks for determining "adverse effect" and incidental take have been established (i.e. core area less than 55 percent, OMRD greater than 33 percent, and TMRD greater than 26 percent), the Service is unable to definitively analyze the potential effects of the proposed action upon grizzly bears residing in the areas outside of but adjacent to the recovery zones.

We assume that road densities within the BORZ are above the average moving window density standards with the recovery zones. However, grizzly bears, including females, have been frequently documented outside the recovery zone (Wittinger 2002; BA 2010, Mace 2010; see also Figure A1). Some of these grizzly bears may have home ranges located entirely outside of the recovery zones, while others may utilize home ranges that span areas both within and outside of the recovery zones. Female grizzly bears with young have been documented, although in some cases the fate of the offspring and whether or not they have been recruited into the breeding population is not known. The low density of grizzly bears in these BORZ areas allow individual bears greater flexibility in habitat selection. The presence of grizzly bears in these areas indicates that some bears have apparently acclimated to the conditions within them, and at least in the short-term, seem able to find and secure the resources necessary for their needs and avoid human encounters resulting in mortality.

Notwithstanding the above, it is reasonable to conclude that adverse effects to grizzly bears are possible for the following reasons: Research indicates that increasing road density and the use of roads affects grizzly bear behavior and habitat use, resulting in displacement or habituation of grizzly bears (see previous effects discussion). Increasing road densities and road use are also likely to increase the chance of grizzly bear encounters with humans, leading to increased stress levels of the animal (U.S. Fish and Wildlife Service 1993). Displacement from habitat and/or increased stress levels may be especially problematic for female grizzly bears attempting to reproduce by causing decreased nutritional status, which may result in reabsorption of fetuses, etc. (Mattson et al. 1987 in: Frederick 1991; Aune and Stivers 1985 in: Frederick 1991). We conclude that these adverse effects due to road density most likely cause significant habitat modification or degradation that results in the injury (increased stress levels, decreased reproductive success) or death of grizzly bears (e.g., potential for direct collision; separation of cubs from sow; and other forms of mortality).

The proposed action would not allow additional linear road impacts to grizzly bears in BORZ areas. The proposed Access Amendment would maintain (or potentially decrease) current linear open and total road densities in BORZ areas. We expect some ongoing adverse effects on grizzly bears attempting to use these areas as a result of the existing roaded conditions. We also expect that some grizzly bears will use these areas despite some level of adverse conditions, including females, albeit at lower densities than grizzly bears in the recovery zones. We base this expectation upon our knowledge of grizzly bears currently using these areas, and the large number of grizzly bears expanding their range into other similarly roaded habitat outside the NCDE (Mace et al. 2011).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Past and present impacts of non-Federal actions are part of the "environmental baseline" as are the impacts of Federal activities that have undergone section 7 consultation.

Due to the broad geographic scope of the proposed action and, therefore, the action area (encompassing most of the CYE and SE), it is difficult to comprehensively assess all of the future, non-Federal activities reasonably certain to occur in the action area that may affect the grizzly bear. This analysis of cumulative effects is based on an assessment of land ownership and use patterns, and the patterns of grizzly bear mortality caused by non-Federal activities, as discussed above in the Status of the Species and Environmental Baseline sections.

Land Ownership and Use Patterns

SE - Approximately 56 percent of the SE Recovery Zone is outside of U.S. federal ownership: about 47 percent of the SE lies within British Columbia, and about 9 percent of the SE is under private and State land ownership within the United States. Non-federal lands in Canada, in the LeClerc BMU, and in the IDL BMU are not in the action area, and thus future activities on these lands that may affect grizzly bears are not considered in this analysis.

Of the U.S. portion of the SE, 15 percent is State, 5 percent is private, and 80 percent is federal land. Most of the State (IDL) and private land within the SE (including the action area) is managed for timber production and is therefore subject to ongoing road construction and periodically high levels of human activity. These lands are not subject to the same management standards as Federal lands within the SE. Ongoing land management activities and associated road construction are reasonably certain to occur throughout these lands for the foreseeable future, resulting in increasing road densities and habitat fragmentation in a significant portion of

the SE. For example, Stimson Lumber Company proposed to access several sections of their land within the LeClerc BMU (outside the action area) to harvest timber. This access includes the construction of approximately 17 miles of new roads, resulting in a decrease in percent core area and an increase in total road densities (open road densities will remain the same). Additionally, the IDL owns and manages a significant portion of the land base within the SE (approximately 8 percent of the U.S. portion of the SE, much of which is outside the action area) and much of it is managed for timber production. Road construction and management of the existing road base, associated with timber management, is reasonably certain to continue on IDL lands within this ecosystem.

CYE - The majority (90 percent) of the CYE is under Federal ownership, with only 5 percent comprised of State and 5 percent private lands. Specific plans for these lands are unknown, but it is reasonable to assume traditional uses such as timber management and limited residential development are likely to continue.

Future Non-Federal Activities Reasonably Certain to Occur in the Action Area that May Affect Grizzly Bears

Human population growth is expected to continue within and adjacent to the action areas. Human population growth may result in various levels of effects to grizzly bears and their habitat, which can be mitigated, depending on: where and how such growth occurs; implementation of proper sanitation measures; dissemination of adequate materials providing public education information on living in grizzly bear habitat and support for dealing with nuisance bears; and adequate hunter and recreational education information regarding grizzly bear conservation needs. Many efforts to address grizzly bear – human conflict issues are underway by public and private organizations (e.g., S/CY Subcommittee notes: May 19, 2010).

The Status of the Species section detailed causes and patterns of grizzly bear mortality within the CYE and SE. There is no way to predict with certainty whether these patterns will hold, but they could be helpful for public land managers and private land owners in focusing efforts at reducing human-caused grizzly bear mortality and recovering the populations. People are reasonably certain to continue carrying firearms in grizzly bear habitat in the action area for many reasons. Hunting specifically for grizzly bears is not permitted by state authorities in the action area. It is impossible to predict how much firearm-related, human-caused mortality could occur in the future, but if they occur, they would be the result of mistaken identity (for other game species including black bears), self-defense, or malicious killing.

The MFWP has implemented a public education program to teach hunters to differentiate grizzly bears from black bears and how to handle attractants in the backcountry. One measure is the requirement that black bear hunters successfully complete Montana's black bear/grizzly bear identification test prior to obtaining a license. The test is also available to anyone, and is popular with all hunters and the public as well. Beginning in 2001, Montana expanded its programs intended to reduce potential hunter-related grizzly bear mortality (Montana Fish, Wildlife and

Parks 2001). Idaho and Washington are developing online bear identification courses as well (Wakkinen, IDFG, pers. comm. 2011; SCYE Subcommittee notes 5/2011).

Education pamphlets are available at Forest District offices as well as other public places describing good attractant storage protocols in bear country. Many residents in the area have been responsive to Montana Fish, Wildlife, and Parks information and other agency brochures to keep wildlife-friendly households. The Forest has provided access to a video on the use of bear spray and defensive behavior (e.g. IGBC–Safety in Bear Country Video, 2001) to back country users on a limited basis.

State bear specialists are influential in numerous ways that promote recovery of grizzly bears. The MFWP stated that perhaps the greatest advancement in the management of problem bears has been the development of bear management specialist positions (Montana Fish, Wildlife and Parks 2001). The combination of shortened response time to grizzly bear conflict reports, preventative actions to remove attractants, the deterrent effects of local law enforcement, and perhaps most important, building community involvement in the management and conservation of grizzly bears, has been and will continue to be invaluable in dealing with nuisance bears, preventing habituation of bears, and fostering local public support of grizzly bear conservation (see Montana Fish, Wildlife and Parks 2005; Wenum 2002; Wenum 2004). The state of Idaho has also had bear management specialists since 1991.

The MFWP is expected to continue its efforts to augment the Cabinet Mountains with grizzly bears from other parts of Montana. This effort will increase the number of grizzly bears in the Cabinet Mountains portion of the action area. Since 2004, 11 females and 3 male grizzly bears have been relocated to the Cabinet Mountains.

The Access Amendment would establish management direction for National Forest lands supporting grizzly bear habitat. However, the BMUs in the action area also include some state and private lands. The calculations used for road densities and core area in this analysis includes effects of roads on state and private lands within the 30 grizzly bear BMUs considered in this action, even though standards set by Design Elements would apply only to national forest lands. In addition, the linear miles of open and total roads in the seven BORZ areas include consideration of roads on state and private lands, even though the standards set by Design Elements would only apply to national forest lands. Therefore, activities on non-federal lands may in some cases limit discretion for road use on federal lands in order to meet standards.

CONCLUSION

After reviewing the current status of the grizzly bear, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is the Service's biological opinion that the effects of the proposed Access Amendment are not likely to jeopardize the continued existence of the grizzly bear. No critical habitat has been designated for this species therefore none will be affected.

Implementing regulations for section 7 (50 CFR 402) define "jeopardize the continued existence of" as to "engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

Our conclusion that the proposed action is not likely to jeopardize the continued existence of grizzly bears in the Selkirk and Cabinet-Yaak grizzly bear recovery zones is based primarily on the information presented in the biological assessment prepared for the proposed project (U.S. Forest Service BA 2010), additional supplemental material from the Forest (2011), information in our files, and informal discussions between the Service, the Forests, and other personnel. We reviewed and considered the best scientific and commercial data available on the grizzly bear, we also considered the six priority needs for recovery of these populations and the "five factors" [Section 4 (a)(1)] for determining whether a species should be listed, delisted, or reclassified; and specifically the significant factors facing the affected recovery zones.

The following are key details or findings, which are discussed in detail in the preceding sections of this biological opinion:

- In the CYE, none of the 1993 demographic recovery criteria have been met (Kasworm et al. 2010). The population goal of 6 females with cubs has not been met. The 6-year running average was 2.0 females with cubs. The distribution criterion has not been met with only 11 of 22 BMUs occupied by females with young. Demographic criteria for zero mortality have also not been met. The running 6-year average (2004-09) of total human caused mortality was 1.2 animals/year including 0.7 females each year.

- In the SE, none of the 1993 demographic recovery criteria have been met. The population goal of 6 females with cubs has not been met. The distribution criterion has not been met with only 4 of 10 BMUs occupied by females with young (Wakkinen et al. 2009). Demographic criteria for zero mortality have also not been met. The running 6-year average of total human-caused mortality was 1.8 animals/year including 0.7 females each year (Wakkinen et al. 2009; Wakkinen 2010, BA 2010, 2011 supplement).

- Connectivity between and within grizzly bear populations remains a concern (Proctor et al. in review). However, the genetic data collected by Proctor et al. (in review) reflect fragmentation occurring on the landscape in the recent past (i.e., last 30-60 years). Yet some recent movements of grizzly bears between recovery zones are indicative of improved connectivity, but not without high mortality risk (Proctor 2003, Proctor et al. in review).

- The proposed Access Amendment would increase security and connectivity within grizzly bear recovery zones by virtue of improving standards for OMRD, TMRD, and Percent Core Area. Additionally, the Forests took into consideration connectivity issues when setting the individual BMU parameters (BA 2010:50; Kaiser 2003) as well as the development of the BORZ polygons (BA 2010:Appendix F). Connectivity between

recovery zones will rely on actions outside of the action area and the jurisdiction of the Forests (Servheen et al. 2001; 2003; IGBC 2004).

- Wakkinen and Kasworm (1997) present the best scientific information available to prescribe road density standards in multiple use forest environments that is conducive to grizzly bear survival and reproduction; the findings of Wakkinen and Kasworm (1997) were used as the benchmarks for development of the motorized use standards under the proposed Access Amendment.

- Grizzly bears can sustain disturbance within their home range without injury or death if an adequate quantity and quality of secure habitat is provided at the home range scale. For example, the bears in the Wakkinen and Kasworm (1997) and Mace and Waller (1998) studies existed in a multiple-use forest environment with a spectrum of ongoing activities including timber sales and public use of the forests. Individual resident grizzly bears are capable of moving within their home range unharmed in response to localized disturbances; if road densities are moderate and adequate core habitat is provided, it is likely that the affected bears will find needed food and shelter resources elsewhere in their home range.

- Grizzly bears experience human-caused mortality near open roads and away from open roads. There is no road density prescription that can ensure a grizzly bear's survival. Rather, managing human behavior in grizzly bear habitat, both on public and private lands, is essential to an effective strategy to reduce human-caused mortality of grizzly bears.

- Much of the recent grizzly bear mortality is associated with conflicts arising from attractants on private lands rather than conflicts on public lands.

- The current downward population trend for the CYE grizzly bear population began in 1999. As Kasworm et al. (2010) explain, most of the decrease in survival rates of grizzly bears during 1999-2009 "was attributable to a dramatic increase in point estimates for **natural mortality** [*emphasis added*] probably related to poor berry production during 1998-2004. A large increase in **[human-caused] mortality occurring on private lands** [*emphasis added*] within the U.S. also contributed heavily to this increase in overall mortality and may also be related to poor berry production that may have caused bears to search more widely for foods that may occur on private lands. Several mortalities occurring during 1999-2009 were associated with issues on private lands."

- A similar phenomenon of increased human-caused grizzly bear mortalities associated with poor berry or other food production, has been documented in the NCDE (Manley 2005).

- **Mortality rates on public lands in the CYE have decreased** while the overall rate of grizzly bear mortality has increased (Kasworm et al. 2010). "Point estimates for human-caused mortality occurring on public lands in the U.S. and British Columbia [in the CYE]

decreased from 1983-1998 to 1999-2009. This apparent decrease in mortality rates on public lands is particularly noteworthy given the dramatic increase in overall mortality rates [including private land and natural mortalities]" (Kasworm et al 2010).

- This decline in grizzly bear mortality rates on public land and increase on private lands is noteworthy. **Disproportionately more bears are killed on private land than public land.** The CYE is 90 percent public land yet human-caused mortality is on public land is only about 14 percent of the trend mortality (Kasworm et al 2010). The CYE is about 10 percent private yet human-caused mortality on private lands in the U.S. accounted for 23 percent of trend mortality. Mortality on private lands in the U.S. has become the largest source of human-caused mortality in the CYE (Ibid.).

- Since 2006 the CYE population trend, although still not increasing, is improving (Kasworm et. al 2010). The rate of decline has lessened, based on improved adult and subadult female survival since 2006 (see Figure A7).

- The preceeding points indicate that although human-caused mortality continues to be the key factor affecting survival and recovery in these ecosystems, access management on National Forest lands alone cannot eliminate this negative factor on the populations. However, the Forests can contribute to survival and recovery by providing sufficient security for grizzly bears through motorized access management.

- The best available information related to access management includes research in the CYE and SE that identified levels of forest roading compatible with female grizzly bear home range use and reproductive success (Wakkinen and Kasworm 1997). The proposed action would set BMU-specific standards for OMRD, TMRD and Percent Core Area based on this research.

- Wakkinen and Kasworm (1997) documented a mix of core and roaded habitat within an average female grizzly bear home range. Some of the study bears used habitat exhibiting more than the averages, some used habitats exhibiting less than the averages (*Ibid.*, pp. 12-22). Therefore replicating this average mix of habitat across the landscape for each BMU presumably moderates road densities broadly, and allows female grizzly bears to distribute themselves across the action area, finding needed resources to live and reproduce.

- Under the proposed action, departures from a "one size fits all" application of the prescriptions into land management standards were made on a case-by-case basis, as envisioned in the 1998 Interim Rule Set and the Service's 1995, 1996, and 2001 biological opinion and incidental take statement (U.S. Fish and Wildlife Service 1995, 1996, 2001). Substantial negative deviations are generally presumed to adversely affect grizzly bears and require section 7 consultations (including this proposal). However, the proposed action results in most BMUs meeting or exceeding research benchmarks for core, OMRD and TMRD.

- With implementation of the proposed action, core area is likely to be well distributed throughout each of the SE and CYE recovery zones, will most often occur at levels at or higher than 55 percent in each BMU, and occur at levels cumulatively higher than 55 percent across the action area (e.g., the KNF/Lolo and the IPNF) overall.

- In the CYE, within 8 years, Forest Plan standards would result in 9 of 22 BMUs providing more than 55 percent core, 11 of 22 BMUs would provide at least 55 percent core, and only 2 BMUs would provide less (see Table 2; Appendix A.2).

- In the SE, within 8 years, Forest Plan standards would result in 4 of 8 BMUs providing more than 55 percent core, 2 of 8 BMUs would provide at least 55 percent core, and only 1 BMU would provide less (see Table 3: Appendix A.2).

- During this implementation period, displacement, disturbance and possibly mortality that may occur because of inadequate levels of core would likely continue at some level, but would steadily diminish as the Forests reached full implementation. To reduce negative effects, under the proposed action no net reductions in Percent Core Area in any BMU will occur until the proposed standards for OMRD, TMRD and Percent Core Area are met at the Forest and recovery zone scales.

- Once core, OMRD, and TMRD in a BMU reach the benchmark densities reported in Wakkinen and Kasworm (1997), disturbance and displacement of grizzly bears is not expected to be at levels that result in adverse effects to bears.

- A few BMUs (three of 30) in the action area will not reach the 55 percent core benchmark under the proposed action. The negative effects in these 3 BMUs would be moderated by conditions in 27 of the 30 BMUs that will have at least 55 percent core area, including 14 of the 30 with higher than 55 percent core; providing between 57.5 and 58.5 percent core in the CYE portion of the action area and between 59.5 and 62 percent core in the of the SE portion of the action area (Tables 3, 4, A6 and A7).

- Similar patterns for levels of OMRD will occur with implementation of the proposed action (see Tables 2, 3 and A7). The majority of BMUs will provide the research benchmark levels or better for OMRD: 15 of 22 BMUs in the CYE and 7 of 8 BMUs in the SE. Ten of 30 BMUs will have better than the OMRD benchmark; 12 are set at the benchmark; and 8 will be below the benchmark (Table A7).

- Similar patterns for levels of TMRD are likely to occur with implementation of the proposed action (see Tables 2, 3, and A7). The majority of BMUs will provide the research benchmark levels or better for TMRD: 16 of 22 BMUs in the CYE and 7 of 8 BMUs in the SE. Ten of 30 BMUs will have better than the TMRD benchmark; 13 BMUs are set at the benchmark; and 7 BMUs are set to be below the benchmark (Table A7).

- Indices for motorized access management in grizzly bear habitat (OMRD, TMRD, Percent Core Area) have been improving steadily in the action area since 1987 as documented by Allen et al. (2011), Summerfield et al. (2004), annual Forest Plan monitoring reports (U.S. Forest Service 1998, 1999, 2002, 2009a, 2010), and the annual monitoring reports sent to the U.S. Fish and Wildlife Service since 2004 (U.S. Forest Service 2005, 2006, 2008, 2009b).

- In the CYE portion of the action area between 1999 and 2010, core area increased by 24,230 acres, or from approximately 55.8 percent of the ecosystem to 57.2 percent. Within 8 years, this will increase to 58.5 percent, and the proposed action requires no less than 57.5 percent over the long term.

- In the SE portion of the action area, on the IPNF between 1999 and 2010, core area increased by 13,302 acres, or from approximately 58.1 to 60.6 percent core. Within 8 years, this will increase to 62 percent, and the proposed action requires no less than 59.5 percent core over the long term.

- Within the BORZ, existing conditions related to wheeled motorized access may result in displacement and/or disturbance of the grizzly bears that occasionally use these areas. On the other hand, grizzly bears have demonstrated a range of tolerances; some have occupied these areas despite highly roaded baseline conditions.

- Nevertheless, the proposed action will allow for no net increases in the existing miles of open and total roads on Forest lands in the seven BORZ areas, thus, no net change in the existing baseline. Individual projects are still subject to section 7 consultation, as appropriate.

- The proposed action finalizes one of the six priority needs to achieve grizzly bear recovery in the SE and the CYE, completing access management direction, and contributing to the conservation of grizzly bears.

- We conclude that the proposed action is not likely to jeopardize the continued existence of grizzly bears in the Selkirk and Cabinet-Yaak grizzly bear recovery zones, and therefore is not likely to jeopardize grizzly bears.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior

patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

The measures in an incidental take statement are non-discretionary and must be undertaken by the action agency so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The action agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the action agency (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the action agency must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

Amount or Extent of Take Anticipated

The proposed Amendment will establish grizzly bear habitat management standards for all 22 BMUs in the CYE and 8 of 10 BMUs in the SE. Of the two BMUs in the SE not addressed by the proposed Amendment, one is managed entirely by the IDL and the other (i.e., LeClerc) is primarily managed by the CNF. Within the action area, the proposed standards for 7 of 8 BMUs in the SE and 20 of 22 BMUs in the CYE will meet or exceed (be better than) the benchmarks for core area; 15 of 22 in the CYE and 7 of 8 in the SE will meet or be better than the benchmark for OMRD; and 16 of 22 in the CYE and 7 of 8 in the SE will meet or be better than the benchmark for TMRD that research suggests provide conditions necessary to support the home range use and habitat needs of an average adult female grizzly bear (Table A6). The grizzly bear access management benchmarks identified through research specific to these ecosystems are as follows: home ranges were comprised of 1) an average 55 percent core area; 2) an average of 26 percent TMRD greater than 2 miles per square mile; and 3) and average of 33 percent OMRD greater than 1 mile per square mile .

As previously described in the accompanying biological opinion, the effect of roads upon grizzly bear behavior and habitat use has been well documented in the scientific literature.

We anticipate that incidental take of grizzly bears is likely to occur in the form of harassment of adult female grizzly bears in highly roaded areas (through displacement caused by road-related disturbance). We also anticipate harm of adult female bears (through significant habitat modification or degradation caused by high open or total road miles), which causes actual injury to female grizzly bears by significantly disrupting normal behavioral patterns, including breeding, feeding, or sheltering. The take we anticipate would be caused by significant displacement of female grizzly bears from key habitat areas in highly roaded areas, which may

result in decreased fitness that impairs a female's inherent reproductive potential. In other words, some adult female grizzly bears wary of humans and human-generated disturbance may not breed at their potential frequency or they would fail to complete gestation due to decreased fitness. We do not anticipate any take of subadult or male grizzly bears. We do not expect all adult female grizzly bears affected by displacement or by alteration of habitat caused by the proposed action to suffer impairment of breeding, feeding and/or sheltering.

Currently, the Service is unaware of scientific or commercial information that could be used to quantify the exact level of incidental take of female grizzly bears as a result of such impacts to or degradation of their habitat, disturbance, or displacement. Reduced reproductive success of females as a result of displacement effects could include grizzly bear cub injury or mortality, but it is more likely to occur through failure to breed or complete gestation. The amount of take is difficult to quantify for the following reasons:

1. The amount of take would depend on the number of adult female grizzly bears impacted by high road densities. We lack specific information on the precise number of adult female grizzly bears that use the action area, but due to the amount of habitat meeting acceptable habitat parameters, we reasonably assume very few adult females would be affected.
2. Individual grizzly bears would react differently to the disturbance. Not all adult female bears that are exposed to disturbances from roaded areas would be adversely impacted to the point of take.
3. Individual female grizzly bears that initially may be sensitive to disturbances may over time become accustomed to the routine disturbances generated by routine forest road use. Therefore, determining the precise amount of take, as defined by impaired reproductive potential, is difficult.

Therefore, the Service anticipates some low level of incidental take of female grizzly bears would occur in the form of harassment or harm from the displacement effects of road densities.

The amount of take would be also difficult to detect for the following reasons:

1. Grizzly bears are not easily detected or observed in the wild.
2. Reproductive rates of individual female grizzly bears vary naturally due to environmental and physiological causes.
3. A reduction in "normal" reproductive success of an individual female is not easily discernable in the wild.
4. The reasons a grizzly bear fails to breed and/or failure to complete gestation are not discernable in the wild.

In instances where incidental take is difficult to quantify or detect, the Service uses surrogate measures of take. Here, we use the research benchmark levels of OMRD, TMRD, and security core as our surrogate measure of incidental take. These benchmarks are discussed in detail in this biological opinion. Where individual BMU road densities are higher than benchmark levels

of OMRD or TMRD, or where core is less, we conservatively assume some level of impaired habitat use, resulting in impaired breeding or feeding for some adult female grizzly bears.

Based on the best available research and information, we anticipate that some level of incidental take of female grizzly bears will occur within individual BMUs as long as: 1) OMRD exceeds one mile per square mile in more than 33 percent of a BMU; 2) TMRD exceeds two miles per square mile in more than 26 percent of a BMU, and/or 3) core area makes up less than 55 percent of a BMU. Within those BMUs achieving the research benchmarks, incidental take of grizzly bears is unlikely to occur.

Through 2019, Forest actions will reduce road densities to achieve Amendment standards in each BMU. Many proposed BMU standards meet research benchmarks. Until these benchmarks are met, we anticipate some level of incidental take of female grizzly bears in these BMUs, and that the likelihood and level of take will diminish over the next eight years as BMUs attain the benchmark levels for access management.

In one of the seven SE BMUs and in nine of the 22 CYE BMUs, one or more of proposed Amendment standards do not meet all three of the research benchmarks. In these BMUS, we anticipate incidental take of female grizzly bears is likely to occur, and that the level and likelihood of take will diminish as open and/or total road densities are lowered, and/or core area increases nearer to benchmark levels. However, the possibility of incidental take would not be entirely eliminated in these BMUs. We anticipate a low level of take because several of the 10 BMUs have standards near the research benchmark (Table A8), 27 of the 30 BMUs will eventually provide 55 percent core area or more (Table A6), and because of the three reasons listed above related to quantification of take.

One of eight BMUs in the SE (Lakeshore) and two of 22 BMUs (Grouse and Pulpit) in the CYE may never be capable of providing the conditions that research has indicated needed to support an average female home range. These BMUs are affected by small size and/or private ownership and /or other constraints. Therefore, for these three BMUs, the proposed Amendment will establish grizzly bear habitat management standards at levels that may not be capable of providing the full suite of home range needs of the average adult female grizzly bear. Thus, incidental take may be a persistent long-term condition.

By the end of 2019, all BMUs shall meet the Access Amendment standards in Tables 2 and 3 (see Appendix A.2), or the amount of take we anticipated and analyzed here would be exceeded, and reinitiation of consultation would be required.

In the BORZ (areas outside the recovery zones within the action area), we anticipate some level of incidental take of female grizzly bears. We base our opinion on the facts that: 1) linear miles of road are relatively high in these areas; and 2) the Forests have not specifically managed for grizzly bear habitat relative to road standards outside of the recovery zones. Thus, given these facts, in conjunction with the cited research pertaining to the effects of roads on grizzly bear behavior and habitat use, we anticipate that linear miles of road are likely causing incidental take of grizzly bears and this will continue. This is a conservative assumption. Since grizzly bears

moving into these areas did so under prevailing conditions, it is also possible that no incidental take is occurring. Grizzly bears are known to tolerate a range of conditions; some apparently adjust to high levels of human activity without apparent consequence. Further, because few grizzly bears occupy this area, those that do may have options related to home range selection and use. Similar to the incidental take likely occurring within BMUs, we anticipate a low level of incidental take of female grizzly bears in the BORZ in the form of harassment, and /or harm through significant habitat modification or degradation (roads and associated disturbance), which causes actual injury to grizzly bears by significantly disrupting normal behavioral patterns, to the extent that a female's normal reproductive potential is impaired.

In the BORZ (BA 2010), we use the surrogate measure of the existing (2010) linear miles of road in each BORZ polygon. In the BORZ, permanent increases in linear miles of open road and/or permanent increases in linear miles of total road beyond the standards in Table 4 of this biological opinion will result in levels of take that exceed the amount of incidental take we anticipate here, and reinitiation of consultation would be required.

