Aquatic Species Biological Assessment for Livestock Grazing on the Pass Creek Allotment

LOST RIVER RANGER DISTRICT

SALMON-CHALLIS NATIONAL FOREST

BUTTE and CUSTER COUNTIES, IDAHO

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1 INTRODUCTION

The Lost River Ranger District of the Salmon-Challis National Forest authorizes livestock grazing activities within the Pass Creek Allotment. This biological assessment describes the proposed action and discusses the probable impacts of that action on listed species and proposed critical habitat that may be affected. This biological assessment forms the basis for any necessary consultation with the Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (collectively the "Services") pursuant to section 7 of the Endangered Species Act (ESA) of 1973 (as amended) and its implementing regulations. This biological assessment replaces all previous consultations associated with this allotment. The regulations for consultation require the action agency to re-initiate consultation if certain triggers are met (50 CFR 402.16). Occasionally during the implementation of a proposed action, changes in circumstances, situations, or information can raise the question as to whether those re-initiation thresholds have been reached. Should that situation occur, the Salmon-Challis National Forest (SCNF) will assess the changes and any potential impacts to listed species, review the re-initiation triggers, coordinate with Services for advice (if needed), and arrive at a determination whether re-initiation of consultation is necessary.

2 BACKGROUND INFORMATION

The Pass Creek Allotment is primarily within the Wet Creek 5^{th} Field HUC (5^{th} Field HUC: 1704021705) and the Middle Big Lost River 5^{th} Field HUC (5^{th} Field HUC: 1704021806). Elevations within these sub-watersheds range from about 5,538 feet at the Big Lost River near the Moore Diversion to over 11,000 feet at the mountain ridges. The geology of the sub-watersheds is primarily sedimentary and alluvial floodplain with smaller amounts of volcanic rocks. The physiography of the sub-watersheds includes high relief mountains and associated canyons, alluvial fans, and floodplains. The primary natural vegetation types are sagebrush steppe, coniferous forests, deciduous riparian communities, sub-alpine, and alpine communities. There is also a considerable amount of developed agriculture and residential land within the Middle Big Lost river sub-watershed. Both sub-watersheds have a snowmelt dominated stream flow pattern with peak flows typically occurring in early summer and low flows occurring during the winter months. These sub-watersheds include Forest Service, Bureau of Land Management, state, and private lands. Significant management actions within these sub-watersheds have included developments associated with agriculture, livestock grazing, road construction, fire suppression, the introduction of non-native fish, stream diversion, and recreation.

3 PROPOSED ACTION

3.1 PROJECT AREA

The Pass Creek Allotment is a 43,632 acre allotment located in both the Little Lost River basin within the Wet Creek 5^{th} Field HUC (5^{th} Field HUC: 1704021705) and the Big Lost River basin within the Middle Big Lost River 5^{th} Field HUC (5^{th} Field HUC: 1704021806) (Figure 1, Figure 2, Figure 3).