Through 2019, the Forests may conduct a one-time entry (i.e., one season of construction activity) of core within a BMU, for the sole purpose of completing needed road decommissioning & stabilization activities on existing closed or barriered roads in core area (i.e., legacy roads that were closed to create core before this issue was identified), that shall occur during one bear season. Such management is in the interest of creating long term secure habitat for bears and in protecting aquatic habitats for bull trout and other species. Roads that are closed in the future will be hydrologically stabilized so as not to need such maintenance. Motorized use of such previously closed roads in core may in some cases result in incidental take of female grizzly bears in the form of harassment (displacement) or harm (significant habitat modification or degradation), which causes actual injury to grizzly bears by significantly disrupting normal behavioral patterns to levels that impair reproduction. Adult female grizzly bears that have established habitat use patterns within a core area may experience significant displacement from an area if a road(s) were entered for decommissioning. We anticipate a low level of take, as we do not expect take would occur if entries were very limited in duration and actions taken were of relatively low impact. Further, not all females impacted by such entries and actions in core would suffer significant displacement. For reasons stated above, this take is difficult to quantify. Here, we use the following surrogate measures to quantify and measure incidental take of female grizzly bears related to such entries into core: If more than one entry of core occurs prior to the end of 2019 within any block of core, or occurs for more than one bear season, or occurs for reasons other than stated in part I.B.2.a of the proposed action, the level of incidental take anticipated here would be exceeded and reinitiation of consultation would be required.

Similarly, after all BMUs have reached standards (i.e. 2019), adverse effects on grizzly bears may occur over the short-term through any permanent loss of core area from existing conditions within any individual BMU currently exceeding (being better than) the research benchmarks. Adult female grizzly bears that have established habitat use patterns within a core area may experience significant displacement from an area if a road(s) were built or upgraded, and used. The Access Amendment, in and of itself, does not permit permanent reductions in core area; but rather establishes some BMU core standards at levels less that the existing condition. The

Forests commit to no permanent reductions in core area in such BMUs until all the BMUs within their jurisdiction in the respective recovery zones are up to standard. Once all BMUs achieve standards, grizzly bear habitat across multiple BMUs, as well as within, will be more conducive to supporting female home ranges. Adult females impacted by new roads in core would likely find alternate suitable habitat over time, and adjust habitat use patterns accordingly. Any project that proposes to permanently reduce core will undergo independent section 7 consultation (as appropriate) and will be analyzed given the prevailing conditions and information at the time, including grizzly bear population and habitat indices. Thus, any incidental take that may result from permanent reductions in core area is not exempted here.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the grizzly bear. The best information indicates the overall status of the Selkirk grizzly bear population is stable to increasing; while the Cabinet-Yaak grizzly bear population is probably decreasing. As detailed in this biological opinion, the proposed action may cause localized and short- or long- term adverse effects, but would result in overall ecosystem-wide improvements, and reductions of incidental take as a result of high road densities, which will benefit the populations. The proposed action would reduce motorized access densities to standards, which in most of the BMUs within the action area, require levels that research indicates would support an average female home range. Twenty seven of the 30 BMUs would have core area that meets or exceeds the research benchmarks. The Amendment would preclude permanent increases in either open and total linear miles in the action area outside of the recovery zones. Therefore, impacts on individual grizzly bears, including anticipated levels of incidental take as a result of proposed access levels and time-frame within which they are attained, will not appreciably reduce survival or the recovery of the species.

Critical habitat has not been designated for the grizzly bear, therefore none would be affected.

Reasonable and Prudent Measures

Biological opinions typically provide reasonable and prudent measures that are expected to reduce the amount of incidental take. Reasonable and prudent measures are those measures necessary and appropriate to minimize incidental take resulting from the proposed Access Amendment. Reasonable and prudent measures are nondiscretionary and must be implemented by the agency in order for the exemption in section 7(o)(2) to apply.

The “design elements” of the proposed action (hereby incorporated by reference and attached in the Appendix A.2 of this biological opinion) includes measures to minimize the effects of some implementation (such as the timeline and gateways for achieving standards; and the sideboards for stabilizing roads within core area). These design elements include many of the “reasonable and prudent measures” and “terms and conditions” previously required by the 2004 biological opinion (U.S Fish and Wildlife Service 2004). Thus, this biological opinion does not repeat those features as reasonable and prudent measures or terms and conditions.

However, it is critical to understand that the conclusion of this opinion is based on those features being implemented as part of the proposed action; if they are not implemented, this opinion may be subject to reinitiation (50 CFR 402.16(3)).

Terms and Conditions

Because no reasonable and prudent measures are provided, with the exception of the reporting requirements below, no terms and conditions are necessary.

Reporting Requirements

1) By April 15 each year, the Forests shall submit annual reports to the Service that detail the progress made toward achieving and maintaining the standards for Percent Core Area, OMRD, and TMRD within the Recovery Zones.

2) The Forests shall coordinate with State and federal agency biologists to collect credible grizzly bear observations that occur outside of the Recovery Zone boundaries and add this information to the 6th-order HUC database for inclusion into the annual report.

3) The annual report shall provide an ongoing list detailing the locations, dates, duration, and circumstances for invoking the allowance for entering core area for the purposes of road decommissioning or stabilizations.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends that:

1. The Forests continue to install grizzly bear information signs at major access points advising the public of grizzly bear presence, proper sanitation/food storage techniques, and providing information on distinguishing characteristics between grizzly bears and black bears.

2. The IPNF and CNF should coordinate with the Service to evaluate for reconfiguration the BMUs that border the two Forests. Specifically, evaluate the appropriateness of reconfiguring the Salmo Priest, Sullivan-Hughes, Kalispell-Granite, and Lakeshore BMUs to more closely approximate the home range size of female grizzly bears within this Ecosystem (i.e., approximately 100 mi^2).

3. The Forests develop, in coordination with the Service and the IGBC, a strategy addressing point source disturbances (e.g., helicopter logging, mining, etc.).

4. The Forests work cooperatively with the Service to identify linkage areas that may be important in providing landscape connectivity within and between geographic areas, across all land ownerships for grizzly bears and Canada lynx.

5. Within linkage areas, the Forests provide for landscape connectivity by participating in the development and implementation of a management plan to protect and restore habitat connectivity within these areas on federal lands.

6. The Forests plan recreational development, and manage recreational and operational uses to provide for grizzly bear, Canada lynx, and mountain caribou movement, and to maintain effectiveness of grizzly bear, Canada lynx, and mountain caribou habitat.

7. The Forests identify and prioritize roads for reclamation or seasonal restrictions within watersheds with relatively high road densities so as to improve habitat quality and/or security for grizzly bears, Canada lynx, and bull trout, as well as other listed and non-listed fish and wildlife species.

8. The Forests continue to monitor, inventory, investigate and document the bull trout populations and spawning activities throughout the entire action area.

9. The Forests continue to reduce sediment inputs from roads and reduce road density throughout the action area to further minimize risk and impacts from sedimentation to bull trout.

10. The Forests identify those watersheds containing bull trout where the road density exceeds the "Functioning Appropriately" standards set forth in the Framework and attempt to bring those watersheds into agreement with that standard.

11. The Forests rip the road base within the RHCA for all decommissioned roads to facilitate water infiltration rates and reduce surface flow and erosion within watersheds containing bull trout habitat, wherever appropriate.

12. Upon finalization of the Bull Trout Recovery Plan, the Forests review and implement all necessary and appropriate recovery objectives that pertain to meeting road density standards or other relevant standards.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes consultation on the action outlined in your December 21, 2010 request for consultation on the effects of the Access Amendment to the Kootenai, Idaho Panhandle, and Lolo National Forests' Plans. As provided in 50 CFR 402.16, reinitiation of formal consultation

is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The amount and extent of incidental take we anticipate as a result of the proposed action is specified in the incidental take statement included above. Also detailed are the circumstances under which the amount or extent of incidental take anticipated and exempted in the incidental take statement would be exceeded.

The Service is unable to precisely quantify the number of grizzly bears that will be incidentally taken as a result of high road densities through 2019. We use the benchmark amount of OMRD, TMRD and security core as surrogate measures of incidental take. If by the end of 2019 (see part I.C. of proposed action), road densities and/or core area levels do not reach the proposed standards within each BMU as detailed in the proposed action (see Table 2 and 3 in this biological opinion), then the amount of take exempted here will be exceeded. If at any time, entries into core do not comply with parts I.B.2.a. of the proposed action, or if linear road miles and use in the BORZ do not comply with Table 4 (of this opinion) or parts II. A. and B. of the proposed action, then the level of take exempted through this incidental take statement would be exceeded.

If, at any time during the course of the action, the level of take occurring exceeds that anticipated in this incidental take statement, such incidental take requires reinitiation of consultation and review of the incidental take statement. The Forest must immediately provide an explanation of the causes of the taking and must review with the Service the need for possible modification of requirements in the incidental take statement.

CLOSING STATEMENT

Many challenges remain to fully recover the grizzly bear in the SE and CYE (e.g., Proctor et al 2004; Servheen, unpubl. rept. March 2009), and some of this work must take place on National Forests (e.g., SCYE subcommittee notes May 19, 2010). However, grizzly bear recovery cannot be achieved through the actions of the Forests alone (U.S. Fish and Wildlife Service 1993; Proctor et al. 2004b; Servheen, unpubl. rept. March 2009; Schwartz et al. 2010). The Access Amendment represents a significant element of the Forests' work towards restoring and conserving the ecosystems upon which the grizzly bear depends, in accordance with sections 7(a)(1) and in fulfillment of 7(a)(2) of the Act.

Thank you for your continued assistance in the conservation of endangered, threatened, and proposed species. If you have any questions or comments on this biological opinion, please contact the Montana Field Office at (406) 449-5225 or the Northern Idaho Field Office at (509) 891-6839, as appropriate.

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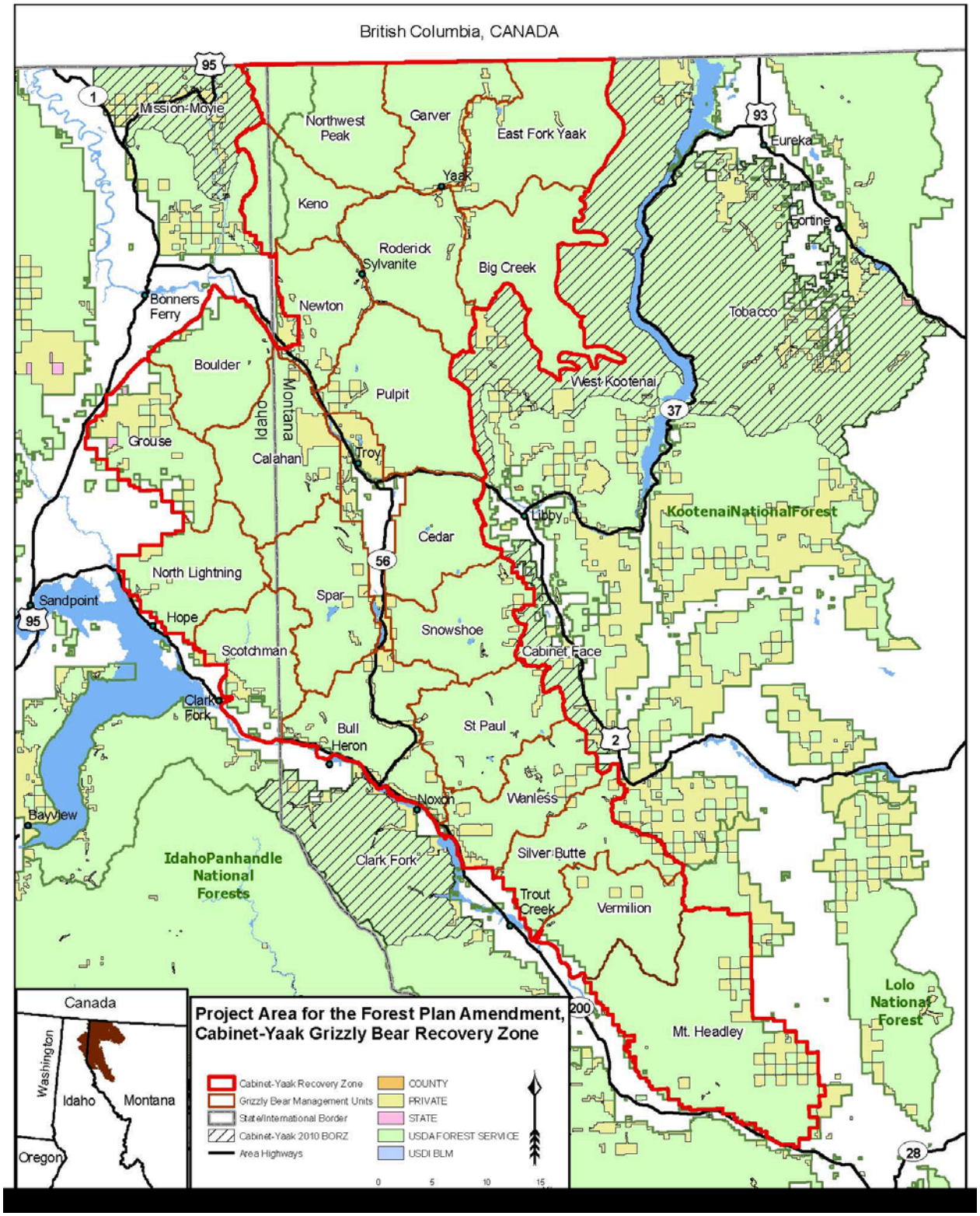
APPENDICES

Appendix A1.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Tobacco
Bonners Ferry
Newton
Boulder
Pulpit
West Kootenai
Grouse
Idaho
Montana
Calahan
Troy
Libby
KootenaiNationalForest
Cedar
North Lightning
Sandpoint
Spar
Hope
Snowshoe
Scotchman
Cabinet Face
Clark Fork
Bull
Heron
St Paul
Noxon
Wanless
Bayview
Silver Butte
IdahoPanhandle National Forests
Clark Fork
Trout Creek
Vermilion
Lolo National Forest
Mt. Headley
Canada
Washington
Idaho
Montana
Oregon
Project Area for the Forest Plan Amendment, Cabinet-Yaak Grizzly Bear Recovery Zone
Cabinet-Yaak Recovery Zone
Grizzly Bear Management Units
State/International Border
Cabinet-Yaak 2010 BORZ
Area Highways
COUNTY
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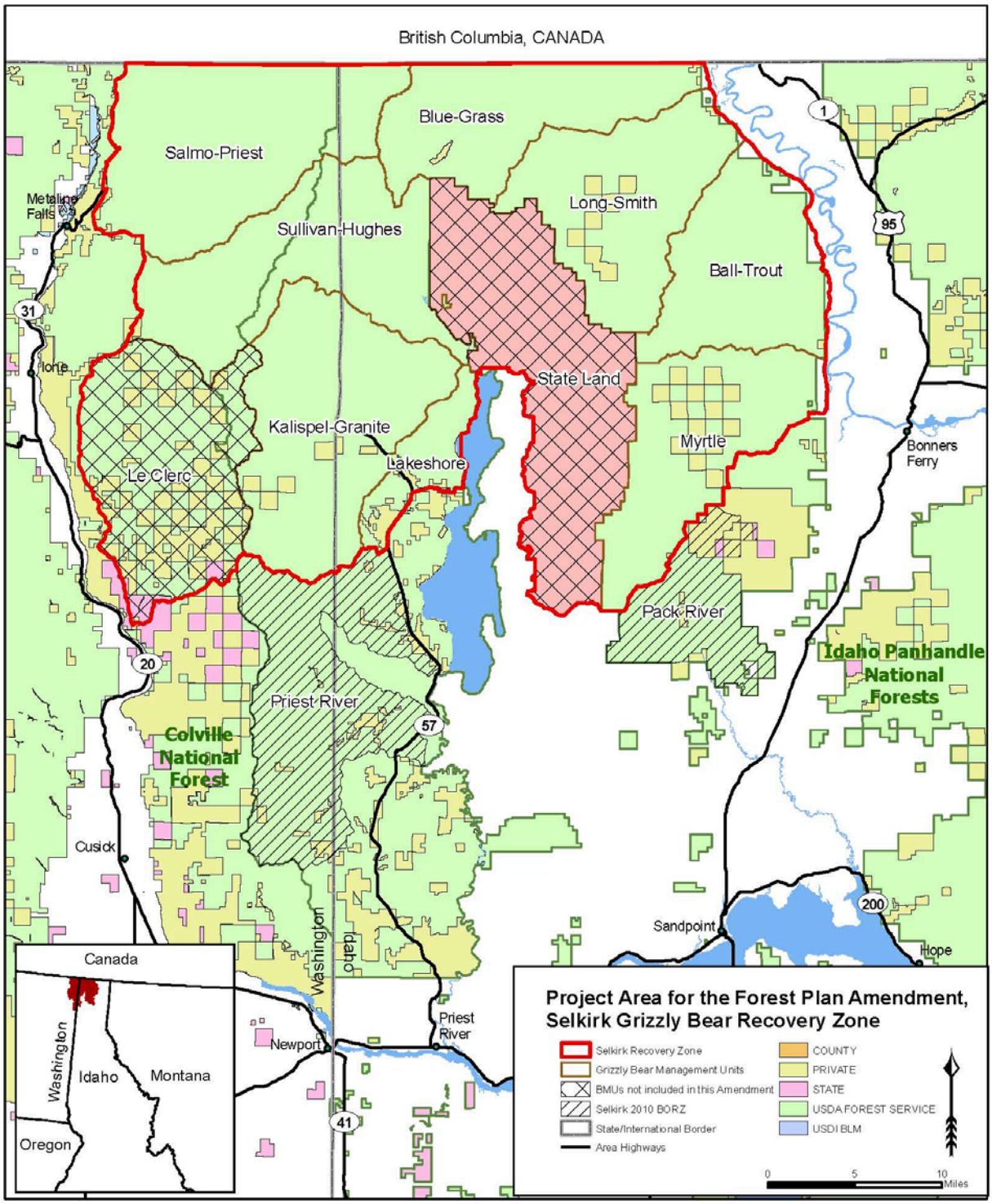
Appendix A1



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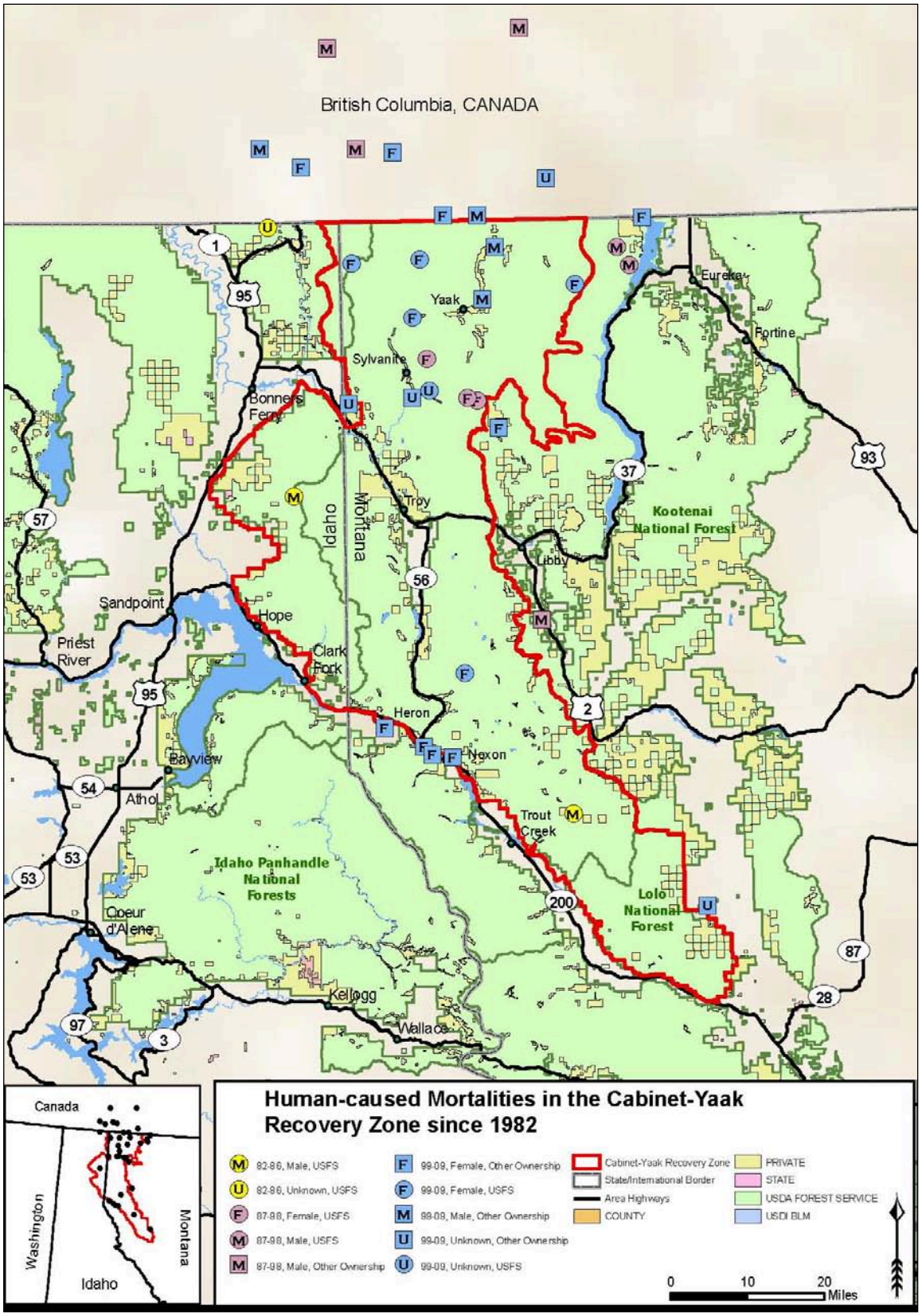
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Hope
Priest River
Clark Fork
Heron
Noxon
Bayview
Athol
Trout Creek
Idaho Panhandle National Forests
Lolo National Forest
Coeur d'Alene
Kellogg
Wallace
Human-caused Mortalities in the Cabinet-Yaak Recovery Zone since 1982
82-86, Male, USFS
82-86, Unknown, USFS
87-98, Female, USFS
87-98, Male, USFS
87-98, Male, Other Ownership
99-09, Female, Other Ownership
99-09, Female, USFS
99-09, Male, Other Ownership
99-09, Unknown, Other Ownership
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Cabinet-Yaak Recovery Zone
State/International Border
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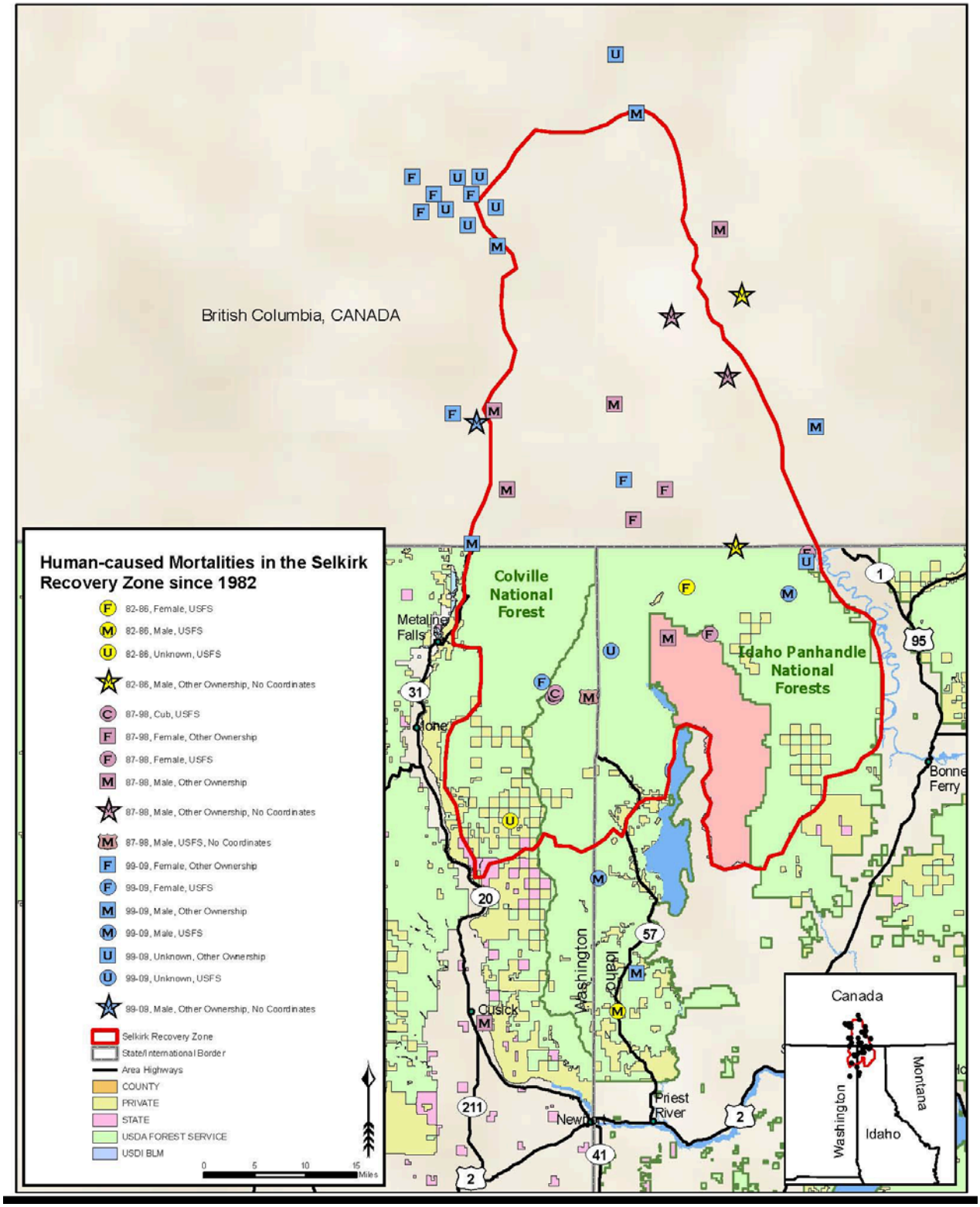
Appendix A1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Human-caused Mortalities in the Selkirk Recovery Zone since 1982
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82-86, Male, Other Ownership, No Coordinates
87-98, Cub, USFS
87-98, Female, Other Ownership
87-98, Female, USFS
87-98, Male, Other Ownership
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99-09, Female, Other Ownership
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99-09, Unknown, Other Ownership
99-09, Unknown, USFS
99-09, Male, Other Ownership, No Coordinates
Selkirk Recovery Zone
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Area Highways
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0 5 10 15 Miles
Colville National Forest
Idaho Panhandle National Forests
Metaline Falls
Ione
Cusick
Newport
Priest River
Bonner Ferry
Washington
Idaho
Canada
Montana
Washington
Idaho

PART B: EFFECTS OF BULL TROUT

Biological Opinion

on the

Forest Plan Amendments for
Motorized Access Management within the
Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the
Kootenai, Idaho Panhandle, and Lolo National Forests

October 2011

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BACKGROUND

In 1998, the Service issued the Biological Opinion for the Effects to Bull Trout from the Continued Implementation of Land and Resource Management Plans and Resource Management Plans as Amended by the Interim Strategies for Managing Fish Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada (INFISH) and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho and portions of California (PACFISH) (U.S. Fish and Wildlife Service 1998b). The Kootenai, Lolo, and Idaho Panhandle National Forest Plans (U.S. Forest Service 1987a, 1986, 1987b) were included in the plans addressed in that consultation.

On October 18, 2010, the Service published the final rule designating critical habitat for bull trout for the Klamath River, Columbia River, Jarbidge River, Coastal-Puget Sound, and Saint Mary-Belly River populations of bull trout (75 FR 63898).

Federal agencies are required to conference on any action which is likely to jeopardize the continued existence of any species proposed for listing or result in the destruction or adverse modification of critical habitat pursuant to section 7(a)(4) of the Act of 1973, as amended (16 U.S.C. 1531 et seq.; 50 CFR 402.10(a)). Furthermore, in the 2010 Final Rule Designating Critical Habitat for Bull Trout (75 FR 63898), additional guidance was given on the appropriate use of terminology to promote consistency in carrying out Service consultation responsibilities with respect to bull trout.

Spatial Context for Bull Trout Consultation and Recovery

For purposes of consultation and recovery for bull trout the Service considers biological effects and project related impacts of proposed actions at several nested spatial levels (i.e., hierarchal relationships), that include the local population, core areas, management units, and interim recovery units (U.S. Fish and Wildlife Service 2002b). In the Draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002b), twenty-seven major watersheds were referred to as recovery units; terminology has since been revised and they are now referred to as management units. The following definitions are from the Draft Bull Trout Recovery Plan:

Interim Recovery Unit: Five interim recovery units have been identified: Columbia River, Klamath River, Jarbidge River, Coastal-Puget Sound, and St. Mary-Belly.

Management/Recovery Unit: Management units are the major units for managing recovery efforts; management units were described (as recovery units) in separate chapters in the draft recovery plan (U.S. Fish and Wildlife Service 2002b). Most management units, as proposed, consist of one or more major river basins. Several factors were considered in identifying management units, for example, biological and genetic factors, political boundaries, and ongoing conservation efforts. In some instances, management unit boundaries were modified to maximize efficiency of established watershed groups, encompass areas of common threats, or accommodate other logistical concerns. Some proposed management units included portions of mainstem rivers (e.g., Columbia and Snake rivers) when biological evidence warranted such inclusion.

Core Area: The combination of core habitat (i.e., habitat that could supply all elements for the long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat) constitutes a core area. Each core area represents the closest approximation of a biologically functioning unit for bull trout and is the geographic scale at which the Service is gauging the status of the species. Core areas require both habitat and bull trout to function, and the number (replication) and characteristics of local populations inhabiting a core area provide a relative indication of the core area's likelihood to persist. Local populations within a core area have the potential to interact because of connected aquatic habitat.

Local Population: A group of bull trout that spawn within a particular stream or portion of a stream system. Multiple local populations may exist within a core area. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit. In most areas a local population is represented by a single headwater tributary or complex of headwater tributaries where spawning occurs. Gene flow may occur between local populations (e.g., those within a core population), but is assumed to be infrequent compared with that among individuals within a local population.

Within each recovery/management unit, there are one or more core areas, which are intended to reflect the metapopulation structure of bull trout. By definition, a core area contains all of the necessary constituent elements for the long-term security of bull trout. The Draft Bull Trout Recovery Plan recognizes core areas as the population units that are necessary to provide for bull trout biological needs in relation to genetic and phenotypic diversity, and to spread the risk of extinction caused by stochastic events. Peer review of the Draft Bull Trout Recovery Plan supported this approach.
In this BO, at a programmatic level we describe biological effects and project impacts at each of the following scales: local population, core area, management unit, and interim recovery unit. The analysis for critical habitat follows a similar, but less extensive, spatial hierarchy. Critical habitat subunits are the smallest division and are roughly (sometimes exactly) equivalent to core areas; critical habitat units are roughly (sometimes exactly) equivalent to interim recovery units, and are made up of the subunits.

Jeopardy Determination

Jeopardy determinations for bull trout are made at the scale of the listed entity, which is the coterminous United States population (64 FR 58910). This follows the April 20, 2006 analytical framework guidance described in the Service's memorandum to Ecological Services Project Leaders in Idaho, Oregon and Washington from the Assistant Regional Director – Ecological Services, Region 1. The guidance indicates that a biological opinion should concisely discuss all the effects and take into account how those effects are likely to influence the survival and recovery functions of the affected interim recovery unit(s), which should be the basis for determining if the proposed action is "likely to appreciably reduce both survival and recovery of the coterminous United States population of bull trout in the wild."

The approach to the jeopardy analysis for the proposed action addressed by this biological opinion follows a hierarchal relationship between units of analysis (i.e., geographical subdivisions) that characterize effects at the lowest level or smallest scale (local population) aggregated to the highest level or largest scale (Columbia River Interim Recovery Unit) of analysis. Table B1 shows the hierarchal relationship between units of analysis that determine whether the proposed action is likely to jeopardize the survival and recovery of bull trout. If the adverse effects of the proposed action do not rise to the level where they appreciably reduce both survival and recovery of the species at a lower scale, such as the local or core population, the proposed action could not jeopardize bull trout in the coterminous United States (i.e., rangewide). Therefore, the determination would result in a no-jeopardy finding. However, if the proposed action causes adverse effects that are determined to appreciably reduce both survival and recovery of the species at a lower scale of analysis, then further analysis is warranted at the next higher scale.

Table B1. Hierarchy of units of analysis for bull trout jeopardy for Forest Plan Amendments for Motorized Access Management in the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones.

Name	Hierarchical Relationship
Interim Recovery Unit	
Columbia River	1 of 5 interim recovery units in the range of the species within the coterminous United States (i.e., the listed ESA entity)
Management Units	
Clark Fork River Basin Kootenai River Basin	2 of 23 management units in the Columbia River Interim Recovery Unit
Core Areas	
Lower Clark Fork River, Priest Lake, Lake Pend Oreille, Pend Oreille River; Kootenai River, Bull Lake	4 of 35 core areas in the Clark Fork River Basin; 2 of 4 core areas in the Kootenai River Basin
Local Populations	
Fishtrap Cr., W. Fk. Thompson River, Graves Cr., Vermilion River., Rock Cr., Bull River	6 of 14 local populations of bull trout in the Lower Clark Fork River Core Area
Upper Priest River, Granite Cr.	2 of 5 local populations of bull trout within the Priest Lake Core Area
Lightning Cr., Wellington Cr., Porcupine Cr., Trestle Cr., Pack River, Grouse Cr.	6 of 9 local populations of bull trout within the Lake Pend Oreille Core Area
Fisher River, Libby Cr., Pipe Cr., Quartz Cr., O'Brien Cr., Callahan Cr.	6 of 6 local populations of bull trout within the Kootenai River Core Area
Keeler Creek	1 of 1 local populations of bull trout within the Bull Lake Core Area

Based on the information that is analyzed and described in this biological opinion, we conclude that this project will not jeopardize the survival and recovery of bull trout. More detailed rationale and discussion for this conclusion is provided below.

Adverse Modification of Designated Critical Habitat

Critical habitat designations identify habitat areas that provide essential life cycle needs of the species, using the best available scientific and commercial data (75 FR 63898). The action area contains approximately 384 stream miles of designated critical habitat that may potentially be impacted through implementation of the proposed action. Potential impacts to bull trout critical habitat will be further analyzed below.

The October 18, 2010, Final Rule Designating Critical Habitat for Bull Trout (75 FR 63898) provides guidance that indicates when a proposed action is "incompatible with the viability of the affected core area population(s), inclusive of associated habitat conditions, a jeopardy finding may be warranted, because of the relationship of each core area population to the survival and recovery of the species as a whole." In addition, further guidance is provided in the Director's December 9, 2004, memorandum, which is in response to litigation on the regulatory standard for determining whether proposed Federal agency actions are likely to result in the "destruction or adverse modification" of designated critical habitat under Section 7(a)(2) of the Act. This memorandum outlines interim measures for conducting Section 7 consultations pending the adoption of any new regulatory definition of "destruction or adverse modification." Consequently, this biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, the Service relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Adverse modification determinations are made at the rangewide scale, based on impacts to one or more critical habitat units. Impacts to the primary constituent elements (PCEs) are assessed within the action area (memorandum to RDs from U.S. Fish and Wildlife Service Director, December 9, 2004), and projected to the critical habitat unit. Table B2 shows the hierarchal relationship between units of analysis that determine whether the proposed action is likely to destroy or adversely modify the designated critical habitat by altering the PCEs to such an extent that the conservation value of the critical habitat is appreciably reduced. If the adverse effects of the proposed action rise to the level where the conservation value of critical habitat is substantially degraded within a core area, then an analysis is made as to whether the conservation value is also substantially degraded in the critical habitat unit.

Based on the information that is analyzed and described in this BO, we conclude that this project will not alter the physical or biological function of critical habitat to such an extent that the conservation function of the critical habitat is appreciably reduced in either the Clark Fork River Basin or the Kootenai River Basin Critical Habitat Units. Therefore, it will not destroy or adversely modify critical habitat at the rangewide scale. More detailed rationale and discussion for this conclusion is provided below.

Table B2 Hierarchy of units of analysis for adverse modification of bull trout critical habitat for Forest Plan Amendments for Motorized Access Management in the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones.

Name	Hierarchical Relationship
Critical Habitat Units	
Clark Fork River Basin Kootenai River Basin	2 of 32 Critical Habitat Units in the range of the species
Critical Habitat Subunits	
Lower Clark Fork River, Priest Lake, Lake Pend Oreille;	3 of 13 critical habitat subunits in the Clark Fork Critical Habitat Unit;
Kootenai River	1 of 3 critical habitat subunits in the Kootenai River Critical Habitat Unit

Significance of the Proposed Action Relative to Bull Trout

The proposed action represents programmatic decisions that would guide future decisions about access as it relates to specific activities and projects, and therefore, by itself, will have only indirect effects on the watershed and fisheries resources in the action area (see Figure B1). Future projects in those BMU's not currently consistent with the standards of this access amendment would require changes in access to comply with the proposed standards, and in the course of those changes, impacts to bull trout are likely to occur.

In the BORZ areas the proposed action has no affect on bull trout, as it requires no road decommissioning, it neither authorizes nor prohibits road construction, per se, and road density in these areas will remain unchanged from the current baseline. This biological opinion will not analyze impacts to bull trout in the BORZs. Future projects which propose the construction, reopening or closing of roads in BORZ areas must undergo independent section 7 consultation for all listed species which may be affected by the project.

In BMUs that currently comply with all of the proposed bear access standards and have an excess of core habitat above the standard, increases in road densities and new road construction or reconstruction and reopening of closed roads could occur as early as 2019, assuming the Forests are successful in bringing all BMUs up to standards within 8 years. This element of the proposed action is permissive, rather than prescriptive or prohibitive. As such, predicting the use of this element is quite speculative in both time and location, and the effects will be analyzed only in a general way at the core area level in the hierarchy.

Table B3 displays the BMUs present on the Kootenai, Lolo and Idaho Panhandle Forests and their current status relative to the proposed standards. The actions stemming from each of the access standards are detailed below.

Table B3. BMU status and proposed standards (U.S. Forest Service 2010). Shaded BMU names are those that overlap with occupied bull trout habitat and may be affected by the proposed action. Italic, blue-shaded BMU names are those with at least one access parameter that currently does not meet the proposed access standard, as indicated by shaded, bold cells. Gray-shaded BMU names currently exceed access standards for core habitat and may be subject to reductions in core in 8+ years. Exceedance amounts are indicated in gray-shaded cells under "Percent Core."

BMU	BMU Priority	OMRD >1mi/mi^2 (%)		TMRD >2mi/mi^2 (%)		Percent Core		Percent Federal Land
		2009 Status	Proposed Standard (max)	2009 Status	Proposed Standard (max)	2009 Status	Proposed Standard (min)	
Cedar	2	14	15	10	15	83	80	99
Snowshoe	2	20	20	16	18	76	70	94
Spar	3	27	33	26	26	62	59	95
Bull	2	**37**	36	**29**	26	62	60	84
St. Paul	1	28	30	23	23	**58**	60	97
Wanless	1	29	34	**34**	32	**53**	55	85
Silver Butte-Fisher	2	**32**	26	23	23	**62**	63	92
Vermilion	3	**33**	32	**24**	21	55	55	93
Callahan	2	27	33	26	26	59	55	90
Pulpit	2	44	44	29	34	**51**	52	95
Roderick	1	28	28	**28**	26	**54**	55	96
Newton	1	42	45	29	31	58	55	92
Keno	1	**34**	33	25	26	59	59	99
NW Peaks	1	28	31	26	26	56	55	99
Garver	1	29	33	25	26	55	55	94
E Fk Yaak	1	29	33	**27**	26	54	55	96
Big Creek	2	30	33	16	26	58	55	99
Boulder	3	31	33	**35**	29	**50**	55	92
Grouse[a, b]	3	**60**	59	**59**	55	**32**	37	54
N. Lightning	1	**36**	35	20	20	62	61	94
Scotchman	2	35	35	**27**	26	63	62	81
Mt. Headley	3	**38**	33	**37**	35	**51**	55	89
Blue-Grass	1	33	33	**28**	26	**50**	55	96
Long-Smith	1	21	25	14	15	73	67	92
Kalispell-Granite	1	31	33	**28**	26	**49**	55	96
Lakeshore	3	82	82	54	56	**18**	20	86
Salmo-Priest	2	30	33	24	26	66	64	99
Sullivan-Hughes	1	24	24	19	19	61	61	99
Myrtle	2	29	33	20	22	60	56	85
Ball-Trout	2	17	20	11	13	72	69	94
Le Clerc [a, c]	3	38	****	55	****	30	****	64

[a]75 percent Federal Lands. [b]Due to the high level of non-Federal lands within the Grouse BMU, existing conditions and standards are calculated assuming no contribution of secure habitat from private lands. [c]LeClerc BMU is not addressed in this proposed Amendment as 90 percent of the acreage lies within the Colville National Forest.

OMRD Standard

Open Motorized Road Density (OMRD) includes all roads that are open to the public and roads that are closed to the public but open for administrative use exceeding a set limit. The limit is 57 round trips per active bear year in the Selkirk Recovery Zone and 60 round trips per active bear year in the Cabinet –Yaak Recovery Zone. This category includes roads which may or may not be gated that have seasonal restrictions on motorized use, but generally not on the number of vehicle trips. All roads in the OMRD category are expected to receive regular maintenance and repair. Roads may move in or out of the OMRD category from one year to the next, as long as the standards are maintained.

If a BMU does not meet the OMRD standard, then roads could be closed to the public by a gate while being left open for administrative, or they could be completely closed to all motorized access. When roads are closed ripping of the road surface, removal of culverts, and other construction activities often occur which may impact bull trout and their habitat.

TMRD Standard

Total Motorized Road Density (TMRD) includes open roads, plus roads that are limited to administrative use only, and are restricted as to the number of vehicle round trips allowed per active bear year as specified for the Selkirk (57 trips) and Cabinet-Yaak (60 trips) Recovery Zones. All roads in the TMRD category are expected to receive regular maintenance and repair.

If a BMU does not meet the TMRD standard, then roads would be closed by an impassable barrier, and maintenance on those roads would cease. When roads are closed, ripping of the road surface, removal of culverts, and other construction activities often occur which may impact bull trout and their habitat. Roads may move in or out of the TMRD category from one year to the next, as long as the standards are maintained.

Core Habitat Standard

Motorized wheeled access is not allowed in grizzly bear core habitat. Therefore, if the amount of core habitat in any given BMU does not meet the standard, then some roads within the BMU would be permanently closed and must remain so for at least 10 years. Core areas may contain relic roads that are impassable due to regrowth of vegetation, effective barriers (other than gates), or placement of forest debris so as to no longer function as a motorized route (U.S. Forest Service 2010).

In order to count towards meeting core habitat, roads that are closed must be made "hydrologically neutral," so that maintenance or repair of the road bed, stream crossings, ditches, and any other road elements would not be anticipated to be needed for at least 10 years. In meeting this requirement road construction activities would occur such as removal of culverts, ripping, water-barring, recontouring of ditches or hillside cuts, and possibly even recontouring of the portions of the road prism. Such activities may impact bull trout and their habitat.

Reduction of Core Habitat after Achieving Standards

Grizzly bear core habitat serves as significant land area that, from the standpoint of bull trout, is essentially unroaded. When all BMUs within the Selkirk or the Cabinet-Yaak Recovery Zone have met all access standards (anticipated occurring in as little as 8 years), then those BMUs that have excess core habitat above the standard are eligible for reductions in core habitat down to the standard. However, such reduction (i.e., removal of a portion of the core habitat) can only occur in areas that have been core habitat for at least 10 years.

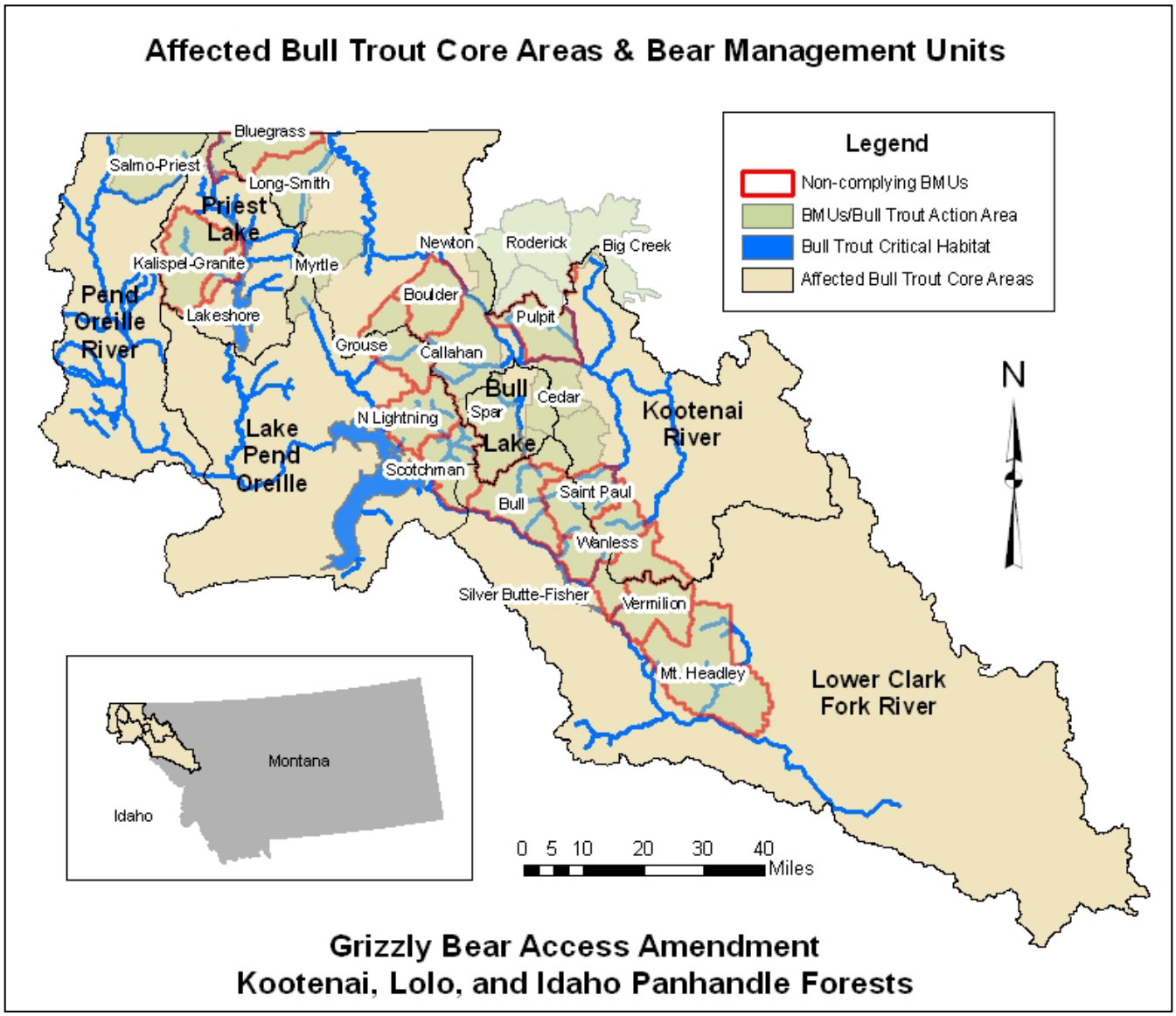
Where the Forests might desire to implement this provision of the standards in 8+ years is essentially impossible to predict, except to identify which BMUs should be eligible. The only known effect is that currently complying BMUs *may* experience an increase in road density after 2019. Given the lack of project-specific details relative to the nature, location, and timing of the activities that may occur in these BMUs, the effects will be analyzed qualitatively, rather than quantitatively in this BO. Future projects which propose the construction or reopening of roads in core bear habitat must undergo independent section 7 consultation for all listed species which may be affected.

Description of the Action Area

The action area with regards to bull trout includes all BMUs that overlap occupied bull trout habitat and are not meeting one or more of the bear access standards. Under the proposed action these BMUs would have access changes falling under one or more of the descriptions above. Only a subset of bull trout streams and/or bull trout critical habitat within a non-complying BMU are likely to be affected because the amount of bull trout occupied or critical habitat streams generally exceeds the maximum number of miles of roads to be treated, and implementation activities must occur at stream crossings or within the riparian corridor to affect bull trout and their habitat. Because of the programmatic nature of this action, exact locations for implementation are uncertain and may occur anywhere within a given BMU.

BMUs that currently meet the proposed bear access standards and overlap occupied bull trout streams or critical habitat are also part of the action area. Figure B1 shows the affected bull trout core areas, bull trout critical habitat, BMUs that do not currently meet bear access standards, BMUs that currently exceed grizzly bear core habitat standards, and the specified action area.

Figure B1. Affected bull trout core areas and the project action area.



STATUS OF THE SPECIES AND CRITICAL HABITAT

Status of the Species

Listing Status

The coterminous United States population of the bull trout (*Salvelinus confluentus*) was listed as threatened on November 1, 1999 (64 FR 58910). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon and in the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (Cavender 1978, Bond 1992, Brewin and Brewin 1997, Leary and Allendorf 1997).

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation and alterations associated with: dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (64 FR 58910).

The bull trout was initially listed as three separate Distinct Population Units (DPSs)(63 FR 31647, 64 FR 17110). The preamble to the final listing rule for the United States coterminous population of the bull trout discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the ESA relative to this species (64 FR 58930):

> Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process.

Current Status and Conservation Needs

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as interim recovery units: (1) Jarbidge River; (2) Klamath River; (3) Columbia River; (4) Coastal-Puget Sound; and (5) St. Mary-Belly River. Each of these segments is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

The proposed action occurs only in the Columbia River interim recovery unit; therefore, this chapter of the biological opinion will focus exclusively on that unit. A summary of the current status and conservation needs in the Columbia River unit is presented below. A comprehensive discussion of the current status and conservation needs of the bull trout within all five interim recovery units is found in the Service's draft recovery plan for the bull trout (U.S. Fish and Wildlife Service 2002b, 2004a,b).

Generally, the conservation needs of the bull trout are often generally expressed as the need to provide the four "C's": cold, clean, complex, and connected habitat. Cold stream temperatures, clean water quality that is relatively free of sediment and contaminants, complex channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well connected by unobstructed migratory pathways are all needed to promote conservation of bull trout at multiple scales ranging from the coterminus to local populations. The recovery planning process for the bull trout (U.S. Fish and Wildlife Service 2002b, 2004a,b) has also identified the following conservation needs for the bull trout: (1) maintain and restore multiple, interconnected populations in diverse habitats across the range of each interim recovery unit; (2) preserve the diversity of life-history strategies; (3) maintaining genetic and phenotypic diversity across the range of each interim recovery unit; and (4) establish a positive population trend. Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each interim recovery unit.

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (U.S. Fish and Wildlife Service 2002b, 2004a,b). A core area is defined as a geographic area occupied by one or more local bull trout populations that overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat. Each of the interim recovery units listed above consists of one or more core areas. Approximately 118 core areas are recognized across the United States range of bull trout (U.S. Fish and Wildlife Service 2002b, 2004a,b).

The Columbia River interim recovery unit currently contains about 90 core areas and 500 local populations. About 62percent of these core areas and local populations occur in central Idaho and northwestern Montana. The condition of the bull trout within these core areas varies from poor to good but generally all have been subject to the combined effects of habitat degradation, fragmentation and alterations associated with one or more of the following activities: dewatering; road construction and maintenance; mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species. The Draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002b) identifies the following conservation needs for this unit: maintain or expand the current distribution of the bull trout within core areas; maintain stable or increasing trends in bull trout abundance; maintain/restore suitable habitat conditions for all bull trout life history stages and strategies; and conserve genetic diversity and provide opportunities for genetic exchange.

Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993). Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs (Fraley and Shepard 1989; Goetz 1989). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989; Goetz 1989), or saltwater (anadromous) to rear as subadults or to live as adults (Cavender 1978; McPhail and Baxter 1996; WDFW et al. 1997). Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. They are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 1982; Fraley and Shepard 1989; Pratt 1992; Rieman and McIntyre 1996).

The iteroparous reproductive system of bull trout has important repercussions for the management of this species. Bull trout require two-way passage up and downstream, not only for repeat spawning but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous (fishes that spawn once and then die, and therefore require only one-way passage upstream) salmonids. Therefore even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

Growth varies depending upon life-history strategy. Resident adults range from 6 to 12 inches total length, and migratory adults commonly reach 24 inches or more (Pratt 1985; Goetz 1989). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982).

Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Fraley and Shepard 1989; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Howell and Buchanan 1992; Pratt 1992; Rieman and McIntyre 1993, 1995; Rich 1996; Watson and Hillman 1997). Watson and Hillman (1997) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993), fish should not be expected to simultaneously occupy all available habitats (Rieman et al.1997).

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout (Rieman and McIntyre 1993; Gilpin 1997; Rieman et al. 1997). Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants. However, it is important to note that the genetic structuring of bull trout indicates that there is limited gene flow among bull trout populations, which may encourage local adaptation within individual populations, and that reestablishment of extirpated populations may take a very long time (Spruell et al. 1999; Rieman and McIntyre 1993).

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59 degrees Fahrenheit), and spawning habitats are generally characterized by temperatures that drop below 48 degrees Fahrenheit in the fall (Fraley and Shepard 1989; Pratt 1992; Rieman and McIntyre 1993).

Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992; Rieman and McIntyre 1993; Baxter and McPhail 1997; Rieman et al. 1997). Optimum incubation temperatures for bull trout eggs range from 35 to 39 degrees Fahrenheit whereas optimum water temperatures for rearing range from about 46 to 50 degrees Fahrenheit (McPhail and Murray 1979; Goetz 1989; Buchanan and Gregory 1997). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 degrees Fahrenheit, within a temperature gradient of 46 to 60 degrees Fahrenheit. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 0.75) until maximum temperatures decline to 52 to 54 degrees Fahrenheit.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River basin (Fraley and Shepard 1989; Rieman and McIntyre 1993, 1995; Buchanan and Gregory 1997; Rieman et al. 1997). Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity (Myrick et al. 2002). In Nevada, adult bull trout have been collected at 63 degrees Fahrenheit in the West Fork of the Jarbidge River (S. Werdon, U.S. Fish and Wildlife Service, pers. comm. 1998) and have been observed in Dave Creek where maximum daily water temperatures were 62.8 to 63.6 degrees Fahrenheit. In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 68 degrees Fahrenheit; however, bull trout made up less than 50 percent of all salmonids when maximum summer water temperature exceeded 59 degrees Fahrenheit and less than 10 of all salmonids when temperature exceeded 63 degrees Fahrenheit (Gamett 1999). In the Little Lost River study, most sites that had high densities of bull trout were in an area where primary productivity increased in the streams following a fire (B. Gamett, U.S. Forest Service, pers. comm. 2002).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Fraley and Shepard 1989; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Pratt 1992; Thomas 1992; Rich 1996; Sexauer and James 1997; Watson and Hillman 1997). Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997). These areas are sensitive to activities that directly or indirectly affect stream channel stability[†] and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and young juveniles in the gravel from winter through spring (Fraley and Shepard 1989; Pratt 1992; Pratt and Huston 1993). Pratt (1992) indicated that increases in fine sediment reduce egg survival and emergence.

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel (Fraley and Shepard 1989). Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989; Pratt 1992; Rieman and McIntyre 1996). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992), and after hatching, juveniles remain in the substrate. Time from egg deposition to emergence of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows (Pratt 1992; Ratliff and Howell 1992).