FIGURE 1 – PASS CREEK ALLOTMENT VICINITY MAP

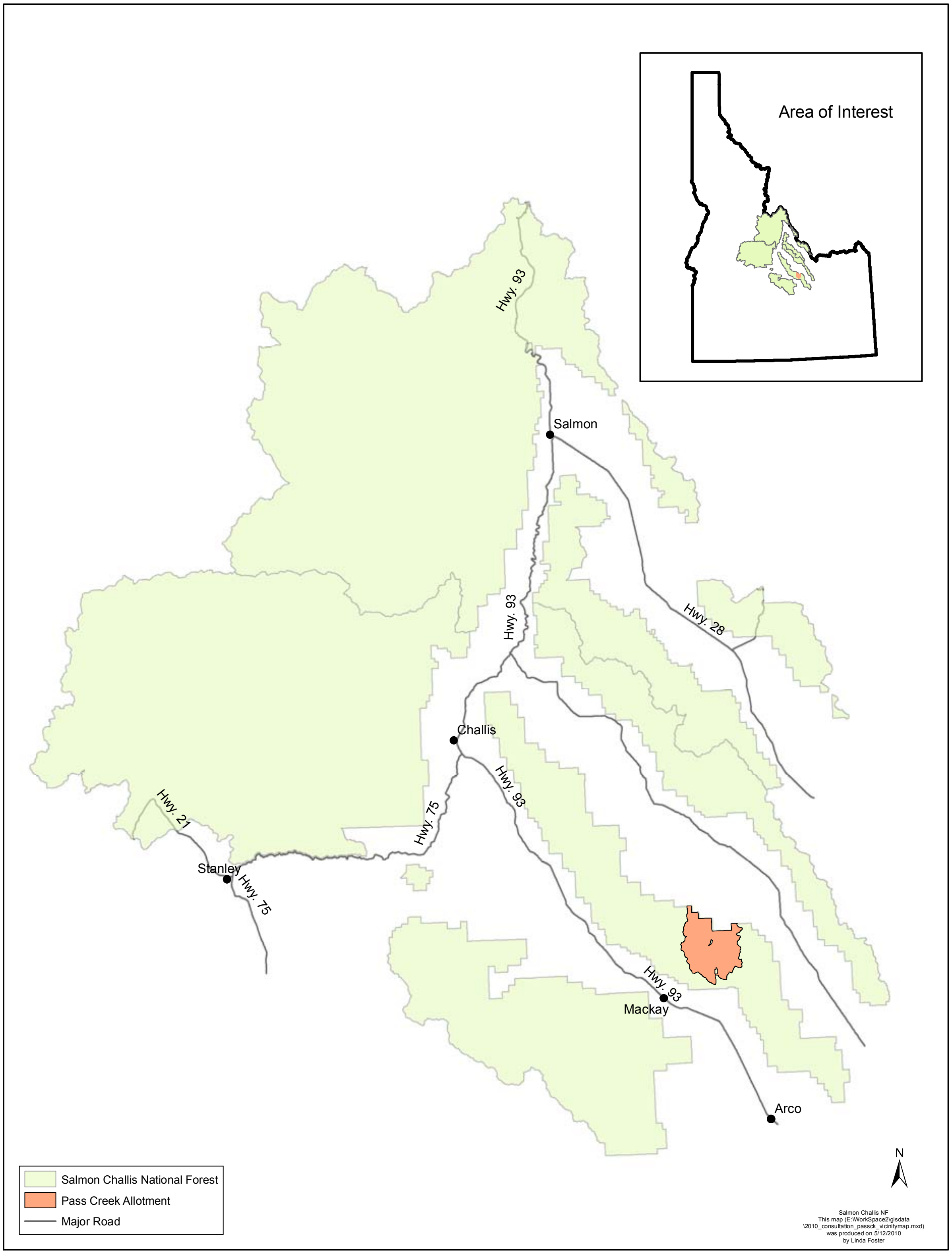