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993). For example, multiple life history forms (e.g., resident and fluvial) and multiple migration patterns have been noted in the Grande Ronde River (Baxter 2002). Parts of this river system have retained habitat conditions that allow free movement between spawning and rearing areas and the mainstem Snake River. Such multiple life history strategies help to maintain the stability and persistence of bull trout populations to environmental changes. Benefits to migratory bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss (Rieman and McIntyre 1993; MBTSG 1998; Frissell 1993). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993).

Diet

Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, and small fish (Boag 1987; Goetz 1989; Donald and Alger 1993). Adult migratory bull trout feed on various fish species (Leathe and Graham 1982; Fraley and Shepard

1989; Brown 1994; Donald and Alger 1993). In coastal areas of western Washington, bull trout feed on Pacific herring (*Clupea pallasi*), Pacific sand lance (*Ammodytes hexapterus*), and surf smelt (*Hypomesus pretiosus*) in the ocean (WDFW et al. 1997).

Bull trout migration and life history strategies are closely related to their feeding and foraging strategies. Optimal foraging theory can be used to describe strategies fish use to choose between alternative sources of food by weighing the benefits and costs of capturing one choice of food over another. For example, prey often occurs in concentrated patches of abundance ("patch model," Gerking 1994). As the predator feeds the prey population is reduced, and it becomes more profitable for the predator to seek a new patch rather than continue feeding on the original one. This can be explained in terms of balancing energy acquired versus energy expended. In the Skagit River system, anadromous bull trout make migrations as long as 121 miles between marine foraging areas in Puget Sound and headwater spawning grounds, foraging on salmon eggs and juvenile salmon along their migratory route (WDFW et al. 1997). Anadromous bull trout also use marine waters as migratory corridors to reach seasonal habitats in non-natal watersheds to forage and possibly overwinter (Brenkman and Corbett 2005; Goetz 2004).

A single optimal foraging strategy is not necessarily a consistent feature in the life of a fish, but this foraging strategy can change from one life stage to another. Fish growth depends on the quantity and quality of food that is eaten (Gerking 1994) and as fish grow their foraging strategy changes as their food changes in quantity, size, or other characteristics. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, mysids and small fish (Shepard et al. 1984, Boag 1987, Goetz 1989, Donald and Alger 1993). Bull trout that are 4.3 inches long or longer commonly have fish in their diet (Shepard et al. 1984), and bull trout of all sizes have been found to eat fish half their length (Beauchamp and Van Tassell 2001).

Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984; Carl 1985). As these fish mature they become larger bodied predators and are able to travel greater distances (with greater energy expended) in search of prey species of larger size and in greater abundance (with greater energy acquired). In Lake Billy Chinook as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 17.7 inches in length to mainly kokanee for bull trout greater in size (Beauchamp and Van Tassell 2001).

Migration allows bull trout to access optimal foraging areas and exploit a wider variety of prey resources. Bull trout likely move to or with a food source. For example, some bull trout in the Wenatchee basin were found to consume large numbers of earthworms during spring runoff in May at the mouth of the Little Wenatchee River where it enters Lake Wenatchee (U.S. Fish and Wildlife Service 2003). In the Wenatchee River, radio-tagged bull trout moved downstream after spawning to the locations of spawning chinook and sockeye salmon and held for a few days to a few weeks, possibly to prey on dislodged eggs, before establishing an overwintering area downstream or in Lake Wenatchee (U.S. Fish and Wildlife Service 2003).

Effects of Climate Change on Bull Trout

With respect to climate change, observations show that warming of the climate is unequivocal, and that human activities, i.e., both Federal and non-Federal, have led to large increases in heat-trapping gases over the past century (Karl et al. 2009). There is high agreement and much evidence that even with current climate change mitigation policies and related sustainable development practices, global greenhouse gas emissions will continue to grow over the next few decades (IPCC 2007). However, it is virtually impossible to attribute proportions of the climate change trends to specific landowners and land managers, or to specific categories of human activities, i.e., many human activities directly and indirectly contribute some proportion to heat-trapping gas emissions.

Based on modeling, Rieman et al. (2007) indicated that the effects of climate change on bull trout populations in the United States are more pronounced in some regions than in others because bull trout are distributed across a broad range of environments and landforms of varied relief. Future loss of bull trout habitat due to climate warming within the interior Columbia River basin was predicted to be 18 to 92 percent of habitat areas that are currently thermally suitable and 27 to 99 percent of large (> 10,000 ha) habitat patches (Rieman et al. 2007). If that were to occur, bull trout would remain in only a few high-elevation strongholds, becoming functionally extinct because the populations would be too small and isolated to guarantee ample genetic flow (Rieman et al. 2007). Because loss and fragmentation of habitats with warming has important implications for bull trout conservation, the loss of isolated patches of habitat could affect bull trout populations at a disproportionately greater level than that predicted based only on the overall loss of habitat area (Rieman et al. 2007). The model also predicted that of the three major bull trout basins in Montana, the Clark Fork River basin is at greatest risk from climate change, followed by the Flathead and Kootenai River basins.

Climate change has the potential to profoundly alter the aquatic ecosystems upon which the bull trout depends via alterations in water yield, peak flows, and water temperatures in streams and large waterbodies, and an increase in the frequency and magnitude of catastrophic wildfires in adjacent terrestrial habitats (Bisson et al. 2003). It is difficult to accurately predict how this aquatic niche species would respond to environmental changes associated with climate change, however, bull trout rely on cold water throughout their various life stages and increasing air temperatures likely will cause a reduction in the availability of suitable cold water habitat. At this time, the scope and scale of such changes are unknown, although the effects on bull trout would likely be negative.

Status of Designated Critical Habitat

Legal Status

The Service published a final critical habitat designation for the coterminous United States population of bull trout on October 18, 2010 (75 FR 63898); the rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on the Service's website (http://www.fws.gov/pacific/bulltrout). The scope of the

designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments (also considered as interim recovery units)[12]. Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing (SR), and 2) foraging, migration, and overwintering (FMO) and includes both reservoirs/lakes and stream/shoreline miles.

The 2010 revision increases the amount of designated bull trout critical habitat by approximately 76 percent for miles of stream/shoreline and by approximately 71 percent for acres of lakes and reservoirs compared to the 2005 designation. For the Columbia River Basin 16,915.9 miles of stream and 427,044 acres of reservoirs/lakes were designated as critical habitat.

This rule also identifies and designates as critical habitat approximately 822.5 miles of streams/shorelines and 16,701.3 acres of lakes/reservoirs of unoccupied habitat to address bull trout conservation needs in specific geographic areas in several areas not occupied at the time of listing. No unoccupied habitat was included in the 2005 designation. These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. These unoccupied areas often include lower main stem river environments that can provide seasonally important migration habitat for bull trout. This type of habitat is essential in areas where bull trout habitat and population loss over time necessitates reestablishing bull trout in currently unoccupied habitat areas to achieve recovery.

Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898:63943 [October 18, 2010]). The core areas reflect the metapopulation structure of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of bull trout.

Thirty-two CHUs within the geographical area occupied by the species at the time of listing are designated under the revised rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the mainstem river units in the Columbia and Snake River basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical biological features associated with Primary Constituent Elements (PCEs) 5 and 6, which relate to breeding habitat.

The primary function of individual CHUs is to maintain and support core areas, which 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics (Rieman and McIntyre 1993); 2)

[12]The Service's 5 year review (USFWS 2008) identifies six draft recovery units. Until the bull trout draft recovery plan is finalized, the current five interim recovery units are in affect for purposes of section 7 jeopardy analysis and recovery. The adverse modification analysis does not rely on recovery units.

provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG 1998; Rieman and McIntyre 1993); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995; Healey and Prince 1995; MBTSG 1998; Rieman and McIntyre 1993); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (Hard 1995; MBTSG 1998; Rieman and Allendorf 2001; Rieman and McIntyre 1993).

Primary Constituent Elements for Bull Trout

Within the designated critical habitat areas, the PCEs for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Based on our current knowledge of the life history, biology, and ecology of this species and the characteristics of the habitat necessary to sustain its essential life-history functions, we have determined that the following PCEs are essential for the conservation of bull trout and may require special management considerations or protection:

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

5. Water temperatures ranging from 2 °C to 15 °C (36 °F to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

9. Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The revised PCE's listed above are similar to those previously in effect under the 2005 designation. The most significant modification is the addition of a ninth PCE to address the presence of nonnative predatory or competitive fish species. Although this PCE applies to both the freshwater and marine environments, currently non-native fish species present no concern in the marine environment, though this could change in the future.

Note that only PCEs 2, 3, 4, 5, and 8 apply to marine nearshore waters identified as critical habitat. Also, lakes and reservoirs within the CHUs also contain most of the physical or biological features necessary to support bull trout, with the exception of those associated with PCEs 1 and 6. Additionally, all except PCE 6 apply to FMO habitat designated as critical habitat.

Critical habitat includes the stream channels within the designated stream reaches and has a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of 1 to 2 years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. The Service assumes in many cases this is the full-pool level of the waterbody. In areas where only one side of the waterbody is designated (where only one side is excluded), the mid-line of the waterbody represents the lateral extent of critical habitat.

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PCEs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to such an extent that the conservation value of critical habitat is appreciably reduced (75 FR 63898:63943; U.S. Fish and Wildlife Service 2004). The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (U.S. Fish and Wildlife Service and NMFS 1998). Thus, adverse modification of bull trout critical habitat is evaluated at the scale of

the final designation, which includes the critical habitat designated for the Klamath River, Jarbidge River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments. However, we consider all 32 CHUs to contain features or areas essential to the conservation of the bull trout (75 FR 63898:63901, 63944). Therefore, if a proposed action would alter the physical or biological features of critical habitat to an extent that appreciably reduces the conservation function of one or more critical habitat units for bull trout, a finding of adverse modification of the entire designated critical habitat area may be warranted (75 FR 63898:63943).

Current Rangewide Condition of Bull Trout Critical Habitat

The condition of bull trout critical habitat varies across its range from poor to good. Although still relatively widely distributed across its historic range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (67 FR 71240). This condition reflects the condition of bull trout habitat. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (63 FR 31647, June 10 1998; 64 FR 17112, April 8, 1999).

There is widespread agreement in the scientific literature that many factors related to human activities have impacted bull trout and their habitat, and continue to do so. Among the many factors that contribute to degraded PCEs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows:

- fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999; Rieman and McIntyre 1993);
- degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989; MBTSG 1998);
- the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993; Rieman et al. 2006);
- in the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development; and
- degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

Effects of Climate Change on Bull Trout Critical Habitat

One objective of the 2010 final rule was to identify and protect those habitats that provide resiliency for bull trout use in the face of climate change. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PCEs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations were important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with non-native fishes).

Bull Trout Status and Distribution

Current and Historic Distribution

Bull trout are found throughout the northwestern United States and in British Columbia and Alberta in western Canada (Rieman and McIntyre 1993; U.S. Fish and Wildlife Service 2002a). Within Montana and Alberta, Canada bull trout also exist in the headwaters of the South Saskatchewan River basin and further north in drainages along the east side of the Continental Divide. In the Klamath River basin, only isolated, resident bull trout are found in higher elevation headwater streams of the Upper Klamath Lake, Sprague River, and Sycan River watersheds (Goetz 1989; Light et al. 1996). In the state of Washington, bull trout are found in coastal drainages of the Olympic Peninsula and in streams surrounding Puget Sound (U.S. Fish and Wildlife Service 2002a). In Montana, bull trout occur in the headwaters of the Columbia River basin in the Clark Fork and the Kootenai subbasins.

The historic range of bull trout was restricted to North America (Cavender 1978; Haas and McPhail 1991). Bull trout were historically recorded from the McCloud River in northern California, the Klamath River basin in Oregon and throughout the Columbia River basin in much of interior Oregon, Washington, Idaho, northern Nevada, and western Montana. They also occurred in coastal and interior Canada in much of British Columbia, with populations extending along the east slopes of the Rockies in Alberta and including a small area in northern Montana (Rieman et al. 1997).

Bull trout distribution has probably contracted and expanded periodically with natural climate change (Williams et al. 1997). Genetic variation (presence of unique alleles) suggests an extended and evolutionarily important isolation between populations in the Klamath basin and those in the Columbia River basin (Leary et al. 1993). Populations within the Columbia River basin are more closely allied and are thought to have expanded from at least two common glacial refugias in recent geologic time (Williams et al. 1997; Haas and McPhail 2001; Whitesel et al. 2004).

Despite bull trout occurring widely across a major portion of the historic potential range, many areas support only remnant populations of bull trout. Bull trout were reported present in 36 percent and unknown or unclassified in 28 percent of the subwatersheds within the potential

historic range. Strong populations were estimated to occur in only 6 percent of the potential historic range (Rieman et al. 1997). Bull trout are now extirpated in California and only remnant populations are found in portions of Oregon (Ratliff and Howell 1992). A small population still exists in the headwaters of the Jarbidge River, Nevada, which represents the present southern limit of the species' range.

Though bull trout may move throughout entire river basins seasonally, spawning and juvenile rearing appear to be restricted to the coldest streams or stream reaches. The downstream limits of habitat used by bull trout are strongly associated with gradients in elevation, longitude, and latitude, which likely approximate a gradient in climate across the basin (Goetz 1994). The patterns indicate that spatial and temporal variation in climate may strongly influence habitat occupancy by bull trout. While temperatures are probably suitable throughout much of the northern and mountainous portions of the range, predicted spawning and rearing habitat are restricted to increasingly isolated high elevation or headwater "islands" toward the south (Goetz 1994; Rieman and McIntyre 1995).

Status of Bull Trout in the Columbia River Basin

Rangewide, local populations of bull trout within their respective core areas are often isolated and remnant. Migratory life histories have been lost or limited throughout major portions of the range (Ratliff and Howell 1992; Pratt and Huston 1993; Rieman and McIntyre 1993, 1995; Goetz 1994; Jakober et al. 1998; MBTSG 1998; U.S. Fish and Wildlife Service 2002b, 2005a,b) and fluvial bull trout populations in portions of the upper Columbia River basin appear to be nearly extirpated (U.S. Fish and Wildlife Service 2002b, 2005a).

At this time, the Service recognizes 118 bull trout core areas rangewide in Idaho, Montana, Oregon, Nevada and Washington (U.S. Fish and Wildlife Service 2002b). This represents a partial consolidation of some of the 188 subpopulations originally described in the various bull trout listing documents (U.S. Fish and Wildlife Service 1999), and is based on the use of more consistent and updated terminology as well as specific information regarding connectivity and consolidation between some populations previously considered autonomous. For example, radio telemetry information from some recent studies has been particularly useful in further describing the movements of bull trout. Core areas were previously defined as approximating interacting biological units for bull trout. Hence, as more information is obtained and recovery proceeds, we would anticipate the number of core areas and the boundaries that describe them will continue to be somewhat fluid.

Within the Columbia River basin, a total of 95 core areas are described (U.S. Fish and Wildlife Service 2002b). Generally, where status is known and population data exists, bull trout populations throughout the Columbia River basin are at best stable and more often declining (Thomas 1992; Schill 1992; Pratt and Huston 1993; U.S. Fish and Wildlife Service 2005a,b). Bull trout in the Columbia basin have been estimated to occupy about 45 percent of their historic range (Quigley and Arbelbide 1997). Many of the bull trout core areas occur as isolated watersheds in headwater tributaries, or in tributaries where the migratory corridors have been lost or restricted. Few bull trout core areas are considered strong in terms of relative abundance and

core area stability (U.S. Fish and Wildlife Service 1998c, 2005a,b). Strong core areas are generally associated with large areas of contiguous habitat.

Status of bull trout in the Clark Fork and Kootenai River Management Units

Within the Clark Fork management unit of western Montana and northern Idaho, the Draft Bull Trout Recovery Plan describes 38 bull trout core areas (now 35 core areas, memorandum to the ARD, Ecological Services, Region 1, Portland, OR, from Field Supervisor, Montana Ecological Services, Helena, MT., July 14, 2006) and at least 152 local populations (U.S. Fish and Wildlife Service 2002b).

The Clark Fork River Management Unit is among the largest and most diverse across the species range and contains the highest number of core areas of any management unit, due in large part to the preponderance of isolated headwater lakes in the system. In the Clark Fork River Management Unit (U.S. Fish and Wildlife Service 2002b), which includes all of the Clark Fork River Basin from Albeni Falls Dam (outlet of Lake Pend Oreille) upstream to Montana headwaters, the Service described 35 core areas for bull trout. Bull trout within the larger and more diverse core areas are typically characterized by having relatively small amounts of genetic diversity within a local population but high levels of divergence between them (see for example Spruell et al. 1999, Kanda and Allendorf 2001; Neraas and Spruell 2001). At the lowest rung in the hierarchical organizational level, the Draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002b) describes groups of bull trout that spawn together in tributaries as local populations. There are 152 local populations of bull trout currently described in the Clark Fork River Management Unit (U.S. Fish and Wildlife Service 2002b).

The Service considers many of the core areas in the Clark Fork River drainage to be at risk of extirpation due in part to natural isolation, single life-history form, and low abundance. Expansion of nonnative species including lake trout into headwater lakes is the single largest human-caused threat in most of the 25 primarily adfluvial core areas (Fredenberg 2008); dams and degraded habitat have contributed to bull trout declines across this Management Unit.

Protect, restore and maintain suitable habitat conditions within the Clark Fork River Management Unit are a high priority identified in the draft Recovery Plan (U.S. Fish and Wildlife Service 2002c). Apart from migration impacts from the major dams, threats in the Clark Fork River Management Unit include, in order of importance, non-native species, water withdrawals, angling and poaching, forestry practices management and legacy mining impacts (Fredenberg 2008). Maintaining and improving habitat condition on federal lands in western Montana is crucial for the recovery of the species.

The Kootenai River Management Unit forms part of the range of the Columbia River population segment. The Kootenai River Management Unit is unique in its international configuration, and recovery will require strong international cooperative efforts. Within the Kootenai River Management Unit, the historic distribution of bull trout is relatively intact. Abundance of bull trout in portions of the watershed has been reduced, and remaining populations are fragmented.

The Kootenai River Management Unit includes 4 core areas (Lake Koocanusa, Kootenay Lake and River, Sophie Lake, Bull Lake) and 10 local populations.

The greatest threats to bull trout in this Management Unit, in order of magnitude, are introduced species, forestry, water withdrawals, angling and poaching, migration barriers, residential development, and mining (Fredenberg 2008). Distribution of bull trout has changed little since listing as bull trout continue to be present in nearly all major watersheds where they likely occurred historically.

Five-year bull trout status review

In 2005, the Service assessed the conservation status of bull trout and the vulnerability for each of 121 bull trout core areas (now 118 core areas; U.S. Fish and Wildlife Service 2005b). We reviewed the Bull Trout Core Area Conservation Assessment and concluded that the original threats to bull trout still existed for the most part in all core areas, but no substantial new and widespread threats were discovered during this review or in the review of previous biological opinions on bull trout. This finding indicates the baseline conditions overall rangewide had not changed substantially in the last five years and that the trend and magnitude of the rangewide population had not worsened nor did it improve measurably.

The risk assessment or ranking portion of the status review was modeled to assess the relative status of each of the 121 core areas. The model used to rank the relative risk to bull trout was based on the Natural Heritage Programs' NatureServe Conservation Status Assessment Criteria, which had been applied in previous assessments of fish status, including bull trout (Master et al. 2003; MNHP and MFWP 2004). The model integrated four factors: population abundance, distribution, population trend, and threats. For a complete understanding of the ranking process, a more thorough review of the report which describes the model and the output (U.S. Fish and Wildlife Service 2005b) is required.

In the Clark Fork River Management Unit the status assessment denoted 16 of 35 core areas at "high risk" of extirpation because of rapidly declining numbers and/or substantial imminent threats. Ten core areas were found to be "at risk" with moderate imminent or substantial non-imminent threats, and nine core areas were designated as a "potential risk" for extirpation primarily due to uncertainty regarding short-term population trends.

For the Kootenai River Management Unit the status assessment indicated that two of the four core areas (Kootenai River and Bull Lake) are considered to be at "at risk" because of very limited and/or declining numbers, range, and/or habitat, making the bull trout in this core area vulnerable to extirpation. The Lake Koocanusa core area is considered to be at "low risk" because bull trout are common or uncommon, but not rare, and usually widespread through the core area. The Sophie Lake core area is considered to be at "high risk" because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making the bull trout in this core area highly vulnerable to extirpation.

Analysis of the Species and Critical Habitat Likely to be Affected

The proposed action will occur in portions of the following core areas within the Clark Fork River Management Unit: Lower Clark Fork River, Lake Pend Oreille, Priest Lake, and Pend Oreille River, and in the Kootenai River and Bull Lake core areas of the Kootenai River Management Unit. Bull trout are the only federally listed fish species that occur in the action area and could potentially be affected by the proposed and connected actions.

Bull trout populations that overlap with non-complying BMUs are likely to be indirectly affected by the proposed action when road closures designed to achieve the standards are implemented over the next 8+ years. Bull trout populations may be affected after 8+ years in BMUs that currently comply with all standards and have excess core bear habitat above the proposed standard.

Designated bull trout critical habitat occurs within the non-complying BMUs is likely to be affected during the next 8+ years. In the BMUs that currently meet standards, critical habitat may possibly be affected after 8+ years. The nature, timing, and location of impacts in the currently complying BMUs is quite speculative. Therefore, impacts in these areas will be assessed qualitatively. See Figure B1 for a visual representation of the areas and critical habitat likely to be affected by this proposed action.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Action area, as defined by the Act, is the entire area to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purposes of this biological opinion, we have defined the action area of the proposed action to include the project area, previously described in the *Description of the Proposed Action* section. Additionally, for grizzly bears, the reinitiated consultation on the Forests LRMPs extends the action area and effects analysis to those recently mapped and delineated areas occupied by resident grizzly bears outside of but adjacent to the Recovery Zones.

<u>Status of Bull Trout in the Action Area</u>

The environmental baseline will be discussed for the core area as a whole, followed by a discussion of the current baseline for the action area, defined as the overlap between BMUs that do not currently meet the proposed access standards and bull trout core areas. Within this geographic outline (see Figure 1), exist one or more bull trout local populations, which occupy

one or more 6th code subwatersheds[13]. Subwatersheds are discrete between local populations. However, BMUs may cross both major and minor watershed divisions and are not discrete between local populations or even, necessarily, between core areas.

Compliance with access standards for grizzly bears is based on BMUs; environmental baseline and the analysis of project effects on bull trout are based on subwatersheds, local populations, and core areas. (As discussed above, the jeopardy determination is made at the scale of the listed entity.) At this time the exact local populations and subwatersheds which may be affected are unknown. Therefore, local populations within non-complying BMUs will be addressed only generally in this biological opinion, and step-down consultation will be used to analyze specific effects of defined projects in known locations during project implementation.

Baseline assessments for step-down consultations will focus on site specific information. Road treatments and changes in road management at the project level are expected as a result of the proposed action. In some cases, a proposed action with road treatments could increase sediment delivery to streams and affect fish and aquatic habitats (U.S. Forest Service 2010).

Bull Trout in the Lower Clark Fork River Core Area

Until recently, fluvial and adfluvial fish were blocked from freely and extensively migrating in the lower Clark Fork River (if not further upstream) by the three dams (Cabinet Gorge, Noxon Rapids, and Thompson Falls) that are positioned in sequence immediately upstream of Lake Pend Oreille. In the absence of the dams, it is likely the Lower Clark Fork core area population would have comprised a single Lake Pend Oreille core area population with local populations located in each of the watersheds. Despite these limitations, the lower Clark Fork continues to support bull trout that exhibit both resident and migratory life history forms. Most of the drainages occupied by bull trout in this watershed are believed to be dependent on migratory individuals to ensure long-term bull trout persistence.

Fragmentation of the migratory corridor by mainstem dams is a major factor affecting the survival and recovery of bull trout in the lower Clark Fork River drainage (MBTSG 1996). However, in the last five years this threat has been addressed to a large degree at the Avista dams through current fish passage programs. A fish ladder over Thompson Falls Dam was completed in October 2010 and became operational in April 2011, thus mitigating that migration barrier.

Prior to the Avista fish passage program, past fragmentation resulted in smaller, isolated groups of bull trout with decreased tributary accessibility. The migratory component of these smaller units was at a higher threat of extirpation due to their limited abundance and available range as well as the inability of fish migrating downstream over or through dams to return to natal waters. Rearing capacity in the reservoirs was greatly reduced compared to Lake Pend Oreille due to the size differential. Furthermore, the quality of available habitat for bull trout in the reservoirs was

[13]In this analysis "subwatershed" always refers to a 6th level hydrologic unit, also known as "6th code HUC," or merely "HUC6." When the term is derived from referenced literature the meaning may deviate, but may be verified in the cited work.

lower due to water level fluctuation, higher turnover rate of nutrients cycling through the system, and especially the much warmer water temperatures and lack of deep-water thermal refugia.

The Bull River supports more spawning bull trout than other tributaries in the Lower Clark Fork core area, with 9-32 bull trout redds located in the East Fork Bull River in 2001-2006, 1-10 bull trout redds in the South Fork Bull River, and occasional redds in the upper mainstem (Moran 2004; MFWP unpublished data 2006; Moran 2005). The bull trout redd counts in Rock Creek indicate inconsistent spawning, likely due in part to intermittent access as a result of a reach in the midsection of the lower mainstem that is perennially dewatered. In 2004, the highest number of redds were recorded since surveys began in 2001, with two redds in the mainstem below the dewatered reach and four redds just upstream of the confluence of the West Fork. At least a portion of those redds were known to be constructed by fish that had been passed upstream over Cabinet Gorge Dam (Lockard et al. 2004).

At the very best, the Lower Clark Fork core area may presently support 200-300 adult bull trout as compared to 12,000 in the Lake Pend Oreille core area (Hansen 2008). Under current circumstances, the rate of recovery of bull trout in the Lower Clark Fork core area has improved slightly with the Avista fish passage program. However, with the development of permanent fish passage facilities and operations within the next 10 years, this rate should improve significantly.

In summary, due largely to the artificial isolation caused by the dams and the habitat unsuitability of the three reservoirs in the Lower Clark Fork core area, bull trout distribution and numbers have been relatively small between 1952 and present. This is evident when this core area is compared to other core areas in the Clark Fork River Management Unit and some other portions of the Columbia River basin (U.S. Fish and Wildlife Service 2005a). Local populations of bull trout in the Bull River (35.3 miles) and Rock Creek (7.1 miles) form a very small percentage (1.3 percent) of the 3,372 miles of important occupied bull trout habitat in the Clark Fork River watershed (U.S. Fish and Wildlife Service 2002b). With improved fish passage in the core area in the next few years, it is likely that some local populations could be strengthened and that bull trout distribution could expand.

Following consolidation of the four fragmented core areas (Clark Fork Section 3, Lower Flathead, Noxon Reservoir, and Cabinet Gorge Reservoir) into a single Lower Clark Fork Core Area, we then applied the same Nature Serve model. The score for the combined Lower Clark Fork Core Area resulted in an “At Risk” ranking, which is one step reduced from the “High Risk” rankings of the status the core areas achieved under the previously fragmented condition. The action of rejoining the core areas through restored connectivity of bull trout migratory corridors, as called for in the Draft Bull Trout Recovery Plan, demonstrated an incremental improvement to the vulnerability status for the Lower Clark Fork Core Area. Full and complete connectivity overall three dams remains the longer term objective.

The integration of species and habitat condition indicator for this core area is FUR. FUR is defined as cumulative disruption of habitat has resulted in a clear declining trend in the local population size. Under current management, habitat conditions will not improve within two generations (5 to 10 years). Little or no connectivity remains among local populations. The

local population survival and recruitment responds sharply to normal environmental events. Of the 52 subwatersheds in this core area, 50 are FUR and 2 FAR. Since 2000 two of these subwatersheds have degraded one functional level and two have improved one level (U.S. Forest Service 2007e,f).

Environmental Baseline for Non-complying BMUs in the Lower Clark Fork River Core Area

Table B4 details local populations, baseline assessments for sediment and road densities in 6th code subwatersheds in the Lower Clark Fork River core area.

Within the Mt. Headley BMU, much spawning activity occurs in Fishtrap Creek and West Fork Thompson River drainages. The Thompson River serves primarily as a migratory corridor with some rearing in the main stem and its tributaries. All of the subwatersheds for the Fishtrap Creek population are FUR for both road density and sediment. Additionally, the West Fork Thompson River population is FUR for sediment in 4 out of 5 subwatersheds.

Vermilion River is the primary bull trout watershed within the Vermilion BMU and has known bull trout spawning locations below the Vermilion Falls. This subwatershed is currently functioning acceptably (FA) for sediment in the three subwatersheds with the strongest bull trout populations; however, it is functioning at unacceptable risk (FUR) for the integration of the habitat and population indicators. This condition is due to past riparian harvesting and intermittent base flows.

Rock Creek is currently functioning at acceptable risk (FAR) for sediment and FUR for road density, and so is a medium priority for restoration work. All subwatersheds in the Bull River local population are FA for sediment.

Table B4. Baseline assessment (U.S. Forest Service 2010, 2011) for the Lower Clark Fork River core area.

Designated Local Population	6th Code HUC	Baseline Call Sed/RD	BMU Name	BMU Stds Not Met
Fishtrap Creek	170102130401 Beartrap Cr	FUR/FUR	Mt. Headley	OMRD TMRD Core
	170102130402 Upper Fishtrap Cr	FUR/FUR		
	170102130403 WF Fishtrap Cr	FUR/FUR		
	170102130404 Lower Fishtrap Cr	FUR/FUR		
West Fork Thompson River	170102130405 WF Thompson River	FUR/FAR		
	170102130406 Deerhorn/Big Hole Cr	FUR/FUR		
	170102130407 Lower Thompson River	FUR/FUR		
	170102130508 Weeksville Cr	FUR/FUR		
	170102130613 Munson/Quartz Cr	FAR/FA		
Graves Creek	170102130804 Graves Creek	FUR/FUR		
Vermilion River	170102130802 Middle Vermilion River	FA/FUR	Vermilion	OMRD TMRD
	170102130803 Lower Vermilion River	FA/FAR	Silver Butte-Fisher	TMRD Core
	170102131005 Swamp Cr	FA/FA		
	170102130902 Squaw Cr	FAR/FAR	Mt. Headley	OMRD TMRD Core
	170102130903 Deep Cr trib to Clark Fork	FAR/FA		
	170102130904 Mosquito/Cougar Cr	FUR/FUR		
Rock Creek	170102131301 Rock Cr	FAR/FUR	Bull, St. Paul,Wanless	OMRD TMRD,Core
Bull River	170102131101 Headwaters Bull River	FA/FAR	Bull & Snowshoe	OMRD TMRD, Core
	170102131102 Upper Bull River	FA/FUR	St. Paul	OMRD
	170102131103 Middle Bull River	FA/FUR	Bull, Spar, St. Paul, Snowshoe	OMRD TMRD Core
	170102131104 Lower Bull River	FA/FAR	Bull, St. Paul	OMRD TMRD,Core

Sed = Sediment; RD = Road Density;
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.

Bull Trout in the Lake Pend Oreille Core Area

During the development of the draft recovery plan, 17 local populations were identified in the Lake Pend Oreille core area (U.S. Fish and Wildlife Service 2002b). However, based on recent survey data, there appears to be at least 20 local populations, as redds and multiple age classes of juvenile bull trout have been identified in several additional streams (IDFG in litt. 2008; R. Ryan, IDFG, pers. comm. 2008).

At the time of bull trout listing, the Lake Pend Oreille core area (originally referred to as subpopulation) was considered to be in a declining trend (U.S. Fish and Wildlife Service 1998a). The Bull Trout Core Area Conservation Status Assessment (U.S. Fish and Wildlife Service 2005) determined the Lake Pend Oreille core area population to be stable. Bull trout redd counts have been conducted annually since 1983 on six index streams, which are also streams identified as supporting local populations (Trestle Creek, East Fork Lightning, Gold Creek, North Gold Creek, Johnson Creek and Grouse Creek). In 2006, the combined total bull trout redd counts for the index streams were considerably higher than the long-term average for these streams (Downs and Jakubowski 2007). These index streams vary, with some approaching restoration objectives and others, particularly those in the Lightning Creek drainage, persisting at degraded levels (Downs and Jakubowski 2007).

A major flood event in 2007 resulted in a decline in redd counts for 2007-2008, however, in 2009 redd counts were once again above the 10-year average (Deeds, S. pers. comm. 2011). Within Lake Pend Oreille, mark and recapture population estimates have indicated there are approximately 12,000 adult bull trout in the lake (Hansen 2008).

Environmental Baseline for Non-complying BMUs in the Lake Pend Oreille Core Area

Table B5 details local populations, baseline assessments for sediment and road densities in 6th code subwatersheds in the Lake Pend Oreille core area.

The Lightning Creek watershed has been heavily impacted from natural mass-wasting events, as well as land management activities, creating an unstable channel and lack of habitat complexity in the main stem Lightning Creek (PBTTAT 1998). The main stem Lightning Creek is braided and has a high width to depth ratio (PBTTAT 1998). Trestle Creek is currently rated FA for both sediment and road density (U.S. Forest Service 2011).

Grouse Creek is the primary bull trout stream within the Grouse BMU and has current spawning. Both of the subwatersheds that may be affected for this local population are rated FAR for sediment, and the integration of species and habitat is also rated FAR.

Table B5. Baseline assessment (U.S. Forest Service 2010, 2011) for the Lake Pend Oreille core area.

Designated Local Population	6th code HUC	Baseline Call Sed/RD	BMU Name	BMU Stds Not Met
Lightning Creek	170102131301 Lightning Cr above Rattle Cr	FAR/FAR	North Lightning	OMRD
Porcupine and Wellington Creeks	170102131302 MF Lightning Cr	FAR/FAR	Scotchman North Lighting	OMRD TMRD
	170102131303 EF Lightning Creek	FAR/FA	Scotchman	TMRD
	170102131304 Lightning Cr blw EF Lightning Cr	FAR/FAR	Scotchman	TMRD
Trestle Creek	170102140404 Trestle Cr	FA/FA	North Lightning	OMRD
Pack River (1701021405)	170102140503 Pack River abv Jeru Cr	FAR/FA	Myrtle	--
Grouse Creek	170102140505 Grouse Cr	FAR/FAR	Grouse	OMRD TMRD Core
	170102140506 Rapid Lightning Cr	FAR/**FUR**	Grouse and North Lightning	OMRD TMRD Core

Sed = Sediment; RD = Road Density;
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.

Bull Trout in the Priest Lake Core Area

Bull trout populations in the Priest Lake core area are composed of adfluvial migrants that winter in Priest Lake and Upper Priest Lake and spawn in tributaries to the lakes. Five local populations are thought to still occur in the core area: Upper Priest River, Gold Creek, Hughes Fork, Indian Creek, and Granite Creek. Small numbers of both juvenile bull trout and redds have been documented in numerous other tributaries throughout this core area in recent years, but whether they constitute local populations is unknown, as comprehensive surveys have not been completed. Genetic analysis indicates that the Priest Lake core area populations are distinct from populations in Lake Pend Oreille and the Clark Fork River (Beetles et al. 2005). In 2005 fewer than 100 adult bull trout were estimated to be present in the core area, and the trend was uncertain to declining.

The presence of non-native lake trout and the concomitant decline in westslope cutthroat trout, mountain whitefish, pygmy whitefish, kokanee, and other bull trout prey are considered the greatest threat to bull trout populations in the Priest Lake core area. Besides competing for prey species, lake trout also prey on subadult bull trout.

Annual gillnetting operations to reduce lake trout in Upper Priest Lake have been conducted since 1998, but as late as 2005 were judged to be effective only as a stopgap measure. In 2007 gillnetting operations intensified, with a switch to a commercial gillnet boat setting over 30 miles of gillnet with a smaller mesh-size, that effectively removed both adults and smaller/younger

lake trout. Capture of lake trout went from 912 in 1998 to 2551 in 2010 (Deeds, S. pers. comm. 2011). Trap netting was also conducted in the Priest Lake Thorofare, which connects Priest Lake and Upper Priest Lake, for approximately one month in 2010 starting in late September. The goal of the trap netting was to reduce the movement of lake trout from Priest Lake, where no control is being attempted, to Upper Priest Lake. An additional 241 lake trout were captured in the Thorofare and removed from the population in 2010 (IDFG 2010).

Redd counts in the Upper Priest River basin reached a low point of 7 in 2007, but have increased in recent years to a count of 42 in 2010. The higher redd counts are believed to result from the increased effectiveness of lake trout removal over the last four years, including both adults and young recruits (Deeds, S. pers. comm. 2011).

Bull trout can generally move freely within the migratory corridors in this core area. However, Outlet Dam at the outlet of Priest Lake is almost certainly a barrier to upstream passage for any fish, including bull trout that are entrained through the dam.

More than 90 percent of the east side of the Priest Lake core area is owned by the State of Idaho, most of which is administered under the State Endowment Trust. (PBTTAT 1998). The Idaho Department of Lands has adopted the Forestry Program outlined in the Snake River Basin Adjudication process as minimum standards for conducting forest practices on State Endowment lands within the Priest River/Priest Lake basin. The Forestry Program offers 75 feet of riparian protection on either side of a fish bearing stream (150' total) including a 25' no cut buffer adjacent to the stream itself. Class 2 streams (everything that is not fish bearing) get 50 of protection on either side of the stream. Also, if a stream wanders through a low gradient area where the stream is likely to migrate laterally, the riparian management zone is extended to cover the entire channel migration area. Most of the time riparian buffers exceed these minimums.

Under the Forestry Program, all stream crossings must be installed to pass fish, and existing stream crossings must be upgraded to meet fish passage criteria within 15 years. However, if an existing crossing lies within an active timber sale area, it must be upgraded to meet fish passage criteria within one year of operations.

The Forestry Program also includes in-stream large woody debris minimums; restrictions on the types of timber harvest equipment and road construction techniques that can be used on unstable or highly erosive geologic types; road building and maintenance terms that require water to be diverted off roads and back on to the forest floor, especially avoiding direct water delivery at stream crossings; and an adaptive management strategy that will allow us to monitor the effectiveness of the terms and make adjustments to improve conditions for fish over time. The monitoring plan is currently in action.

Environmental Baseline for Non-complying BMUs in the Priest Lake Core Area

Table B6 details local populations, baseline assessments for sediment and road densities in 6th code subwatersheds in the Priest Lake core area.

Most of the Blue-Grass BMU falls outside the Priest Lake core area (see Figure 1). Sediment is currently rated FA for both of the subwatersheds that may be affected within the Upper Priest River local population. In the Lakeshore and Kalispell-Granite BMUs, the Kalispell Creek subwatershed rates FUR for sediment. Granite Creek has more acceptable levels of sediment and road density. The Hughes Fork local population will not be affected by this action.

Table B6. Baseline assessment (U.S. Forest Service 2010, 2011) for the Priest Lake core area.

Designated Local Population	6th code HU1.8C	Baseline Call Sed/RD	BMU Name	BMU Stds Not Met
Upper Priest River	170102150101 Upper Priest River above Malcolm Cr	FA/FA	Blue-Grass and Salmo-Priest	TMRD Core
	170102150102 Upper Priest River above Upper Priest Lake	FA/FAR	Blue-Grass, Sullivan-Hughes, Salmo-Priest	TMRD Core
Hughes Fork	170102150104 Hughes Fork abv Gold Cr	FAR/FA	Sullivan-Hughes	--
Granite Creek	170102150302 NF Granite	FA/FAR	Lakeshore & Kalispell-Granite	TMRD Core
	170102150301 SF Granite	FAR/FA		
Kalispell Creek	170102150208 Kalispell Cr	FUR/FAR		

Sed = Sediment; RD = Road Density; FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.

Bull Trout in the Pend Oreille River Core Area

On the Pend Oreille River system, Box Canyon Dam in Washington and Albeni Falls Dam in Idaho have disconnected Lake Pend Oreille and the Priest River system in Idaho from the Pend Oreille River system downstream of Albeni Falls Dam. Waneta and Seven Mile dams in Canada, although not within the action area, and Boundary Dam just south of the Canada/U.S. border, all without fish passage facilities, fragment bull trout habitat in the lower Pend Oreille River system downstream of Metaline Falls and Z Canyon. Other dams and water diversion facilities without fish passage facilities were constructed in tributaries to the Pend Oreille River and have further fragmented native fish populations and reduced connectivity (e.g. Sullivan Creek Dam, Mill Pond Dam, Cedar Creek Dam, Calispell Creek Pumping Plant, and the Priest Lake Outlet Dam).

In northeastern Washington, the Pend Oreille River is the only bull trout core area, however the one previously identified local population (the LeClerc Creek complex) is believed to have been extirpated (U.S. Fish and Wildlife Service 2008). The Pend Oreille River has been designated as foraging, migration, and over-wintering habitat for bull trout, and likely provided those same functions under pre-dam conditions. Spawning and rearing habitat currently occurs in tributaries.

It is unknown which bull trout life history stage is currently most limiting to bull trout production in the lower Pend Oreille River system downstream of Albeni Falls Dam (within Washington). It is also unknown which habitat attribute or combination of habitat attributes negatively impacted by human activities, are most limiting each bull trout life history stage in the lower Pend Oreille system downstream of Albeni Falls Dam (within Washington). However, several factors are known to be significant in the decline of bull trout populations in the lower Pend Oreille River system within Washington State: habitat degradation on the mainstem and within the tributaries; human-made fish passage barriers into tributaries to the Pend Oreille River; nonnative fish species introduction and management; and the construction and operation of three hydroelectric facilities on the mainstem Pend Oreille River (Boundary Dam, Box Canyon Dam and Albeni Falls Dam). The 1950's conversion of the mainstem Pend Oreille River (in the United States) into a series of three reservoirs associated with hydroelectric development began with the completion of Albeni Falls Dam in 1955 followed by construction of BCD in 1956 and Boundary Dam in 1967. All the Pend Oreille River dams were built without fish passage facilities. In addition, two more dams were built across the mainstem Pend Oreille River in Canada (Waneta Dam and Seven Mile Dam, in 1954 and 1975, respectively), however these dams are not included in the action area for the Project. The Northeast Washington Recovery Unit Team noted that complete recovery of bull trout populations in the Pend Oreille River in Washington is contingent upon reconnection with the Lower Clark Fork Recovery Subunit in Idaho (U.S. Fish and Wildlife Service 2002b, Andonaegui 2003).

Numerous native and nonnative fish species are found in the lower Pend Oreille River in the reservoir below Albeni Falls Dam. Salmonids include bull trout, westslope cutthroat trout (*O. clarki lewisi*), kokanee, mountain whitefish *(Prosopium williamsoni),* brook trout, lake trout, brown trout *(Salmo trutta*), and rainbow trout. Brown trout were the most common salmonid observed during the PUD's three year adfluvial fish trapping effort from March 1998 through December 2000, while brook trout were the second most common (PUD 2001). Of the above, only bull trout, westslope cutthroat trout, and mountain whitefish are native salmonid species. Other game and non-game fishes present include: large scale sucker (*Catostomus macrocheilus*), bridge lip sucker (*C. columbianus*), mottled sculpin (*Cottus bairdi*), northern pikeminnow (*Ptychocheilus oregonenis*), yellow perch (*Perca flavescens*), pumpkinseed (*Lepomis gibbosus*), and largemouth bass (*Micropterus salmoides*) (PUD 2000; Geist et al. 2004).

According to contemporary observations, bull trout and other native salmonids were still relatively common in the lower Pend Oreille River after Albeni Falls Dam was built. *"In the early 1950s, during spawning seasons, heavy concentrations of whitefish and Dolly Varden [bull trout] could be found at the mouth of Le Clerc Creek …. Large five to ten pound Dolly Varden could be caught in the Pend Oreille River at Charr Springs and around Indian Creek …"* (U.S. Fish and Wildlife Service 2002a, p. 9). As recently as 1957 *"many large Dolly Varden (i.e., bull trout*)" were caught in sport fisheries within Box Canyon Reservoir (reviewed in Ashe and Scholz 1992). Presumably, this population was utilizing both the existing rearing habitat in the river, and spawning and rearing habitat within its tributaries, including lower Slate Creek (West, K. pers. comm. 1996), Le Clerc Creek (Cole, R. pers. comm. 1998) and Ruby Creek (Gray, L. pers. comm. 1999). In the early 1950's, during spawning seasons, heavy concentrations of whitefish and "Dolly Varden" (bull trout), could be found at the mouth of LeClerc Creek. Large

2.3 to 4.5 kg (5 to 10-pound) "Dolly Varden" could be caught in Char Springs and around Indian Creek (Cole, R. pers. comm. 1998), both locations within the present reservoir. Large "Dolly Varden" (bull trout) were also caught off of log booms at Newport, Dalkena, and Usk, Washington, prior to Box Canyon and Albeni Falls dam construction (Pool, D. pers. comm. 2001).

With the completion of Boundary Dam (RM 17.0) in 1967, Metaline Falls was eliminated as a physical barrier to fish movement for a distance of 17.5 miles below BCD. This allowed access to tributary streams, such as Sweet and Slate creeks, where bull trout have been observed in the recent past. For example, four bull trout were captured near the outlet of Slate Creek (two in July 1994 and two in August 1995) during hook and line surveys conducted by Washington Department of Fish and Wildlife (WDFW) and the U.S. Forest Service (U.S. Forest Service) (Shuhda 2002). In September 1997, a 220 millimeter (9 inches) bull trout was captured (marked with an adipose fin clip) in a live trap in the mouth of Slate Creek. This fish was recaptured in a live trap in November of 1997, within 5 meters (16 feet) of the previous capture location. In August 1999, a 510 millimeter (20 inch) adult bull trout was captured during hook-and-line sampling being conducted by R2 Resource consultants near the mouth of Slate Creek. Slate Creek provides a plume of cold water in the Pend Oreille River within the preferred range of bull trout with summer high water temperatures of 10° C (50° F). (Solonsky 2000; U.S. Forest Service 1998). These individuals found in Sullivan and Slate Creeks are most likely adfluvial bull trout, based on their large size.

Once abundant in the lower Pend Oreille River and in numerous tributary streams, bull trout numbers are now severely limited. According to Andonaegui (2003), only 33 bull trout had been observed in the previous 28 years in the Pend Oreille River and its tributaries between Albeni Falls and Boundary dams prior to 2003. Within the Pend Oreille Core Area (Pend Oreille River from Canadian border to Albeni Falls Dam; see U.S. Fish and Wildlife Service 2002b), individual sightings of bull trout have occurred in LeClerc Creek, Mill Creek, Cedar Creek, Indian Creek, Sullivan Creek, Sweet Creek, Marshall Creek, and Slate Creek (U.S. Fish and Wildlife Service 2002b), but there are no known healthy populations of bull trout in any of these tributaries.

Bull Trout in the Kootenai River Core Area

The Kootenai River Core Area is considered a primary core area, meaning that it includes several identified local populations of bull trout and that in recovered condition is expected to support at least 5 local populations with 100 or more spawning adults and contain 1,000 or more adult bull trout (U.S. Fish and Wildlife Service 2002b). Currently, this core area is not meeting the criteria established in the draft recovery plan, with only one to four local populations meeting the draft recovery criteria and an overall adult population level below 1,000 individuals (U.S. Fish and Wildlife Service 2005b).

The Kootenai River Core Area stretches from Libby Dam downstream to the Canadian border with Idaho. Bull trout were first recorded in the Kootenai River in 1864, but historical accounts are limited to anecdotal information (MBTSG 1996). In general, migratory bull trout spend their

adult lives in the Kootenai River or Kootenay Lake in British Columbia, while using the major river tributaries for spawning and rearing (U.S. Fish and Wildlife Service 2002b). The highest quality spawning and rearing stream within the core area in Montana is in the Quartz Creek drainage, though bull trout spawning sites have been inventoried on several Montana tributaries to the Kootenai River including Pipe, O'Brien, and Callahan Creeks, and tributaries to Libby Creek and the Fisher River (MBTSG 1996).

Migration in the Kootenai River Core Area is constrained by a partial barrier at Kootenai Falls between Libby and Troy, Montana. Montana Fish, Wildlife, and Parks (MFWP) tracked at least one adult bull trout upstream past Kootenai Falls, indicating this may only be a seasonal barrier to upstream migration (U.S. Fish and Wildlife Service 2005a).

The MBTSG (1996) considers forestry practices, operation of dams, and fish introductions to be the major concerns for this Montana section of the Kootenai River bull trout population. Forestry practices rank as the highest risk because of its status as the dominant land use throughout the watershed. Legal fish introductions included brook trout which are now found throughout all core areas and are known to hybridize and displace native bull trout (MBTSG 1996).

Data compiled by U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2005b) indicates that the adult bull trout population in this core area may have increased in the late 1990's (redd counts ~ 250) and potentially even exceeded 1,000 individuals by 1999. However, redd count data collected between 2002 and 2004 (redd counts ~ 150) suggest that the adult bull trout population may have decreased to less than 1,000 individuals, similar to baseline estimates in the early 1990's (U.S. Fish and Wildlife Service 2005a). The overall conclusion for the Kootenai River Core Area was that there was no overall population trend and that despite a population level below historically natural levels, the population is stable (U.S. Fish and Wildlife Service 2005b).

Environmental Baseline for Non-complying BMUs in the Kootenai River Core Area

Table B7 details local populations, baseline assessments for sediment and road densities in 6th code subwatersheds in the Kootenai River core area.

Sediment baseline assessments for all subwatersheds within the Fisher River, Libby Creek, Pipe Creek, Quartz Creek, and O'Brien Creek local populations are FA, even though road density baselines range from FAR to FUR. The level of impacts to these local populations is expected to be fairly low because much of the Grouse, Roderick, and Pulpit BMUs fall outside the Kootenai River bull trout core area. Sediment levels for the Callahan Creek local population are mostly FA, with the exception of the Deep Creek and Brown Creek subwatersheds.

Table B7. Baseline assessment (U.S. Forest Service 2010, 2011) for the Kootenai River core area.

Designated Local Population	6th code HUC	Baseline Call Sed/RD	BMU Name	BMU Stds Not Met
Fisher River	170101020401 WF Fisher Cr	FA/**FUR**	Wanless	TMRD Core
Libby Creek	170101010803 Granite Cr	FA/FAR	Snowshoe	--
	170101010404 Big Cherry Cr	FA/**FUR**		
Pipe Creek	170101010902 Upper Pipe Cr	FA/**FUR**	Big Creek Roderick	TMRD Core
	170101010901 EF Pipe Creek	FA/FUR	Big Creek	--
Quartz Creek	170101011004 Quartz Cr	FA/**FUR**	Pulpit	Core
O'Brien Creek	170101011201 O'Brien Cr	FA/**FUR**		
Callahan Creek	170101011204 Callahan Cr	FA/FAR	Callahan	--
	170101040201 Boulder Cr above MF Boulder	FA/FAR	Boulder	TMRD Core
	170101040202 Boulder Cr below MF Boulder, includes MF and EF Boulder	FA/FAR	Boulder	TMRD Core
	170101040402 Deep Cr above Brown Cr	FAR/**FUR**	Grouse	O,T,C
	170101040406 Brown Cr , includes Twentymile Cr	**FUR/FUR**	Boulder and Grouse	OMRD TMRD Core
	170101040502 Myrtle Cr	FAR/FA	Myrtle	--
	170101040801 Boundary Cr abv Grass Cr	FA/FAR	Blue-Grass	TMRD Core
	170101040802 Grass Cr	FA/FAR		
	170101040803 Boundary Cr blw Grass Cr	FA/FAR		

Sed = Sediment; RD = Road Density;
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.

Bull Trout in the Bull Lake Core Area

Bull trout in this core area exhibit a complex and relatively unique migratory strategy (U.S. Fish and Wildlife Service 2002b, 2009). Adults from Bull Lake migrate approximately 8 miles downstream via Lake Creek, and then up Keeler Creek where most of the known spawning and rearing occurs. The Bull Lake Core Area is naturally bound by Bull Lake on the upper end and a natural falls (believed to be an upstream migration barrier) downstream just before Lake Creek confluences with the Kootenai River. Currently, the NLI Lake Creek Hydroelectric Project dam is located at the natural falls. Therefore, bull trout in this core area have been naturally isolated from other core area populations in the Kootenai River Basin Management Unit. This conclusion is further supported by a recent genetic analysis of bull trout core areas in the Kootenai River Basin that showed that the Keeler Creek bull trout are genetically distinct and have relatively low genetic diversity and heterozygosity, likely attributed to the long-term isolation (Ardren et al 2007).

Keeler Creek is the only designated local population in this core area; it consists of several hundred adult fish (200-500) and the population trend appears to be stable (U.S. Fish and Wildlife Service 2009). Redd counts have been conducted annually in Keeler Creek since 1997

(MFWP 2009), with counts ranging from 11 to 126, but typically in the high double digits and averaged 83. In 2005 through 2007, bull trout redd counts were 170, 142, and 84 redds, respectively (U.S. Fish and Wildlife Service 2009), with the counts in 2005 and 2006 exceeding the historical high number for the previous eight years. These data generally reflect a favorable population trend that is at least stable, or possibly increasing (U.S. Fish and Wildlife Service 2009). Most recently redd counts were 62 in 2008 and 24 in 2009, which shows a declining trend since 2005 and counts for 2009 representing the second lowest redd counts on record (MFWP 2009).

The Draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002b) identified impacts to bull trout in the core area to include past forest management practices and poorly constructed roads that have destabilized channel conditions in Keeler Creek, mining operations, illegal harvest, and habitat isolation. More recently the threats were re-assessed to include fish passage/dewatering issues, introduced species (e.g., brook trout, brown trout, and northern pike), angling and harvest (legal or illegal), forest management practices and forest roads, and residential development and urbanization along Bull Lake and Lake Creek (U.S. Fish and Wildlife Service 2009).

There is only a single spawning stream supporting the bull trout in this core area (i.e., Keeler Creek), which makes the population particularly vulnerable to disturbances in the spawning and rearing habitat (U.S. Fish and Wildlife Service 2009). The Forest Service has conducted a number of projects in the Keeler Creek drainage involving road decommissioning and road BMPs in the recent past, with the expectation that habitat conditions for bull trout in this important drainage will gradually improve. Thus far there has been little documentation of changing conditions. It is currently rated as FAR for both sediment and road density (U.S. Forest Service 2011).

Status of Critical Habitat within the Action Area

The baseline for critical habitat will be discussed for the core area as a whole, followed by a discussion of the baseline for the action area, defined as the overlap between BMUs that do not currently meet the proposed access standards and bull trout core areas. Critical habitat applies only to those specifically designated streams (75 FR 63898) and only to the area within the ordinary high watermark.

Compliance with access standards or grizzly bears is based on BMUs; environmental baseline and the analysis of project effects on bull trout critical habitat are based on project effects to the PCEs in critical habitat streams. (As discussed above, the adverse modification determination is made at the rangewide extent of critical habitat.) At this time the exact stream segments which may be affected are unknown. Therefore, critical habitat within any non-complying BMU will be discussed generally, and step-down consultation will be used to determine specific effects during project implementation.

While assessing the environmental baseline and potential effects to bull trout as a species, agency biologists have concurrently provided a companion analysis of effects to the PCEs for

designated bull trout critical habitat and related habitat indicators. This companion analysis, titled "*Crosswalk between the Bull Trout Matrix of Pathways and Indicators (MPI) and Primary Constituent Elements (PCEs) of Designated Critical Habitat*" shows that the matrix analysis for environmental baseline conditions thoroughly addresses the PCEs for baseline conditions of designated critical habitat for bull trout (see Appendix B1).