Figure 2 – Pass Creek Action Area

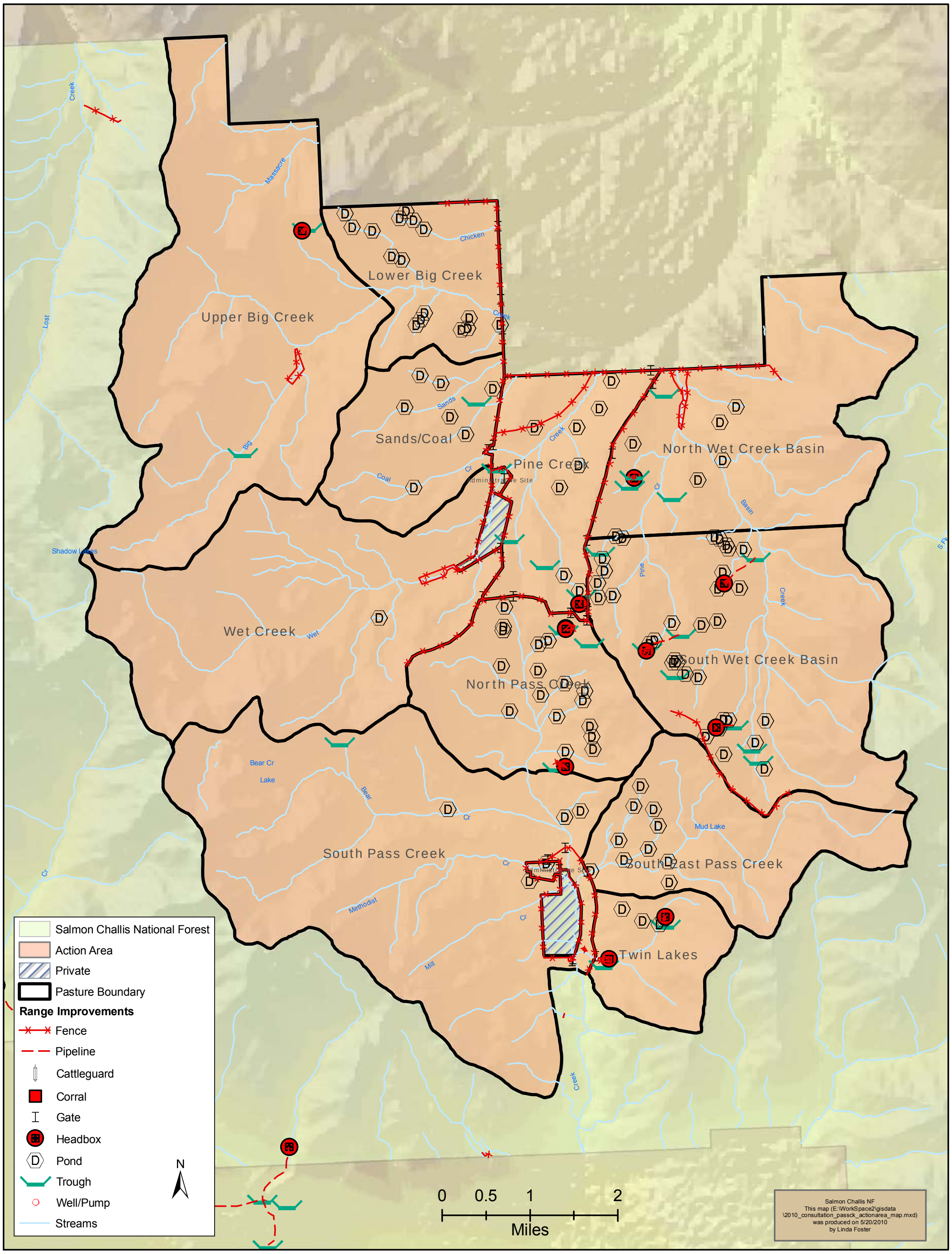
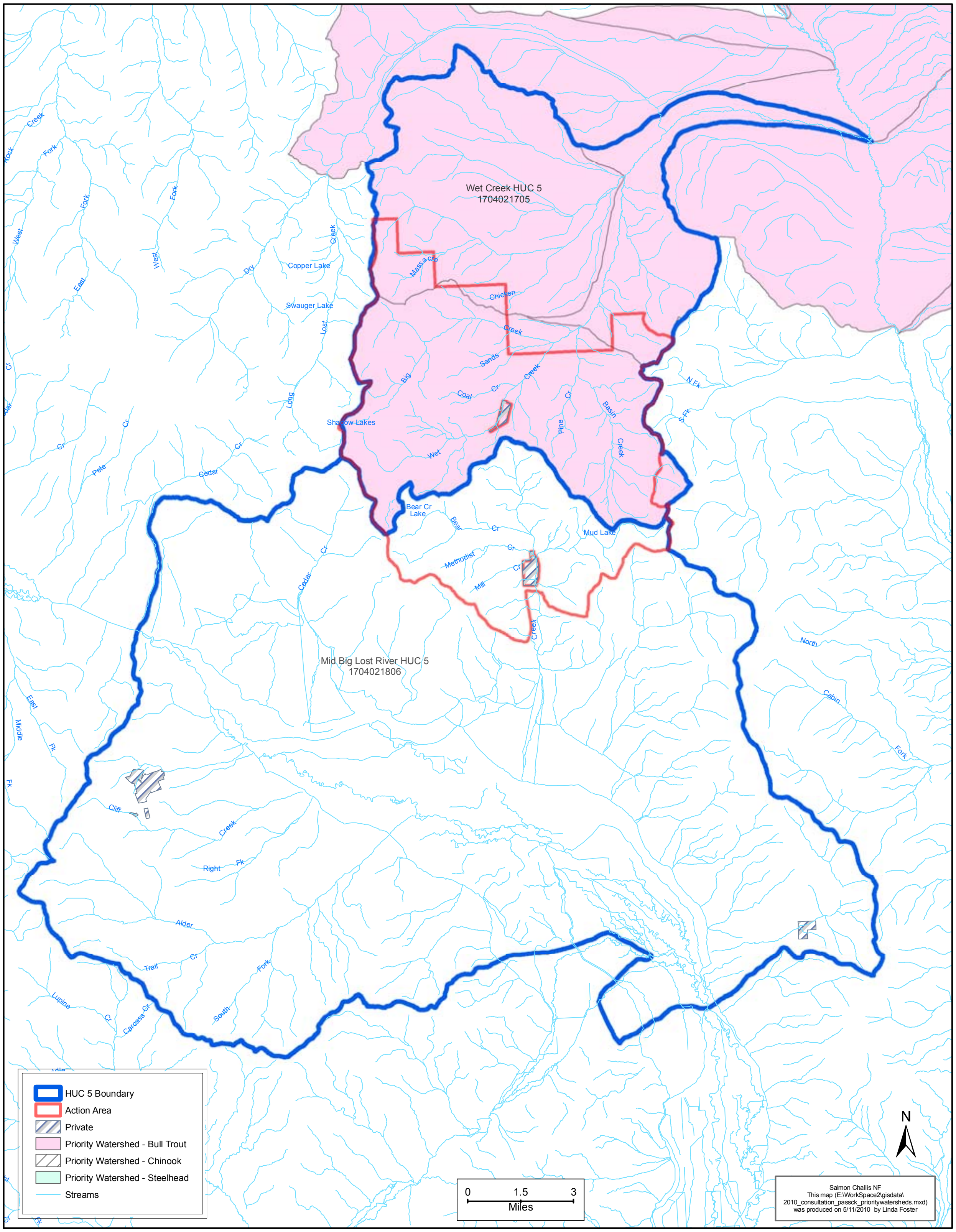