Critical Habitat in the Lower Clark Fork River Core Area

A total of 327 miles of stream/river and 8,984 acres of reservoir are included in the revised designation of critical habitat for the Lower Clark Fork River core area. The fragmented nature of the migratory corridor by the mainstem dams (Cabinet Gorge, Noxon Rapids, and Thompson Falls) affects PCE 2, limiting the physical connections between spawning, rearing, foraging, and overwintering habitats (MBTSG 1996b). Mitigations are being undertaken at the dams at Cabinet Gorge (Lockard et al. 2004) and Noxon Rapids, but apart from such ongoing management, these are permanent barriers. A fish ladder has been installed at Thompson Falls and is functioning for the first time this season; its effectiveness is yet to be determined.

The mainstem dams and the reservoirs behind them affect PCEs 4, 5, 7, and 8. Complexity of river, stream, and reservoir aquatic environments is reduced over the natural condition by both the backup and slowing of water behind the dams and the changed hydrograph affecting the natural rates and locations of erosion, deposition, and sediment transport (PCE 4). The large surface area of the reservoirs allows for greater solar insolation and raises water temperatures (PCE 5). The dams and their regulation based on energy production needs disrupt the natural hydrograph governing the timing and quantity of runoff (PCE 7). Finally, the high aeration of the water going through the dams can result in super-saturation by nitrogen, which may be lethal to fish in extreme cases (PCE 8).

PCE 9 is degraded because the reservoirs change the habitat to favor non-native species, such as brown trout and lake trout. Brook trout and rainbow trout are also common in many of the spawning and rearing streams (U.S. Fish and Wildlife Service 2005a).

<u>Critical Habitat Baseline for Non-complying BMUs in the Lower Clark Fork River Core Area</u>

In the Mt. Headley BMU critical habitat streams and rivers include Thompson River, West Fork Thompson River, Graves Creek, Beatrice Creek, Fishtrap Creek, and the West Fork of Fishtrap Creek. Graves Creek, West Fork Thompson and Fishtrap Creeks are degraded for PCE's 4, 6, and 8 where heavy logging impacts have occurred (U.S. Forest Service 2010). In the Vermilion BMU critical habitat consists of the Vermilion River, which is functioning acceptably for most habitat indicators resulting in only minor degradation to PCEs. Swamp Creek constitutes the critical habitat in the Silver Butte Fisher BMU, and like the Vermilion River has few degraded PCEs. Rock Creek critical habitat runs through the St Paul and Wanless BMUs; PCEs 3, 4, 6, and 8 show some degradation. East Fork Bull River constitutes the remaining critical habitat in the St. Paul BMU; none of the PCEs show significant degradation there. For the Bull River in the Bull BMU, PCE 4 has some minor degrading resulting from relatively high road density; other PCEs show little degradation.

Critical Habitat in the Lake Pend Oreille Core Area

A total of 218.6 miles of stream/river and 82,972 acres of lakes are included in the revised critical habitat for the Lake Pend Oreille core area. The vast majority of critical habitat in this core area is outside the action area in the Pend Oreille, Priest, East and Pack Rivers and will not be affected by this decision (see Figure 1). The primary threats to critical habitat in the Lake Pend Oreille core area result from the presence of non-native fish, degrading PCE 9 and private development impacting PCEs 1, 3, 4, and 8.

Critical Habitat Baseline for Non-complying BMUs in the Lake Pend Oreille Core Area

Lightning Creek drainage constitutes the primary critical habitat in the Scotchman and North Lightning BMUs. PCEs 4 and 6 have been impacted in the Lightning Creek drainage by mass-wasting events (PBTTAT 1998). Trestle Creek is also critical habitat in the North Lightning BMU, and shows no significant degradation of the PCEs. Grouse Creek is the only critical habitat in the Grouse BMU, and shows minor to moderate degradation for PCEs 2, 4, 5, 7, and 8.

Critical Habitat in the Priest Lake Core Area

Critical habitat was designated in 2010 for Priest Lake, the Thorofare, Upper Priest Lake, Upper Priest River, and numerous tributaries to Upper Priest River and the lakes. A total of 237.7 miles of stream/river and 24,671 acres of lakes are included in the revised critical habitat for the Priest Lake core area. Similar to the Lake Pend Oreille core area, the vast majority of critical habitat in this core area is outside the action area in the Upper Priest River and several tributaries to Upper and Lower Priest Lakes and the Priest River. Degradation of PCE 9 due to the ubiquitous presence of non-native fish constitutes the most severe and immediate threat to this core area. Private development is much less of a threat as most of the areas adjacent to critical habitat are public lands, both state and federal.

Critical Habitat Baseline for Non-complying BMUs in the Priest Lake Core Area

Granite Creek, including the North and South Forks constitutes the entire critical habitat in the Lakeshore and Kalispell-Granite BMUs. The Granite Creek drainage shows mild to moderate degradation for PCEs 2, 3, 4, 5, 6, 7, and 8 (U.S. Forest Service 2010). Critical habitat in the Upper Priest River runs adjacent to the Blue-Grass BMU, with very short stretches actually contained within the BMU boundary. Habitat indicators and the PCE's are generally all functioning appropriately.

Critical Habitat in the Pend Oreille River Core Area

The revised critical habitat in the Pend Oreille River core area includes the main stem of the Pend Oreille River, Cedar Creek, Sullivan Creek, Ruby Creek, LeClerc Creek complex, Fourth of July, Tacoma, Winchester, Indian, and Small Creeks for a total of 227.6 stream miles in the core area. The only critical habitat that may be affected by this decision is Sullivan Creek. For

the core area as a whole, the greatest threat to critical habitat stems from a number of dams that fragment habitat and form barriers to natural migration. Non-native fish species and forest roads and management practices are the next largest threats (U.S. Fish and Wildlife Service 2008).

Non-complying BMUs do not occur in the Pend Oreille River core area. The Salmo-Priest BMU currently exceeds the recommended grizzly core habitat standard.

Critical Habitat in the Kootenai River Core Area

A total of 109 miles of stream/river and 0 acres of lakes/reservoir are included in the revised critical habitat for the Kootenai River core area. The greatest threat to critical habitat in this core area is non-native fish, affecting PCE 9, followed by the high aeration of the water going through the Kootenai River Dam, resulting in super-saturation by nitrogen, which may be lethal to fish in extreme cases (PCE 8). Forestry practices have also had extensive impacts to this core area, affecting PCEs 3, 4, 6, and 8.

Critical Habitat Baseline for Non-complying BMUs in the Kootenai River Core Area

A small section of Boulder Creek constitutes the entire critical habitat in the Boulder BMU, and the PCEs are generally functioning acceptably here. In the Pulpit BMU critical habitat occurs in West Fork Quartz and O'Brien Creeks. O'Brien Creek has high quality physical habitat, but PCE 9 is degraded with a high presence of non-native brook trout that hybridize with bull trout. West Fork Quartz Creek is functioning appropriately for most habitat indicators and the related PCEs (U.S. Forest Service 2011). The Wanless BMU contains critical habitat in West Fisher Creek, in which most of the PCEs are supportive of bull trout life history with the exception of PCE 9, due to the high presence of non-native fish, and a minor degrade in PCE 4 (complex habitat features).

Critical Habitat in the Bull Lake Core Area

Bull Lake, Lake Creek and Keeler Creek constitute critical habitat in the Bull Lake core area, totally 17.5 miles of stream and 1162 acres of lake. Much of Bull Lake and Lake Creek run through private land. The greatest impacts to critical habitat in this core area come from dewatering, the presence of non-native species, forest management practices, and residential development (U.S. Fish and Wildlife Service 2008), resulting in reduced function of PCEs 2, 3, 4, 6, 8 and 9.

Keeler Creek is the sole spawning reach for the adfluvial population that migrates from Bull Lake and occurs primarily on National Forest lands. The Kootenai National Forest has been conducting road decommissioning and the implementation of road BMPs with the intent of improving habitat in the spawning area.

Non-complying BMUs do not occur in the Bull Lake core area. The Spar, Cedar, and Snowshoe BMUs currently exceed the recommended grizzly core habitat standard and may see increased

road densities after all BMUs in the Cabinet-Yaak Recovery Zone comply with the proposed access standards.

EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, with the effects of other activities interrelated or interdependent with that action. Indirect effects are those caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). The effects of the action are added to the environmental baseline to determine the future baseline and to form the basis for the determination in this opinion. Should the Federal action result in a jeopardy situation and/or adverse modification conclusion, the Service may propose reasonable and prudent alternatives that the Federal agency can take to avoid violation of section 7(a)(2). The impacts discussed below are the result of direct and indirect impacts of implementing the proposed project.

For purposes of consultation under section 7 of the Act, the “action area” is defined by 50 CFR 402.02 as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” Although the specific actions which might potentially affect the covered species are restricted to National Forest System lands within the grizzly bear Recovery Zones on the KNF, LNF, and IPNF, the effects of the action on these species may extend beyond this area. Effects considered are only applicable to those watersheds where bull trout may or are known to be present or where critical habitat is present. We assume that areas with functional connectivity to any designated local population of bull trout is occupied, unless known otherwise.

The Forest Service determined that the proposed action, to set road density standards within the grizzly bear Recovery Zones, may affect and is likely to adversely affect bull trout (U.S. Forest Service 2010). Therefore, an analysis of these effects to bull trout from the implementation of the actions necessary to meet the proposed standards is required throughout the action area. This analysis has focused on those BMUs in the Recovery Zones not currently meeting standards (Core, OMRD, or TMRD) which overlap with bull trout occupancy. BMUs which are not currently meeting standards (based on 2009 road density analyses) include: Bull, St. Paul, Wanless, Silver Butte-Fisher, Vermilion, Pulpit, Roderick, Boulder, Grouse, Scotchman, Mt Headley, Blue-Grass, Kalispell-Granite, and Lakeshore.

Reductions in grizzly bear core habitat down to the core area standard may occur in BMUs that currently exceed the core habitat standard after all BMUs within a given Recovery Zone meet all standards (U.S. Forest Service 2010). These BMUs include: Cedar, Snowshoe, Spar, Bull, Callahan, Newton, Big Creek, North Lightning, Scotchman, Long-Smith, Salmo-Priest, and Myrtle. Such reductions are not anticipated for a minimum of 8 years (U.S. Forest Service 2010), and no specific locations or amounts are proposed.

The proposed action is programmatic in nature. Specific road segments to be closed or decommissioned are not identified, rather only large areas where roads need to be decreased. Therefore, a site-specific analysis of the effects on each local population of bull trout is not

possible at this time. The current analysis will focus on potential effects of the proposed action to bull trout core areas and their constituent local populations. However, projects undertaken to move towards achieving the OMRD, TMRD, and/or core standards in a BMU will need site-specific analysis as to effects on bull trout and separate, step-down consultation with the Service.

Direct and Indirect Effects

Direct effects encompass the direct or immediate effects of the project on the species or its critical habitat. Indirect effects are those that are caused by the proposed project and are later in time, but are still reasonably certain to occur (U.S. Fish and Wildlife Service 1998c). Future actions with federal agency involvement, not mentioned in this biological opinion and which potentially impact bull trout, are not covered under this document but are subject to separate section 7 analysis and review.

The proposed action would impose standards that affect future decisions about access and road management in specifically defined geographic areas (i.e., BMUs). Therefore, no direct effects occur to bull trout as a result of the proposed action. The focus of the proposed access standards is to benefit grizzly bear populations within the Cabinet Yaak and Selkirk recovery areas. Future projects in those BMU's not currently consistent with the standards of this access amendment would require changes in access to comply with the proposed standards, and in the course of those changes, potential impacts to bull trout and their habitat are likely to occur. In those BMUs with excess core habitat, future decisions after all BMUs have met all standards may result in rebuilding and opening currently closed roads or constructing new roads, as long as total core habitat is retained.

The proposed access standards must be implemented in compliance with the appropriate Forest Plans as amended by INFISH, which requires consideration of aquatic resources. Therefore, as the Forests implement their respective Forest Plans to become consistent with these proposed standards they must inherently consider roads that also have the potential to improve habitat conditions for bull trout. Direct effects would be caused by implementing future subsequent site-specific decisions about closing or limiting wheeled motorized access on roads and trails. These future actions and their effects are currently highly uncertain at the site-specific scale, but would affect those bull trout core areas and occupied habitat that overlap with BMUs (blue-shaded in Table B3 and outlined in red in Figure 1) that are not meeting access standards. Direct effects may occur in BMUs (gray-shaded in Table B3) that exceed core habitat standards from future site-specific decisions to increase road density up to the allowed core habitat standard. This potential impact is even more uncertain, as such activities are allowed but not required under the proposed action.

For the BMUs requiring future management to comply with the proposed standards, road access would change as appropriate. To meet these standards, selected roads would be gated or barricaded, and some of the barricaded roads would be decommissioned or obliterated. Each action has the potential for both short-term negative and long-term beneficial effects. The level or intensity of effects to aquatic resources would vary depending on the location of selected roads, associated aquatic resources, and the level of treatment selected for the specific road.

Table B8 details the potential miles of roads and motorized trails slated for access changes and the nature of those changes which may be affected (total in all non-complying BMUs) by bull trout core area. The number of miles is presented as a range because standards are computed as road density (miles per square mile) and the number of linear miles required to be treated depends on the spatial arrangement of existing classes of roads. A further source of uncertainty regarding impacts to specific bull trout core areas results because BMU and bull trout core area boundaries do not completely coincide, and some BMUs overlap more than one core area.

Specific actions and locations, and thus the exact impacts, are unknowable given the programmatic nature of the proposed action. Specific effects to local bull trout populations will be analyzed during step-down consultation for projects to implement the proposed bear access standards. Activities expected to impact bull trout and bull trout critical habitat resulting from the proposed action include changes in road density, changes in road access and use, and construction to implement those changes. This analysis focuses on these activities and impacts.

Table B8. Miles of roads and trails that will have access changes to achieve grizzly bear standards for non-achieving BMUs that overlap bull trout core areas.

Bull Trout Core Areas	Roads Open to Gated	Roads Open to Barricaded	Roads Gated to Barricaded	Trails Motor to Non-Motor
Lower Clark Fork River	14-42	12-36	16-54	28
Lake Pend Oreille	2-6	4-12	8-24	0
Priest Lake	0	0	24-72	0
Kootenai River	0	2-6	40-120	0
TOTALS	**16-48**	**16-48***	**76-270***	**28**

*Totals are less than the sum of the column as several BMUs overlap two or more core areas.

Effects of Road Density

Road density and location is one of the key habitat indicators for bull trout and is related to PCEs 1, 5, and 7 (subsurface water connectivity, water temperature, natural hydrograph). In areas where grizzly bear core habitat does not meet the standard, roads will be closed to all motorized use and will remain so for a minimum of ten years and, in many cases obliterated, thus reducing the road density on the landscape. Roads will also be closed to all access where the TMRD standard is exceeded, but may later be reopened if other roads are closed to maintain the standard. Roads closed to meet the TMRD standard may or may not be obliterated.

High road densities can contribute to increased peak flows, but to varying degrees, and depending on local conditions. Scientific literature indicates variable responses of peak flows related to road density (peak flows exceeding a two-year recurrence interval) in the Pacific Northwest. While Jones and Grant (1996) identified increases in small peak flows (less than 2-year runoff events), this was not identified for larger peak flows (Thomas and Megahan 1998). In

the Rockies, King and Tennyson (1984) studied road construction effects on peak flows in six watersheds and did not find any significant effect on flood flows.

McGreer et al. (1998) suggested that a cause-and-effect relationship of road impacts should not be attributed to road density because the impacts of roads on streams is predominantly dependent upon road location, design, construction, and maintenance practices. Some studies of these factors have shown that a cause-and-effect relationship exists only between road surface drainage characteristics and sediment delivery. Nevertheless, other studies have documented aquatic habitat or fish density changes associated with road density or indices of road density (Trombulak and Frissell 2000). Eaglin and Hubert (1993) showed a positive correlation with numbers of culverts and stream crossings and amount of fine sediment in stream channels, and a negative correlation with fish density and numbers of culverts on the Medicine Bow National Forest, Wyoming. Macro invertebrate diversity has also been demonstrated to be negatively correlated with an index of road density (McGurk and Fong 1995). Lee et al. (1997) concluded the best indicator of management intensity was predicted road density, and that overlaying road density on the location of key salmonid populations showed that the strongest populations occurred with areas of lowest road densities.

It seems reasonable to assume that watersheds with higher road densities would have greater potential to deliver sediment to nearby streams. The implication is that high road densities can be detrimental to fish resources in the affected streams. An environmental review published in the monthly newsletter of Environmental Science and Policy (Environmental Review 11. No. 5 May 2004) asked the question of Dr. Bruce Rieman, who is considered by the scientific community an expert on bull trout because of his extensive research, "How does road density affect bull trout?" The following is his answer:

> "*At least in the data sets that we have worked with one of the best predictors of the status for bull trout populations is road density. There are lots of reasons why road density could be a good predictor of the status of the fish. Roads can influence erosion and therefore water quality, they can influence the timing and volume of runoff, they can be vectors for the introduction of nonnative species like brook trout, and roads can bring in fishermen. We don't know exactly what it is about roads, but there is a strong association between the status of bull trout populations and the density of roads in a given system. We've seen that in the broad picture across the Columbia River Basin and we've seen it in the work we've done in the Boise River Basin.*
>
> *The implication is that the kinds of things that come with roads can be detrimental to bull trout habitats, but it doesn't mean that if you build a road you're going to see a decline in bull trout. It just means that the probability of a negative effect increases."*

Considering sediment impacts only, some research suggests that sediment production from forest roads is highly variable from road segment to road segment and that most road segments produce little sediment (Luce and Black 1999). McGreer et al. (1998) suggested that sources of sediment delivery from certain road segments in the Thompson River watershed in western Montana can be identified and therefore treated individually. For example, they found that nine individual

locations delivered 76 percent of the total sediment volume in Boiling Springs Creek. On Goat Creek in the Swan Valley, five stream crossings contributed 70 percent of the total sediment delivered by roads to the watershed. In both the Goat Creek and Piper Creek watersheds, the majority of sediment was determined to come from a minority of stream crossings. Overall for both watersheds, less than 5 percent of road mileage was considered to actually deliver sediment to streams (Watson et al. 1997). This implies that managing sediment production of the few highest risk segments would be most efficient in preventing or reducing risk of sediment delivery to streams.

According to Baxter et al. (1999), in the Swan River sub-basin in Montana changes in bull trout redd densities over time were negatively correlated with road densities, and the protection of critical spawning tributary catchments from additional road building and associated land use disturbance will likely be necessary to maintain viable bull trout populations in the Swan River sub-basin. However, this bull trout core area population remains as one of the population strongholds throughout its entire range (as it has historically) with about 2000 adults (U.S. Fish and Wildlife Service 2009). Redd counts are stable despite the existing high road densities. In fact, the major threat to this population is the recent population expansion of nonnative lake trout into the system (U.S. Fish and Wildlife Service 2009). This indicates that the relationship between road densities and resiliency of bull trout populations is not entirely clear.

That forest roads generate erosion is well established, and even in the presence of old roads that have been treated with BMPs and closed to traffic, sediment from these roads cannot be turned off all at once. Closing and upgrading existing roads and constructing new roads to higher standards in a damaged watershed may not be adequate in all cases to recover the watershed and associated fish habitat in time to allow a local population of a sensitive species, such as bull trout, to recover. Although some mechanisms of increased road surface erosion and hydrologic change can be minimized by BMPs, some mechanisms are inherent to watershed and site conditions (e.g., slope steepness, stream network density, and geologic instability) and are not readily controllable by BMPs or improved road design (USDA et al.1993; Furniss et al. 1991; Packer 1967).

Effects of Road Access Treatments and Associated Sedimentation

Road access treatments also constitute actions that result from this proposed action which may have affects on bull trout and their critical habitat. Potential road failures and their associated effects are typically reduced or avoided through road monitoring and maintenance, which becomes more difficult when access to a given road segment is limited. Therefore, subsequent site-specific decisions at the project level must consider hydrologic needs when gates or barriers are proposed for road status changes.

Road treatments could increase sediment delivery to streams, thereby affecting fish and aquatic habitat. Studies have shown that about 60 percent of the sediment yield resulting from instream activities such as culvert removal is suspended sediment, which ranges up to sand-sized particles (Waters 1995). Increases in suspended sediment have been shown to affect salmonid behavior in several ways. Fish may avoid high concentrations of suspended sediments altogether (Hicks et

al. 1991). Even small elevations in suspended sediment may reduce feeding efficiency and growth rates of some salmonids. At lower concentrations of suspended sediment fish may decrease feeding and at higher concentrations may cease feeding completely (Sigler et al. 1984).

Based on observations made at two culvert replacement projects in Washington (Bakke et al. 2002), the Service estimated bull trout could be exposed to up to 2,000 mg/l of suspended sediment for up to 3 hours. This sediment dose may be at a level where serious physiological effects of disease, reduced growth, and hindered immunological response are probably avoided (Newcombe and Jensen 1996). However, short-term reductions in oxygen uptake are likely, until bull trout relocate to more suitable water. Therefore, bull trout may be significantly disrupted from their normal behavior patterns during periodic sediment pulses that could last up to 3 hours during any one pulse, with the highest concentration reached during the reinstatement of streamflow in the reconstructed channel. Excavation, backfilling, and upland restoration activities are likely to produce some sediment, but the Service surmised that action agency efforts to maintain silt fencing and other erosion control measures should ensure minimization of suspended sediment concentration to avoid adverse affects (U.S. Fish and Wildlife Service 2004b). Based on Washington State water quality turbidity standards that were exceeded 600 ft downstream from an instream work site, the Service concluded that in extreme cases the high turbidity levels could significantly alter the breeding, feeding and sheltering behavior of bull trout as far downstream as 600 ft. (U.S. Fish and Wildlife Service 2004b).

In addition, social behavior patterns of salmonids may be altered by suspended sediment (Berg and Northcote 1985). High concentrations of suspended sediment can also affect survival, growth, and behavior of stream biota that serve as forage for salmonids (Harvey and Lisle 1998). Suspended sediment may alter food supply by decreasing abundance and availability of aquatic insects. However, the precise thresholds of fine sediment in suspension or in deposits that result in harmful effects to benthic invertebrates are difficult to characterize (Chapman and McLeod 1987).

One key factor in reducing the risk of road failure is culvert removal. Removing culverts prevents them from plugging and the associated fill slope failures from occurring, thereby preventing large increases in stream channel sediment. Channel widths, slope, and streambed forms are artificially altered upstream and downstream of culverts (Lee et al. 1997). By removing culverts and reconstructing the stream channels where the culverts were located, the stream channel and fish habitat would begin to be restored.

Culvert replacement or removal is generally a short-term activity (less than one day) and typically results in a short-term pulse of sediment that is mobilized from equipment having to work instream. However, some larger culvert projects can take longer because of the site characteristics such as stream size, stream gradient, and slope steepness, which may require significant amounts of fill or other construction features that take longer to install. Monitoring of road treatment activities on the Libby Ranger District (KNF) and Priest Lake Ranger District (IPNF) has documented that the increase in turbidity and sedimentation is isolated to the project site and of very short duration (U.S. Forest Service 1998c; Foltz et al. 2007). Associated sediment transport is also very limited. The long-term benefits of reducing water routing, reducing sediment input, reducing the potential for road failures, and restoring fish passage

would outweigh the short-term negative effects of the work required to make proposed roads hydrologically stable.

The introduced sediment from most culvert projects would be localized and relatively small in comparison to background levels, but it could be additive to the background levels. Also, due to the construction timing, these small quantities of sediment would be generated at a time of low background sediment yield in the system. In other words, the timing of the sediment input from construction-related activities would generally occur when backgrounds levels of sediment in the stream system are generally absent or in low quantities (i.e., lack of precipitation during this time). Whereas sediment generated during fall and winter rains or runoff would occur when background levels of sediment are generally higher. Depending upon the concentration and duration of exposure, sediment could seriously degrade existing spawning habitat conditions to a point where bull trout reproductive success is reduced (Shepard et al. 1984).

Substrate embeddedness is an indicator of the overall habitat condition and is a measure that is particularly useful in assessing the quality of bull trout rearing areas (U.S. Fish and Wildlife Service 1998b). Rearing habitat within a reach of a given stream is considered to be functioning appropriately when the reach embeddedness is less than 20 percent; functioning at risk when reach embeddedness is 20 percent to 30 percent; and when over 30 percent, the rearing habitat is considered to be functioning at unacceptable risk (U.S. Fish and Wildlife Service 1998b). Juvenile bull trout densities are highly influenced by substrate composition (Shepard et al. 1984, Rieman and McIntyre 1993, MBTRT 1997). During the summer, juvenile bull trout hold positions close to the stream bottom and often seek cover within the substrate itself. All bull trout, regardless of their life history/reproductive strategy, are associated with complex forms of cover including large woody debris, undercut banks, boulders, and pools. Therefore, channel and hydrologic stability are important to bull trout (Rieman and McIntyre 1993). When streambed substrate contains more than 30 percent fine materials, juvenile bull trout densities drop off sharply due to a reduction in interstitial spaces (Shepard et al. 1984). Any loss of interstitial space or streambed complexity through the deposition of sediment would result in a loss of summer and winter habitats (MBTRT 1997). The reduction of rearing habitat will ultimately reduce the potential number of recruited juveniles and therefore reduce population numbers (Shepard et al. 1984).

Culvert projects within 600 feet upstream of bull trout rearing habitat may result in a short-term increase in embeddedness, reducing rearing habitat quality and effectiveness. Sediment impacted rearing habitat may function at a lower level until the next freshet removes the fine sediment downstream (U.S. Fish and Wildlife Service 2004b). Considering the extent of these impacts, juvenile bull trout are expected to be displaced and thus experience a temporary but significant disruption in their normal behavior. These effects are not anticipated to lead to lethal impacts on juvenile bull trout.

Increased embeddedness from sedimentation also results in decreased aquatic insect production and diversity. Juvenile bull trout feed primarily on aquatic macroinvertebrates, and the distribution of aquatic macroinvertebrates inhabiting running water environments is highly dependent on substrate particle size (Cummins and Lauff 1968). Increased levels of deposited

sediment reduce the quantity of the food base for bull trout resulting in slower growth rates, higher mortality, and reduced fecundity of bull trout. Sedimentation could also reduce the amount of rearing habitat available to juvenile and subadult bull trout, as well as adult bull trout, by decreasing the availability and quality of the necessary pool habitat and the interstitial spaces.

Monitoring by the Flathead and Lolo National Forests (U.S. Forest Service 1999) indicated that during the application of BMP's, 1 to 2 tons of sediment is typically produced at each crossing, and most of the sediment that is created is deposited within the first 150 feet downstream of the culvert. Although BMP's (silt fences, clean water diversions, etc) were considered effective in greatly minimizing sediment input during the replacement or removal process, the Forest Service concluded that it was impossible to stop all sediment input from occurring. Furthermore, they surmised that sediment produced by the culvert replacements were likely to cause some scattered, temporary (several weeks to months) reductions in bull trout spawning and rearing habitat near culverts that occur in or near spawning and rearing areas. Additionally, these habitat reductions would displace some juvenile bull trout in habitats near the culverts for several weeks to months.

Culvert generated sediment can create artificially high sediment levels during bull trout egg incubation and is truly not flushed until the spring freshets; however, substrates used for rearing would be cleansed by those spring freshets thus reducing sediment levels and minimizing impacts to juvenile bull trout from that year class. Certainly, age 1+ and older juveniles could be subject to elevated levels of sediment during fall and winter prior to spring rains and flushing of fines. This dynamic would likely occur until the site becomes revegetated. Confounding this relationship, however, is the sediment capacity of the stream at any given discharge. If sediment exceeds transport capacity, deposition can occur at any discharge, while transport may continue at very low discharge levels if capacity is not exceeded.

Gating or constructing barriers across roads have the greatest long-term risk to aquatics when roads are closed but are not made hydrologically stable prior to closure. Once a road is closed to administrative access, maintenance is discontinued, which may increase the potential risk to aquatic resources, as lack of maintenance is the primary cause for road failures and subsequent sedimentation to stream channels (U.S. Forest Service 1998b, 1999a, 2000b). Road failures include culvert plugging and/or blow out, fill slope failures, ditch malfunctions, and surface erosion. Road failures in most cases would directly affect sediment delivery to streams and potentially affect bull trout and their respective habitat. Increased sediment production could directly affect fish that are subjected to a sediment pulse, degrade spawning and rearing habitat, and reduce aquatic insect production through increases in substrate embeddedness.

The action of closing a road with a permanent barrier and the subsequent construction to render the road hydrologically stable may result in a short-term negative impact with a long-term benefit to the watershed and associated fisheries habitat. After treatments, negative effects from sediment would be reduced as disturbed areas revegetate. Activities associated with treatments, such as unstable fill removal, ripping road prisms, and recontouring, can be done in time for revegetation to occur prior to fall rains. When revegetation occurs prior to fall rains, associated sediment generation is usually negligible (U.S. Forest Service 2010).

The Forests will be adhering to the State of Montana's and the State of Idaho's best management practices to further reduce any sediment from road management and other construction activities. Techniques for culvert removal and subsequent streambank and streambed restoration actions are detailed in the Forest Service's Manuals and Handbook. The Forests have proposed no additional minimization measures due to the programmatic nature of this action and will consult on future individual actions in a step-down approach. The potential for long-term negative effects to bull trout and their critical habitat would exist where roads were closed without first being made hydrologically stable. In such cases, the potential for road failures and increased sediment would be elevated over the existing condition.

A temporary increase in sediment may result from road reclamation/obliteration activities. Many roads will not be obliterated, but will merely be closed by a gate or berm barrier. Existing but unmaintained roads run the risk of contributing large amounts of sediment from culvert failure, storm damage to the road prism and drainage ditches, or general degradation over time.

The proposed action specifies that roads that are closed, decommissioned, or barricaded to create grizzly bear core habitat will be made hydrologically stable, so that no motorized maintenance activities are needed for a period of at least 10 years. Hydrologic stability entails removing undersized or at-risk culverts and treating the prism and/or surface of road segments that are unstable or at high risk to develop such instability.

Implementation of these proposed standards may reduce the long term threat from culverts and roads by removing the risk of road prism failure and restoring the natural hydrology patterns to road crossings where implementation activities contribute to meeting grizzly core habitat standards. However, these requirements are not specified for activities to meet OMRD and TMRD standards, so the risk of road prism and culvert failure still applies outside of grizzly core habitat. In order to minimize the risk of large sediment inputs, the Forests need to assure hydrologic stability by regular inspection and maintenance of gated roads, especially at stream crossings.

Roads may also be closed by the construction of a physical barrier or barricade that restricts road access while maintaining the road prism and crossings intact. Roads that are not anticipated to be needed for administrative purposes for some years may contribute to meeting TMRD standards. These are the roads that are most at risk of high sediment inputs if they are not being regularly monitored and maintained. For these reasons, the Forests would be anticipated to complete site-specific analysis and consultation to address the hydrologic stability of roads closed by gates or barricades when projects are proposed to implement these standards.

The Forests have stated that the greatest long-term risk to bull trout results "when roads are closed but are not made hydrologically stable prior to closure" (U.S. Forest Service 2010). Additionally, the lack of maintenance of forest roads is the number one cause of road failures and subsequent sediment introduction to stream channels (U.S. Forest Service 2010). This lack of maintenance may result in culverts becoming plugged with debris, increasing the likelihood of the road prism being eroded into the stream channel. Removal of culverts from active stream

channels significantly reduces the amount of sediment that may be introduced to the stream channel should the culverts become plugged and the road prism be eroded into the channel.

The proposed action may result in a short-term increase of sediment from both construction activities and any overland flow from the disturbed roadbed. During and after construction an unspecified amount of sediment is likely to be delivered into a stream channel where bull trout may be present. The amount of sediment delivered into each watershed is difficult to quantify due to the unknown nature of the future actions and the variance of factors such as topography, hydrology, geology, and scope of activities within a drainage, which all affect the sediment load of a given stream. Due to this difficulty, the exact effects and the degree of impact is indeterminate, but the full range of adverse impacts to bull trout from lethal to discountable may occur, depending on the circumstances and the life stage affected. Critical habitat may be adversely affected by deposition of fine sediments in bull trout spawning areas.

The temporal nature of the potential effects ranges from short-term negative to long-term beneficial effects. The short-term increase in sediment from road closure activities ranging from total road obliteration including associated culvert removals, to partial obliteration or rendering a given road inaccessible is difficult to establish. Increased sediment delivery is expected to last 1-3 years following road closure activities and depends on the level of closure, soils types, precipitation patterns, success of re-vegetation efforts and other variables. The long-term nature of the effects could range from road failures and a heavy increase in sediments from those roads in core habitat areas that do not have proper maintenance or drainage structures, to stabilizing effects from the removal of the road network and associated stream crossings in a given watershed. We estimate that upon removal of a culvert and the associated restoration efforts such as vegetative plantings, adverse effects from sediment delivery will be minimized after a period of 1-3 years while the vegetation establishes and secures the soil from erosive forces.

Effects of Road Building and Reopening

Twelve BMUs currently exceed the proposed standards for grizzly bear core habitat. For these BMUs roads that are currently closed could be reopened or new roads could be constructed to reduce the amount of core habitat down to the proposed standard.

Construction of road networks can greatly accelerate and lead to long-lasting erosion rates within a watershed (MBTSG 1998; Beschta 1978; Reid and Dunne 1984; Swanston and Swanson 1976). Elements that lead to these effects include poor road location and surface drainage, undersized culverts, generation of sidecast materials, and inadequate road maintenance practices (Quigley and Arbelbide 1997). Road surface erosion is particularly affected by traffic, which increases sediment yields substantially (Reid and Dunne 1984). Other important factors affecting road surface erosion include condition of the road surface, timing of when roads are used in relation to rainfall, road prism moisture content, location of the road relative to watercourses, methods used to construct the road, and steepness of the terrain on which the road is located.

Processes initiated or affected by roads include landslides, road surface erosion, secondary surface erosion (landslide scars exposed to rain splash), gullying, debris torrents, debris flows, slumps, and earthflows (Swanston 1991). Forest roads can substantially increase the frequency of mass soil movements in steep watersheds by several to hundreds of times depending on site variables (Everest et al. 1987; Furniss et al. 1991). Jenson and Finn (1966) observed that sedimentation is directly proportional to road mileage in granitic areas. Swanston and Swanson (1976) estimated that debris torrents in managed forests in Oregon occurred at rates of 41 and 4.5 times greater than rates in unmanaged forests as a result of forest roads and clearcuts. Similarly, Morrison (1975) found rates of debris torrents to be 13 and 8.8 times greater in forests with roads and clearcuts than in forests without them. Furniss et al. (1991) reported that sediment produced from roads greatly exceeds sediment produced from forests and clearcuts. In many locations, poorly-designed roads have been shown to have a larger effect on sedimentation than hillslope landslides or surface erosion (Kelsey 1980; Best et al. 1995; Wu and Swanston 1980; Swanson et al. 1987; Ziemer et al. 1996). Furniss et al. (1991) reported that road location is the most important factor in construction of roads because it affects more site variables like slope steepness, soil stability, bedrock structure, and presence of subsurface water and will determine the extent of surface failure.

Roads and related ditch networks are often connected to streams via surface flowpaths, providing a direct conduit for the sediment. Ground disturbance from road blading, particularly where the road is immediately adjacent to streams, and at intermittent and perennial stream crossings, can result in elevated sediment levels. The amount of sediment delivered continuously to streams may temporarily increase as bare soil is exposed as a result of blading and when ditch-roughness features (which store and route sediment) are removed. Ditch maintenance is another source of sediment which can increase erosion within the ditch. Sediment yield from road segments with freshly graded ditches is five to seven times greater than the yield from segments with vegetated ditches (Elliot and Tysdal 1999).

Road crossing across streams can restrict channel geometry and prevent or interfere with migration of adult and juvenile salmonids (Furniss et al. 1991). Crossings can also be a source of sedimentation, especially if they fail or become plugged with debris, causing debris torrents and significant cumulative impacts downstream (Furniss et al. 1991; Murphy 1995). In fact, Furniss et al. (1991) considered stream crossings (culverts primarily) as dams that are designed to fail and that the failure will be substantial for most crossings. Furthermore, whether a crossing fails is less important than *how* it fails, meaning that failure is often catastrophic causing extensive local scour and deposition and downstream erosion that could last for years.

Impediment or delay in fish migration is often the result of culvert hydraulics, which creates water velocity barriers, depth barriers, and/or vertical jump barriers. Fluvial and adfluvial fish movements occur at certain times of the year that can be critical for survival. For example, in the Blackfoot River in Montana there appears to be a run of juvenile bull trout in mid-summer (July/August) into smaller streams presumably for thermal refuge (Pierce et al. 1997). Culverts

installed with a perched outlet can create a vertical jump, resulting in a fish passage barrier or obstacle at various flows, for some species and life stages.

Conceivably the most important mitigation measure related to sediment delivery from road erosion to streams depends on the location of the road with respect to the stream. The closer the road to the stream the more the mitigation should focus on the road ditch or traveled way (Elliot and Tysdal 1999). Some have observed that sediments discharged from the road do not reach streams due to the filtering and sediment trapping effects of intervening buffer strips (Megahan and Ketcheson 1996; Washington Forest Practices Board 1997; Ketcheson and Megahan 1996).

The proposed action forestalls any reduction in core habitat until all other BMUs within the Recovery Zone (Cabinet-Yaak or Selkirk) meet all access standards. This target is not expected to occur until at least 8 years after the Record of Decision is signed (U.S. Forest Service 2010). Table B9 lists the affected BMUs, their respective bull trout core areas and the allowed magnitude of change.

Locations for these potential changes are unknown at this time, as well as the total number of miles of road that might be added to OMRD or TMRD, and even whether or not these increases in road density will actually occur. The magnitude of potential reductions ranges from 1 percent to 6 percent, but at this time estimating the number of miles of new or reopened road and associated road crossings is not possible. Collectively, Kootenai River and the Bull Lake bull trout core areas have the greatest potential for increased road density from the reduction in grizzly bear core habitat with an average reduction of at least 4 percent potentially occurring in 6 BMUs for Kootenai River and in 3 BMUs for Bull Lake (Table B10).

Under the proposed action, the Forests will consult with the Service when increasing road densities to reduce core habitat down to the proposed standard so that site specific effects of the actions on bull trout can be ascertained. Predicting site-specific effects that may occur at this time is not possible.

Table B9. BMUs that currently exceed proposed grizzly core habitat standards and potential reduction to core habitat starting in 8+ years (U.S. Forest Service 2010).

BMU	Bull Trout Core Area(s)	Critical Habitat Streams	Percent Core		Magnitude of Potential Reduction (percent)
			Current	Proposed Standard (min)	
Cedar	Bull Lake Kootenai River	Kootenai River	83	80	3
Snowshoe	Bull Lake Kootenai River	---	76	70	6
Spar	Bull Lake	Keeler Creek	62	59	3
Bull	Lower Clark Fork River	Bull River	62	60	2
Callahan	Kootenai River	Callahan Creek	59	55	4
Newton	Kootenai River	Kootenai River	58	55	3
Big Creek	Kootenai River	EF Pipe Creek	58	55	3
N. Lightning	Lake Pend Oreille	Lightning, Rattle, Trestle Creeks	62	61	1
Scotchman	Lake Pend Oreille	Lightning, Morris, Porcupine, East Fork, Char, Savage Creeks	63	62	1
Long-Smith	Kootenai River	Long Canyon Creek	73	67	6
Salmo-Priest	Pend Oreille River Priest Lake	Sullivan Creek	66	64	2
Myrtle	Lake Pend Oreille Kootenai River	Pack River	60	56	4

Table B10. Average percent potential reduction of grizzly core habitat and number of BMU's by bull trout core area.

Bull Trout Core Area	Average Grizzly Core Habitat Reduction (%)	Number of BMUs
Kootenai River	4.1	7
Bull Lake	4.0	3
Lake Pend Oreille	2.0	3
Lower Clark Fork River	2.0	1
Priest Lake/Pend Oreille River	2.0	1

Core Area Specific Effects

Lower Clark Fork River Core Area

Five BMUs are currently failing to meet the road density standards as defined by the proposed action: Mt. Headley, Vermilion, Silver Butte-Fisher, Bull, and St. Paul. Snowshoe and Spar BMUs currently meet the proposed standards. Table B11 shows the anticipated road access changes in the BMUs that overlap the Lower Clark Fork River core area and the number of miles of critical habitat in each BMU.

Table B11. Road treatments (miles) by BMU expected to be implemented and critical habitat that may potentially be affected within the Lower Clark Fork River bull trout core area.

BMU	Roads Open to Gated	Roads Open to Barricaded	Roads Gated to Barricaded	Trails Motor to Non-Motor	CH Stream Miles
Mt Headley	0	10-30	0	28	92.8
Vermilion	0	2-6	6-18	0	10.6
Silver Butte-Fisher	12-36	0	2-6	0	11.6
Bull	2-6	0	6-18	0	26.9
St. Paul	0	0	4-12	0	16.4
Totals	**14-42**	**12-36**	**16-54**	**28**	**158.3**

Mt. Headley BMU: Because most of the bull trout subwatersheds within Mt. Headley BMU are FUR for both sediment and road density, all of these subwatersheds are rated as high priority for restoration with the exception of Weeksville, Munson, and Quartz Creeks, which have very low numbers of bull trout. Short-term impacts to the Fishtrap Creek and West Fork Thompson local populations are likely to occur, however the closing of 10 to 30 miles of roads and 28 miles of motorized trail is expected to result in a long-term benefit to these populations. Currently this BMU is rated with a low priority for bear management.

Vermilion and Silver Butte-Fisher BMUs: Based on the current FA determination for the sediment indicator and the low for priority for restoration, impacts to the Vermilion River population are anticipated to be minimal. In spite of high sediment and road density, Mosquito Creek subwatershed has a low priority for restoration because bull trout populations are extremely low and the expected response for both habitat and population is minimal (Carlson, J. pers. comm. 2011).

Bull and St. Paul BMUs: Subwatersheds associated with the Rock Creek and Bull River local populations are found in these BMUs. Because the sediment ratings are generally good, even though road densities are high in some subwatersheds, the priority for restoration is medium to low. Effects to these populations are also expected to be low. The Bull BMU exceeds the proposed standard for grizzly bear core habitat, and so could see a reduction in core in 8+ years through reopening of currently barricaded roads or construction of new roads.

Lake Pend Oreille Core Area

Three of four BMUs currently do not meet the road density standards as defined by the proposed action: North Lightning, Scotchman and Grouse. The Myrtle BMU currently complies with the proposed access standards and has additional core habitat above the minimum standard, and so could see an increase in road density if core habitat is reduced down to the standard after all other BMUs in the Recovery Zone comply. Table B12 shows the anticipated road access changes in the BMUs that overlap the Lake Pend Oreille core area and the number of miles of critical habitat in each BMU.

Table B12. Road treatments (miles) by BMU expected to be implemented and critical habitat that may potentially be affected within the Lake Pend Oreille bull trout core area.

BMU	Roads Open to Gated	Roads Open to Barricaded	Roads Gated to Barricaded	CH Stream Miles
North Lightning	2-6	0	0	15.3
Scotchman	0	2-6	0	32.2
Grouse	0	2-6	8-24	16.3
Totals	**2-6**	**4-12**	**8-24**	**63.8**

North Lightning BMU and Scotchman BMUs: Only gates will be installed in this BMU to limit access on 2 to 6 miles of road. The effects to bull trout are expected to be minimal, as long as the gated roads are well maintained. East and Middle Forks of Lightning Creek are high priority for road closure relative to other subwatersheds in the Scotchman and North Lightning BMUs. Trestle Creek is currently rated FA for both sediment and road density, so the priority should be to maintain this functioning habitat. Minor short-term impacts and minor long-term benefits are likely to occur to the Porcupine and Wellington Creek populations if road closures to meet bear access standards are implemented in the subwatersheds that affect these populations.

Grouse BMU: With a total of 10 to 30 miles of road needing to be closed in the Grouse BMU, the Grouse Creek population is likely to experience short-term adverse impacts associated with the construction activity for closing these roads, followed by a long-term benefit from reduced sediment and a more natural hydrograph. Rapid Lightning Creek subwatershed is a higher priority for restoration than Grouse Creek because of the higher road density found there.

Priest Lake Core Area

Three BMUs currently fail to meet the proposed standards in the Priest Lake core area: Blue-Grass, Lakeshore, and Kalispell-Granite. Salmo-Priest and Sullivan-Hughes currently comply for all standards, and Salmo-Priest has additional core habitat above the minimum standard. Table B13 shows the anticipated road access changes in the BMUs that overlap the Priest Lake core area and the number of miles of critical habitat in each BMU. All changes entail going from a

gated road to an immovable barrier. Refer to Table B16 for baseline conditions and bull trout restoration priorities.

Table B13. Road treatments (miles) by BMU expected to be implemented and critical habitat that may potentially be affected within the Priest Lake bull trout core area.

BMU	Roads Open to Gated	Roads Open to Barricaded	Roads Gated to Barricaded	CH Stream Miles
Blue-Grass	0	0	10-30	20.6
Lakeshore	0	0	2-6	2.8
Kalispell-Granite	0	0	12-36	13.8
Totals	**0**	**0**	**24-72**	**12.4**

Blue-Grass BMU: Given that the two subwatersheds that fall within the Blue-Grass BMU are both FA for sediment, the priority is low for restoration and high for maintaining the current good conditions. Much of the 10 to 30 miles of road closure that is needed should be done outside these subwatersheds so that effects to the Upper Priest River local population would be minimal.

Lakeshore and Kalispell-Granite BMUs: The priority for restoration of bull trout habitat in these BMUs is "high" for Kalispell Creek, "medium" for South Fork Granite Creek, and "low" for North Fork Granite Creek. Short-term adverse impacts are expected to the Kalispell Creek local population, with substantial long-term benefits if implementation focuses on treating the most problematic roads.

Pend Oreille River Core Area

Salmo-Priest and Sullivan-Hughes are the only two BMUs from the proposed action that occur in the Pend Oreille River core area. No effects will be associated with Sullivan-Hughes BMU, as all parameters currently meet the proposed access standards, and core habitat does not exceed the standard. Road density in the Salmo-Priest portion of the Pend Oreille River core area may increase after all other BMUs within the Selkirk Recovery Zone meet standards. Grizzly bear core habitat within the Salmo-Priest BMU may be reduced from 66 percent to 64 percent. Effects to bull trout and their critical habitat are not possible to predict at this time, and will be addressed in step down consultation.

Kootenai River Core Area

Within this core area a total of six BMUs do not currently meet grizzly bear access standards as proposed: Wanless, Grouse, Blue-Grass, Roderick, Pulpit, and Boulder. Seven other BMUs currently meet all standards and exceed the core habitat standard, including Cedar, Snowshoe, Big Creek, Callahan, Newton, Long-Smith, and Myrtle. The average reduction in core habitat that may take place in these BMUs is 4.1 percent; however, much of these BMU areas fall outside the Kootenai River core area. Table B14 shows the anticipated road access changes in

the BMUs that overlap the Kootenai River core area and the number of miles of critical habitat in each BMU. The majority of changes entail going from a gated road to an immovable barrier.

Wanless, Roderick, and Pulpit BMUs: All of the bull trout subwatersheds in these BMUs are currently rated FA for sediment, but road densities are FUR, so the Forest is expected to locate some road closures in these subwatersheds, where there are likely to be short-term adverse impacts to bull trout followed by a long-term benefit. All these watersheds rate as a medium priority for restoration given the acceptable function of sediment transport.

Boulder and Grouse BMUs: Two subwatersheds in these BMUs that affect the Callahan Creek local population rate "medium" to "high" for restoration. Overall, the effects to this local population are expected to be minimal. Assuming that the prioritization schedule is followed, short-term impact to the Callahan Creek local population should be concentrated in these two subwatersheds with few impacts in other subwatersheds. Long-term reductions in sediment are expected to result if the implementation of road closures to benefit grizzly bears is focused in these two subwatersheds.

Blue-Grass BMU: Given the low sediment values and priority, impacts in the Kootenai portion of the Blue-Grass BMU are expected to be minimal.

Table B14. Road treatments (miles) by BMU expected to be implemented and critical habitat that may potentially be affected within the Kootenai River bull trout core area.

BMU	Roads Open to Gated	Roads Open to Barricaded	Roads Gated to Barricaded	CH Stream Miles
Wanless	0	0	4-12	11.1
Grouse	0	2-6	8-24	0
Blue-Grass	0	0	10-30	0
Roderick	0	0	4-12	0
Pulpit	0	0	2-6	67.8
Boulder	0	0	12-36	1.3
Totals	**0**	**2-6**	**40-120**	**80.2**

Bull Lake Core Area

Spar BMU and portions of Cedar and Snowshoe BMUs occur in the Bull Lake core area. Road density in these BMUs may increase after all other BMUs within the Cabinet-Yaak Recovery Zone meet access standards. Grizzly bear core habitat within these BMUs may be reduced an average of 4 percent. Effects to bull trout and their critical habitat are not possible to predict at this time, and will be addressed in step down consultation.

Effects to Designated Critical Habitat

Affects to critical habitat are analyzed through the effects on the primary constituent elements (PCEs) that have been defined (75 FR 63898). All of the road access activities that result from this proposed action may potentially result in a temporary increase in the delivery of sediment to bull trout critical habitat. Such an increase would impact the function of PCE 8, at least temporarily, and possibly the function of PCEs 2, 3, 6, and 8. Table B15 describes these PCEs and summarizes the direction and duration of potential impacts. Beneficial affects are credited with lasting at least 10 years because this is the minimum required time for grizzly bear core habitat to remain in place.

Table B15. Primary constituent elements of bull trout critical habitat that may be impacted by implementation of the proposed action.

PCE	Description	Direction	Duration
2	Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	Possible Restore	> 10 years
3	An abundant food based, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Possible Degrade	Short term
6	In spawning and rearing areas, substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Possible Degrade	Short term
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	Possible Restore	> 10 years
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Likely Degrade, Followed by Restore	<1 – 3 years/ > 10 years

Construction activity to remove culverts is likely to result in temporary, localized increases in sediment delivery to the stream, thereby increasing suspended sediment and reducing water quality and the function of PCE 8. A temporary increase in sediment delivery by definition results in an increase in contaminants, but may or may not result in an increase in substrate

embeddedness (which may or may not affect the abundance of aquatic macro-invertebrates) depending on conditions of water flow, topography, existing substrate, and other site-specific and timing factors during and directly following implementation. Depending on a variety of temporal and physical environmental factors, this suspended sediment may either be flushed downstream, or may settle onto the streambed, increasing the amount of fine sediment in spawning and rearing areas. Such an event may impact the function of PCEs 3 and 6 by making the habitat less suitable for aquatic macroinvertebrates, and less suitable for the survival of bull trout eggs and alevins.

When culverts are removed from roads that are closed, barriers to fish passage may be reduced. The removal of culverts that serve as partial or complete barriers would result in a positive impact to the function of PCE 2. However, beneficial impacts to the function of PCE 2 are only speculative at the programmatic level and must be thoroughly analyzed in step-down consultation.

Road ripping, obliteration, and recontouring may all help to restore a more natural hydrograph by increasing infiltration and reducing run-off. The removal of culverts may reduce the point concentration of surface flows and the potential for water to back up behind a blocked or under-sized culvert. All these impacts would help to improve the function of PCE 7.

The total miles of critical habitat which may potentially be affected by the action is the sum of all stream critical habitat within BMUs that do not currently meet the proposed access standards for a given bull trout core area. For BMUs that span multiple core areas, a spatial analysis was performed to determine the quantity of critical habitat in each core area.

Figures presented in Table B16 generally represent only a theoretical maximum of impacted critical habitat that is highly unlikely to occur. The total of all miles of roads to potentially undergo access changes is not precisely known and is represented by a range for each BMU and core area (see previous discussion). At the lower end of the ranges, all core areas contain more critical habitat streams than miles of roads to be affected. Even if the upper end of the ranges is actually implemented, most of the implementation is unlikely to affect critical habitat streams, as not all segments of critical habitat are in close enough proximity to a road to potentially be affected.

In the 12 BMUs that currently exceed the proposed standards for grizzly bear core habitat, some impacts to critical habitat may occur after all other BMUs within the respective Recovery Zones meet all access standards, and grizzly bear core habitat is reduced down to the standard. What, or even if, impacts to critical habitat may occur are unknown at this time and will be addressed in step down consultations.

Table B16. Potentially affected critical habitat stream miles by bull trout core area.

Bull Trout Core Areas	CH Streams Potentially Affected (mi)	Total CH in the Core Area (mi)	Maximum CH Potentially Affected (%)
Lower Clark Fork River	158.3	237.7	67
Lake Pend Oreille	63.8	218.6	29
Priest Lake	49.1	109.0	45
Kootenai River	112.7	327.0	34
TOTALS	**383.9**	**892.3**	**43**

Species Response to the Proposed Action

Short-term adverse effects may occur during road reclamation/obliteration activities for both perennial and intermittent streams. Sediment disturbing activities such as culvert removal and the associated streambank recontouring, along with disturbance of the road prism itself, may result in adverse effects to both spawning and rearing bull trout from direct mortality and a temporary degradation of critical habitat. Migratory bull trout may become disoriented should they encounter a large pulse of sediment. Additionally, feeding rates may be retarded due to sediment inputs to rearing habitat. Short-term impacts are estimated to last 1-3 years. This duration is related to the period of successful re-establishment of vegetation. State and Federal BMP's call for revegetation efforts for streambed restoration projects associated with road crossings. These short-term effects may occur throughout the action area in those BMU's not currently meeting TMRD and/or core habitat standards.

The total amount of critical habitat that could possibly be affected in the Clark Fork River Basin is less than 384 miles because in many cases more miles of critical habitat exist in a BMU than the maximum of road miles to be treated. In addition, an unknown portion of treatments will occur outside watersheds with any critical habitat and will, therefore, have no effect. For the Kootenai River Basin less than 80.2 miles of critical habitat will be affected. These figures indicate that less than 7% of the total critical habitat in the Clark Fork River Basin and less than 25% in the Kootenai River Basin may experience a temporary degradation, followed within 1-3 years by a long-term beneficial effect.

The implementation of the grizzly bear proposed road access standards will likely result in positive impacts for bull trout over the long-term. This project should reduce the long-term sediment input by restoring the stream channel to a naturally functioning condition, potentially providing additional bull trout habitat, as well as revegetating the streambank and establishing a healthy riparian zone. By reducing the road densities in key bull trout watersheds, impacts from road maintenance and the threats posed by road failures will be removed. By removing the culverts, the risk of a road failure, resulting in a large volume of sediment entering the stream, is greatly reduced.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative Effects to the Species

Cumulative effects on bull trout range from illegal harvest activities to development on private lands. Commercial and residential development may further lead to fragmentation of bull trout habitat and local populations, degrade water quality, and degrade fish habitat. Development is reasonably certain to occur along the major rivers and lakes in this analysis area, particularly the Pend Oreille and Priest Lakes. Timber harvest and the associated activities on Idaho State lands bordering the upper and lower Priest Lakes will impact the water quality and fish habitat of those watersheds on the east side of the Priest Lakes. Additionally, timber harvest and the associated activities is likely to occur on private lands within the analysis area. The Plum Creek Timber Company HCP activities are currently being implemented to provide minimization measures to protect and conserve bull trout, predominantly in the Thompson River/Fisher River watershed and the Middle Kootenai River. The Montana Department of Natural Resources and Conservation is currently developing an HCP with the intention of minimizing impacts to listed species from their land management actions. Their activities are predominantly located throughout the Clark Fork River Management Unit. Stimson Lumber Company has developed and is implementing an HCP on their lands in the vicinity of Troy, Montana. Their minimization measures and implementing conditions mirror those of the Plum Creek Timber Company HCP.

Additionally, numerous watershed groups have been established in Montana and Idaho covering most of the range of bull trout. These councils may be implementing restoration plans in their respective watersheds which may result in short-term effects to bull trout with the long-term goal of watershed stabilization. Avista is currently pursuing a program which is restoring fisheries habitat, as well as acquiring key riparian lands, with the intention of protecting the habitat values. Additionally, they are implementing a plan to provide for both upstream and downstream bull trout passage. Their activities are limited to the lower Clark Fork River and Lake Pend Oreille. PPL Montana completed a new fish ladder at the Thompson Falls Hydroelectric Dam in the fall of 2010. Migrating bull trout and other fish will have full passage over this dam for the 2011 season. Both MFWP and IDFG conduct bull trout surveys and limited restoration projects throughout the action area, which may result in additional impacts to the species.

Cumulative Effects to Designated Critical Habitat

The function of the PCEs that constitute bull trout critical habitat in the Clark Fork and Kootenai Critical Habitat Units will continue to be impacted by multiple factors. Where inclusions of private or State land occur within BMUs, the principle factors are expected to include increased residential and/or commercial development and forestry activities, including road building, construction of new fish passage barriers, bank stabilization and other impacts to riparian

habitats, and possible impacts to the near-surface water table from well-drilling or the construction of non-permeable surfaces. The function of all of the PCEs may be affected by such activities.

CONCLUSION

Jeopardy Analysis

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, the Service has determined that the action, as proposed, is not likely to jeopardize the continued existence of bull trout within the coterminous United States.

We base our conclusions primarily on the fact that for many bull trout local populations within the action area sediment conditions are currently good, and low levels of road reclamation activities will occur due to the low levels of roads within the watersheds. Pursuant to the Forests' current LRMPs, they are required to implement best management practices that are designed to reduce the potential for both short- and long-term adverse effects to occur to bull trout and bull trout critical habitat as a result of conducting road related actions; these requirements are expected to further reduce the effects to local populations. All of the affected core areas (Lower Clark Fork River, Pend Oreille Lake, Priest Lake, and Kootenai River) have a number of local populations that may be affected to various degrees by this action, some more extensively and some less. However, negative impacts are expected to last only 1-3 years, and the staging of implementation activities within a core area may further reduce the concentration of impacts in that core area. Thus, no single core area is likely to experience negative impacts that would result in apparently reducing the function of the core area to support the Management Unit. For this reason, we conclude there is no jeopardy from this action to the survival and recovery of bull trout in the Columbia River Interim Recovery Unit.

Prior to implementing individual road related actions which have the potential to affect bull trout in watersheds occupied by the species, the Forests will be required to consult with the Service. During such consultations additional measures, such as timing constraints, site-specific hydrologic stability, and location relative to recent impacts, can be incorporated into the proposed action to further minimize the potential for incidental take due to short-term adverse effects.

Finally, removing road prisms and/or reducing road densities within bull trout occupied watersheds should result in long-term beneficial effects to the species and should reduce the long-term threat from culverts and roads by removing/reducing the risk of road failures, restoring the natural hydrology to areas currently impacted by road crossings, and removing some existing barriers to fish passage, thus resulting in benefits to the conservation of bull trout. Removal of fish passage barriers on small streams in both the Clark Fork and Kootenai River Basin Management Units is a specific action cited in the Draft Recovery Plan (U.S. Fish and Wildlife Service 2002) for these management units. Reducing road density and road use will reduce the frequency and severity of anthropogenic runoff and sedimentation and contribute to bringing

treated areas into a more natural hydrologic balance, assisting in bull trout conservation and recovery. Culverts and road crossings comprise the majority of anthropogenic fish blockages in spawning streams, removal of which contributes substantially to reestablishing connectivity in treated areas, and addresses a major goal of the Draft Recovery Plan for the Clark Fork and Kootenai River Basins.

Adverse Modification Analysis

After reviewing the current status and environmental baseline for critical habitat in the action area, the effects of the proposed action and the cumulative effects, the Service believes that the action, as proposed, is not likely to appreciably reduce the function of critical habitat in the Clark Fork River Basin and the Kootenai River Basin Critical Habitat Units. For these reasons the action is not likely to destroy or adversely modify the critical habitat rangewide.

We base our conclusions primarily on the fact that adverse impacts to critical habitat are temporary and localized, focused primarily on the function of PCE 8 by temporary increases in sediment delivery resulting from road closure activities. This temporary degrade is expected to be followed by long-term beneficial effects resulting in improved function of a number of PCEs for bull trout critical habitat by reducing road densities and long-term sediment delivery, removing barriers, and restoring a more natural hydrograph. Long-term positive impacts are expected to occur for PCEs 2, 3, 6, 7, and 8.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary upon the agency, and must also be undertaken by the agency so that they become binding conditions of any grant or permit issued by the Forests, as appropriate, for the exemption in section 7(o)(2) to apply. The Forests have a continuing duty to regulate the activity covered by this incidental take statement. If the Forests (1) fail to assume and implement the terms and conditions; (2) fail to require any entity or individual, contracted to implement the action or any part of the action, to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the

permit, grant, or contract document; and/or (3) fail to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forests must report the progress of implementing the action and mitigation measures to the Service as specified in the incidental take statement [50 CFR, Part 402.14(i)(3)].

Amount or Extent of Take Anticipated

This incidental take statement addresses impacts to the Columbia River Interim Recovery Unit from the establishment of road density standards within the Grizzly Bear Recovery Zones on the Kootenai, the Lolo, and the Idaho Panhandle National Forests. The Service is unable to anticipate all possible circumstances related to the implementation of activities necessary to meet the standards which are expected to be developed in the future. Therefore, the Service is unable to issue an all-encompassing incidental take statement or a comprehensive list of reasonable and prudent measures. Even though the Service anticipates a low amount of take will result from these activities, the programmatic nature of the proposed action and the lack of site-specific information prevent us from estimating specific amounts of incidental take of bull trout. While the Service has determined that the level of anticipated take associated with the activities necessary to meet the road density standards are not likely to jeopardize the Columbia River Interim Recovery Unit, the Service is not authorizing incidental take of bull trout through this biological opinion for any specific actions carried out by the Forests to meet these road density standards.

The Service is able, however, to provide terms and conditions for the Forests to utilize when implementing future actions to meet road density standards within the BMUs. These measures should reduce the overall level of the risk of incidental take, which may result from the implementation of such future actions. Two key elements of the future evaluation of proposed actions are: 1) suitable measures to minimize the level of incidental take are integrated into the proposed action; and 2) the necessary information is presented that the Service will need to identify specific measures and their associated terms and conditions for the individual actions and the watershed scale activities implemented by the Forests to meet road density standards.

Incidental take, if any, will be authorized at the site-specific action level for future actions associated with this proposed action. Site-specific biological opinions may tier to and incorporate by reference the analysis and technical assistance (i.e., recommended measures) contained in this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forests must comply with the following terms and conditions. These terms and conditions are non-discretionary.

1. The Forests shall assure consistent implementation of measures and standards specified in the Aquatic Conservation strategies as indicated in the *1998 Biological Opinion for the Effects to Bull Trout from the Continued Implementation of Land and Resource*

Management Plans and Resource Management Plans as Amended by the Interim Strategies for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada (INFISH).

2. The Forests shall ensure that the watershed baselines are updated according to the INFISH Biological Opinion's Reasonable and Prudent Measure #2 (U.S. Fish and Wildlife Service 1998b). These baselines shall be updated after every project requiring consultation which may affect them until the LRMP for each Forest is revised, or another analysis method is developed in conjunction with the Service.

3. The Forests shall assume bull trout are present in a given watershed if it is connected to an area known to be occupied, unless site-specific information indicates otherwise. The Forests shall informally consult with the Service to determine the effects of proposed actions upon bull trout prior to initiating formal consultation and to ensure that the necessary site-specific information and technical data is provided in the baseline and effects analysis for biological assessments for the individual projects.

4. The Forests shall integrate the value and risk to both bull trout and grizzly bears when deciding where to implement projects stemming from this proposed action. This action may entail increasing the priority for implementation of some BMUs.

5. In the course of planning projects to achieve the grizzly bear access standards, the Forests shall conduct site-specific assessments of roads and road-crossings at the 6th code subwatershed scale to identify:
   - road segments that are primary contributors of sediment or at risk of failure;
   - stream crossings at risk of failure or that will not pass a 100-year flood event;
   - culverts or other road crossings that act as fish barriers.

   Assessments and corrective actions within any given BMU shall follow the prioritization provided in this biological opinion, if practicable, unless new site-specific information changes the priority.

6. The Forests shall ensure that all road features, particularly stream crossings on roads or any road that is closed by a barrier (i.e., not a gate) and is intended to be kept closed for at least 5 years is hydrologically neutral (as defined in subsequent project level consultations with the Service) and capable of passing at least a 100-year flood event with minimal erosion. Should the Forests decide to leave a culvert on a road blocked by a barrier, then that crossing shall be capable of passing a 100-year event. Crossings that are barriers to fish passage shall be removed, unless site-specific analysis contradicts such action. Roads that are intended to be kept closed for less than 5 years shall be adequately stabilized so that maintenance is not expected to be required for the duration of the closure.

7. The Forests shall minimize sediment input to the maximum extent practicable from culvert removals and subsequent streambed and streambank restoration activities by following all appropriate best management practices.

8. The Forests shall, where practical, time culvert removals to coincide with low flow on perennial streams or no flow on intermittent streams to minimize sediment impacts to bull trout spawning activities and bull trout spawning and rearing habitat.

9. The placement of new roads and reopening of previously closed roads shall be done in a manner to reduce or eliminate impacts to bull trout streams and critical habitat. The design of new or replaced culverts shall be done in accordance with the Forest Service's Aquatic Organism Passage program, or other design criteria that ensure fish passage at the appropriate life stages.

10. Prior to closing a road by gate or barricade, the Forests shall complete an inventory and risk assessment of individual stream crossing structures and features behind the proposed barrier and develop a monitoring plan based on the risk assessment. After closing, periodically monitor and inspect culvert stream crossings, bridges, fords, and other drainage features behind gated or barriered roads in bull trout watersheds which are subject to high erosion risk due to floods or peak storm events and/or are in close proximity to bull trout occupied streams or critical habitat.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Priorities to Reduce Long-term Risks to Bull Trout

In spite of short term effects from increased sedimentation associated with road closures and/or restrictions, the long term impact from reducing road density and use is reduced sediment inputs for those subwatersheds where such treatments occur. In order to promote the conservation of bull trout and minimize long term risk of adverse effects to important bull trout subwatersheds and local populations, we are recommending a prioritization for treatment of 6th code subwatersheds within BMUs that are not currently achieving grizzly bear access standards. This prioritization is based on environmental baseline conditions for sediment and road density within 6th code subwatersheds that are associated with designated local populations of bull trout in core areas that overlap with non-achieving BMUs.

The Service recommends that the baseline assessment in this biological opinion be used by the Forests to inform decisions regarding specific locations for road closures and the opportunity for long-term beneficial effects to bull trout within a given BMU. The priority ranking is based on

the Service's best judgment as to where populations are adequately robust so as to benefit from habitat improvement (as evidenced by an increase in the number of redds or juvenile abundance). Priority rankings should only be used relative to other subwatersheds within a BMU and are not necessarily intended to be applied to other projects.

Priority ranking within each BMU is detailed for each bull trout core area below, along with the baseline assessments which form the starting point for the prioritization scheme. Baseline conditions for sediment are given more weight in the prioritization than those for road density because, although high overall road density is correlated with reductions in the quality of bull trout habitat (Lee et al. 1997), individual roads differ in their level of impacts for increased sediment delivery. Whether or not roads deliver excess sediment to streams depends on a wide variety of factors, such as proximity to the stream, local topography, surface condition, and the size and condition of stream crossings. For this reason, assessment of actual road impacts is imperative for implementation of the grizzly access standards in order for the Forests to maximize the conservation benefits to bull trout.

The Service additionally recommends that:

1. The Forests identify and prioritize roads for reclamation or seasonal restrictions within watersheds exceeding > 2 mi/mi^2 of open road density to improve habitat quality and/or security for bull trout, as well as other listed and non-listed fish and wildlife species.

2. The Forests continue to monitor, inventory, investigate and document the bull trout populations and spawning activities throughout the entire action area.

3. The Forests continue to reduce sediment inputs from roads and reduce road density throughout the action area to further minimize risk and impacts from sedimentation to bull trout.

4. The Forests identify those watersheds containing bull trout where the road density exceeds the Functioning Appropriately standards set forth in the Framework and attempt to bring those watersheds into agreement with that standard.

5. The Forests rip the road base within the RHCA for all decommissioned roads to facilitate water infiltration rates and reduce surface flow and erosion within watersheds containing bull trout habitat, wherever appropriate.

6. Upon finalization of the Draft Bull Trout Recovery Plan, the Forests review and implement all necessary and appropriate recovery objectives that pertain to meeting road density standards or other relevant standards.

7. Culvert designs should incorporate the lowest maximum average water velocity for the weakest-swimming fish requiring passage, which is often determined by that which allows juvenile fish to pass safely (Furniss et al. 1991; Bates 1997; Bell 1991). To avoid delay due to water depth, culvert design should be based on timing of fluvial and

adfluvial fish movements and life stages and to accommodate the natural hydrograph and a minimum water depth. Recommended water depths on the Lolo National Forest in July and August when it appears that large, adult bull trout have migrated is four inches to provide for the juvenile run of bull trout (Hendrickson 2000).

8. Near stream crossings, the length of road ditch discharging sediment directly to the stream should be limited to short distances through location of intervening relief drainage structures such as broad-based dips, relief drain culverts, water bars, or other appropriate drainage structures that direct runoff onto the forest floor or through vegetated filter strips. Treatments of channels located below roads that are insloped or have culverts or water bars could include lining the channel with rock or similar materials, establishing vegetation, or installing control structures. Relief culverts inside ditches near streams should be located as close as possible to the stream crossing so sediment drains off before reaching the stream. The addition of these road drainage structures may eliminate 25 percent to 85 percent of road sediment delivered to the stream (McGreer et al. 1998).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the proposed Amendment, and the reinitiated formal consultation on the continued implementation of the LRMPs for grizzly bears outside of the Recovery Zones. As provided in 50 CFR, Part 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. the amount or extent of incidental take is exceeded;
2. new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
3. the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or
4. a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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APPENDICES

APPENDIX B1

Crosswalk between the Bull Trout Matrix of Pathways and Indicators (MPI) and Primary Constituent Elements (PCEs) of Critical Habitat

The Matrix of Pathway Indicators (MPI) for bull trout is used to evaluate and document baseline conditions and to aid in determining whether a project is likely to adversely affect or result in the incidental take of bull trout.

The MPI analysis incorporates 4 population indicators and 19 physical habitat indicators. Analysis of the habitat indicators can provide a thorough evaluation of the existing baseline condition and potential project impacts to the PCEs of critical habitat for bull trout. Table 1 shows the relationship between the PCEs for bull trout critical habitat and the MPI habitat indicators.

The following paragraphs describe how the MPI indicators are related to evaluating the function of each PCE for bull trout critical habitat.

1. ***Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.***
   The analysis of *floodplain connectivity* considers the hydrologic linkage of off-channel areas with the main channel and overbank-flow maintenance of wetland function and riparian vegetation and succession. Floodplain and riparian areas provide hydrologic connectivity for springs, seeps, groundwater upwelling and wetlands and contribute to the maintenance of the water table. The analysis of *changes in peak/base flows* addresses subsurface water connectivity and *substrate embeddedness* addresses inter-gravel flows. *Increase in drainage network* and *road density and location* address potential changes to groundwater sources and subsurface water connectivity. *Streambank condition*, *floodplain connectivity* and *riparian conservation areas* address groundwater influence. C*hemical contamination/nutrients* addresses concerns regarding groundwater water quality.

2. ***Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.***
   Physical, biological or chemical barriers to migration are addressed directly through water quality habitat indicators, including *temperature*, *sediment*, *chemical contamination/nutrients* and *physical barriers*. The analysis of these indicators assess whether barriers have been created due to impacts such as high temperatures or high concentrations of turbidity or contaminants. Analysis of *change in peak/base flows* and *average wetted width/maximum depth ratio* assess whether changes in flow might create a seasonal barrier to migration. An analysis of *refugia* considers the habitat's ability to support strong, well distributed, and connected populations for all life stages and forms of bull trout.

3. ***An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.***

Floodplain connectivity and *riparian conservation areas* provide habitat to aquatic invertebrates, which in turn provide a forage base for bull trout. *Pool frequency and quality* and *substrate embeddedness* contributes to the variety and density of aquatic invertebrates and other fish species. Changes in *temperature, sediment*, and *chemical contaminants and nutrients* affect aquatic invertebrate production, floodplain and riparian areas provide habitat to aquatic invertebrates, which in turn provide a forage base for bull trout. The combined analyses of all the Matrix habitat indicators and the other seven PCEs provide information to assess whether there is an abundant food base in the analysis area. Therefore, any impairment to the food base will be addressed by way of summarizing the biological and habitat indicators.

4. ***Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.***
   Large woody debris increases channel complexity and creates pools and undercut banks, so the analysis of the current amounts and sources of *large woody debris* available for recruitment is pertinent to this PCE. *Pool frequency and quality* considers the number of pools per mile as well as the amount of cover and temperature of water in the pools. *Average wetted width/maximum depth ratio* is an indicator of channel shape and pool quality. Low ratios suggest deeper, higher quality pools. *Large pools,* consisting of a wide range of water depths, velocities, substrates and cover, are typical of high quality habitat and are a key component of channel complexity. Analysis of *off-channel habitat* describes side-channels and other off-channel areas. *Streambank condition* analyzes the stability of the banks, including features such as undercut banks. The analysis of *riparian conservation areas,* and *floodplain connectivity, disturbance history, and disturbance regime* includes the maintenance of habitat and channel complexity, the recruitment of large woody debris, and the connectivity to off-channel habitats or side channels. Complex habitats provide refugia for bull trout and in turn, analysis of *refugia* assesses complex stream channels. All of these habitat indicators consider the numerous characteristics of instream bull trout habitat and quantify critical components that are fundamental to creating and maintaining complex instream habitat over time.

5. ***Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.***
   This PCE is addressed directly by the analysis of *temperature*. It is also addressed through consideration of *refugia*, which by definition is high quality habitat of appropriate temperature. Availability of refugia is also considered in analysis of *pool frequency and quality* and *large pools*. *Average wetted width/maximum depth ratio* is an indication of water volume, which indirectly indicates water temperature, i.e., low ratios indicate deeper water, which in turn indicates possible refugia. This indicator in conjunction with *change in peak/base flows* is an indicator of potential temperature and refugia concerns particularly during low flow periods. *Streambank condition, floodplain*

connectivity, r*oad density and location* and *riparian conservation areas* address the components of shade and groundwater influence, both of which are important factors of water temperature. Stable streambanks and intact riparian areas, which include part of the floodplain, typically support adequate vegetation to maintain thermal cover to streams during low flow periods. *Road density and location* addresses the potential contributions of warm water discharges from stormwater ponds.

6. ***Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.***
   The analyses for *sediment* and *substrate embeddedness* assess substrate composition and stability in relation to the various life stages of the bull trout as well as the sediment transportation and deposition. *Large woody debris* and *pool frequency and quality* affect sediment transport and redistribution within a stream and assessment of these indicators will clarify substrate composition and amounts. Analysis of *streambank condition* will provide insight into the amount of fine sediment contribution.

7. ***A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.***
   The analysis of *change in peak/base flows* considers changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography. Analyses of *floodplain connectivity, increase in drainage network, road density and location, disturbance history*, and *riparian conservation areas* provides further information regarding possible interruptions in the natural stream hydrology. *Floodplain connectivity* considers the hydrologic linkage of off-channel areas with the main channel. Roads and vegetation management both have effects strongly linked to a stream's hydrograph. *Disturbance regime* ties this information together to consider how a watershed reacts to disturbance and the time required to recover back to pre-disturbance conditions.

8. ***Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.***
   The quantity of permanent water will be considered in the analyses for PCE 4 natural hydrograph and PCE 5 springs, seeps, and groundwater, which include *floodplain connectivity, changes in peak/base flows, drainage network increase, disturbance history,* and *disturbance regime*. Analysis of *temperature, sediment, and chemical contaminates and nutrients* consider the quality of permanent water. Current listing under 303(d) and 305(d) status should be considered, as well as the causes for that listing. Analysis pertinent to sediment should address turbidity.

9. ***Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.*** This PCE is addressed specifically by analysis of the biological indicator *persistence and genetic integrity*. This indicator analyzes the probability of hybridization or displacement by competitive species. An analysis of *physical barriers* may indirectly address non-native species in those areas where a barrier may prevent the invasion of non-native species.

Table 1. MPI indicators relevant to each of the Primary Constituent Elements of proposed bull trout critical habitat (2010 version).

Diagnostic Pathway/Indicator	*PCE 1 - Springs, seeps, groundwater	PCE 2 - Migratory Habitats	PCE 3 - Abundant food base	PCE 4 - Complex habitats	PCE 5 - Water Temperature	PCE 6 - Substrate features	PCE 7 - Natural Hydrograph	PCE 8 - Water quality and quantity	PCE 9 - Predators and competitors
Water Quality									
Temperature		x	x		x			x	
Sediment		x	x			x		x	
Chemical Contaminants and Nutrients	x	x	x					x	
Habitat Access									
Physical Barriers	x	x	x						x
Habitat Elements									
Substrate Embeddedness	x		x			x			
Large Woody Debris				x		x			
Pool Frequency and Quality			x	x		x			
Large Pools				x	x				
Off-Channel Habitat				x					
Refugia		x			x				x
Channel Conditions and Dynamics									
Wetted Width/Maximum Depth Ratio		x		x	x				
Streambank Condition	x			x	x	x			
Floodplain Connectivity	x		x	x	x		x	x	
Flow/Hydrology									
Changes in Peak/Base Flows	x	x			x		x	x	
Drainage Network Increase	x						x	x	
Watershed Conditions									
Road Density and Location	x				x		x		
Disturbance History				x			x	x	x
Riparian Conservation Areas	x		x	x	x		x		
Disturbance Regime				x			x	x	

*Updated for 2010 proposed rule Khalupka 2-24-10

APPENDIX B2

FWS recommended priorities for restoration in subwatersheds by BMU for each bull trout core area where implementation actions must occur to achieve grizzly bear standards.

LOWER CLARK FORK RIVER CORE AREA				
BMU Name	**Designated Local Population**	**6th code HUC**	**Baseline Call Sed/RD**	**Priority to Restore**
Mt. Headley	Fishtrap Creek	170102130401 Beartrap Cr	**FUR/FUR**	High
		170102130402 Upper Fishtrap Cr	**FUR/FUR**	High
		170102130403 WF Fishtrap Cr	**FUR/FUR**	High
		170102130404 Lower Fishtrap Cr	**FUR/FUR**	High
	Graves Creek	170102130804 Graves Creek	**FUR/FUR**	High
	WF Thompson River	170102130405 WF Thompson River	**FUR**/FAR	High
		170102130406 Deerhorn Big Hole Cr	**FUR/FUR**	High
		170102130407 Lower Thompson River	**FUR/FUR**	High
		170102130508 Weeksville Cr	**FUR/FUR**	Low*
		170102130613 Munson/Quartz Cr	FAR/FA	Low*
	Vermilion River	170102130902 Squaw Cr	FAR/FAR	Low*
		170102130903 Deep Cr trib to Clark Fk	FAR/FA	Low*
		170102130904 Mosquito/Cougar Cr	**FUR/FUR**	Low*
Silver Butte-Fisher		170102131005 Swamp Cr	FA/FA	Maintain
		170102130803 Lower Vermilion River	FA/FAR	Low
Vermilion		170102130802 Middle Vermilion River	FA/**FUR**	Medium
Bull St. Paul Wanless	Rock Creek	170102131301 Rock Cr	FAR/**FUR**	High
	Bull River	170102131102 Upper Bull River	FA/**FUR**	Medium
		170102131103 Middle Bull River	FA/**FUR**	Medium
		170102131104 Lower Bull River	FA/FAR	Low
		170102131101 Headwaters Bull River	FA/FAR	Low

Sed = Sediment; RD = Road Density.
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.
* Priority level is lower than warranted by the baseline assessment because bull trout numbers are extremely low and/or a majority of individuals are hybrids.

LAKE PEND OREILLE CORE AREA				
BMU Name	**Designated Local Population**	**6th code HUC**	**Baseline Call Sed/RD**	**Priority to Restore**
Scotchman North Lighting	Lightning Creek	170102131301 Lightning Creek above Rattle Cr	FAR/FAR	High
	Porcupine and Wellington Creeks	170102131302 Middle Fork Lightning Cr	FAR/FAR	High
		170102131304 Lightning Cr blw EF Lightning Cr	FAR/FAR	High
		170102131303 East Fork Lightning Creek	FAR/FA	Medium
	Trestle Creek	170102140404 Trestle Cr	FA/FA	Maintain
Grouse	Grouse Creek	170102140506 Rapid Lightning Cr	FAR/**FUR**	High
		170102140505 Grouse Cr	FAR/FAR	Medium

PRIEST LAKE CORE AREA				
BMU Name	**Designated Local Population**	**6th code HUC**	**Baseline Call Sed/RD**	**Priority to Restore**
Blue-Grass	Upper Priest River	170102150101 Upper Priest River above Malcolm Cr	FA/FA	Maintain
		170102150102 Upper Priest River above Upper Priest Lake	FA/FAR	Low
Lakeshore Kalispell	Kalispell Creek	170102150208 Kalispell Cr	**FUR**/FAR	High
	Granite Creek	170102150301 SF Granite	FAR/FA	Medium
		170102150302 NF Granite	FA/FAR	Low

Sed = Sediment; RD = Road Density.
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.
* Priority level is lower than warranted by the baseline assessment because bull trout numbers are extremely low and/or a majority of individuals are hybrids.

KOOTENAI RIVER CORE AREA				
BMU Name	**Designated Local Population**	**6th code HUC**	**Baseline Call Sed/RD**	**Priority to Restore**
Wanless	Fisher River	170101020401 WF Fisher Cr	FA/**FUR**	Medium
Roderick	Pipe Creek	170101010902 Upper Pipe Cr	FA/**FUR**	Medium
Pulpit	Quartz Creek	170101011004 Quartz Cr	FA/**FUR**	Medium
	O'Brien Creek	170101011201 O'Brien Cr	FA/**FUR**	Low*
Boulder Grouse	Callahan Creek	170101040406 Brown Cr , Twentymile Cr	**FUR/FUR**	High
		170101040402 Deep Cr above Brown Cr	FAR/**FUR**	Medium
		170101040201 Boulder Cr abv MF Boulder	FA/FAR	Low
		170101040202 Boulder Cr blw MF Boulder, MF and EF Boulder Cr	FA/FAR	Low
Blue-Grass	Callahan Creek	170101040801 Boundary Cr above Grass Cr	FA/FAR	Low
		170101040802 Grass Cr	FA/FAR	Low
		170101040803 Boundary Cr below Grass Cr	FA/FAR	Low

Sed = Sediment; RD = Road Density;
FA = Functioning Acceptably; FAR = Functioning at Risk; FUR = Functioning at Unacceptable Risk.
* Priority level is lower than warranted by the baseline assessment because bull trout numbers are extremely low and/or a majority of individuals are hybrids.