FIGURE 3 – PASS CREEK HUCS AND PRIORITY WATERSHEDS



3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The grazing permits for this allotment are permits 40150, 40158, 40147, 40159, 40149, 40151, 40148, 40160, 40156, 40161, 40157, 40153, 40154, and 40155 which expire on December 31, 2015.

3.2.2 GRAZING SYSTEM

Grazing on this allotment will involve grazing up to 1660 cow/calf pairs under a deferred grazing system with grazing occurring anytime between July 15 and October 10. The units located in the Little Lost River Basin are Pine Creek, North Wet Creek Basin, South Wet Creek Basin, Upper Big Creek, Lower Big Creek, Wet Creek, and Sands/Coal. The units located in the Big Lost River Basin are North Pass Creek, South Pass Creek, Southeast Pass Creek, and Twin Lakes. Grazing will not occur within the Basin Creek, Big Creek, or Wet Creek exclosures or within the Forest Service Administrative Site Pasture.[1] Livestock grazing will be rotated so that no pasture is continuously grazed early or late in the season. Two riders are also required to be on the allotment seven days per week.

Upper Big Creek Unit:

- Bull Trout: Bull trout are not present within this unit. This unit has proposed critical habitat. Livestock will be present in the unit after August 15th for up to 3 weeks three out of every six years.
- Trailing: N/A.

Lower Big Creek Unit:

- Bull Trout: Bull trout are not present within this unit. This unit has proposed critical habitat. Livestock will be present in the unit after August 15th for up to 3 weeks three out of every six years.
- Trailing: N/A.

Sands/Coal Unit

- There are no TES species or proposed critical habitat within this unit.

Wet Creek Unit:

- Bull Trout: Bull trout are present within this unit. Bull trout spawning areas are protected by an exclosure. Livestock will be present in the unit after August 15th for up to 2 weeks three out of every six years.
- Trailing: Cows will not trail through the Wet Creek Unit.

Pine Creek Unit:

- Bull Trout: Bull trout are present within this unit. Livestock will be present in the unit after August 15th for up to 2 weeks three out of every six years.
- Trailing: Livestock trail across the Pine Creek Unit on or about June 1 yearly to the BLM into the Pass Creek Grazing Association private ground yearly, some trailing may occur on Pass Creek Road (FS RD 122). Duration of each move is approximately 1 day.

[1] The Forest Service occasionally grazes horses and mules within the Forest Service Administrative Site Pasture. However, this pasture is not part of the Pass Creek Allotment and this proposed action does not authorize any grazing within this pasture.

North Wet Creek Basin Unit, South Wet Creek Basin Unit, North Pass Creek Unit, South Pass Creek Unit, South East Pass Creek Unit and Twin Lake Unit:

- There are no TES species or proposed critical habitat within these units.

3.2.3 RESOURCE OBJECTIVES

Resource Objectives and Effectiveness Monitoring: The allotment is being managed to achieve specific resource conditions in riparian areas. Resource objectives are the Forest's description of the desired land, plant, and water resources condition within riparian areas in the allotment. Some resource objectives are Riparian Management Objectives (RMOs) that were implemented as part of the Inland Native Fish Strategy (INFISH) and the consultation associated with INFISH. INFISH is a strategy implemented by the USDA Forest Service in 1995 that was "…intended to provide interim direction to protect habitat and populations of resident native fish outside of anadromous fish habitat in eastern Oregon, Idaho , western Montana, and portions of Nevada" (USDA Forest Service 1995). INFISH provides riparian management objectives, standards and guidelines, and monitoring requirements. INFISH amended the Challis National Forest plan and applies to those national forest lands in the Big Lost River and Little Lost River basins.

Effectiveness monitoring for resource objectives will be monitored every 3-5 years at Designated Monitoring Areas (DMAs) using the Multiple Indicator Monitoring (MIM) technical reference or other best available science as it becomes available. DMAs are areas representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. They should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream (Burton et al 2008). Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

The resource objectives area as follows:

Greenline Successional Status: A greenline successional status value of at least 61 (late seral) or the current value, whichever is greatest (see Winward 2000).

Woody Species Regeneration: Sufficient woody recruitment to develop and maintain healthy woody plant populations.

Bank Stability (INFISH): A bank stability of at least 90%[2] or the current value, whichever is greatest.

Water Temperature (INFISH): No measurable increase in maximum water temperature.[3] Maximum water temperatures below 59°F (15°C) within adult holding habitat and below 48°F (8.9°C) within spawning and rearing habitats.

Width:Depth Ratio (INFISH): <10 or by channel type as follows[4]:

A Channel: 21

B Channel: 27

C Channel: 28

Sediment (INFISH): <20% surface fines (substrate <0.25 inches (6.4 mm) in diameter) in spawning habitat or <30% cobble embeddedness in rearing habitat.[5]

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[2] The INFISH environmental assessment established a riparian management objective for bank stability of 80%. However, during consultation this standard was increased to 90% within bull trout priority watersheds. This allotment is within a priority watershed.

[3] In this case, maximum water temperature is expressed as the 7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.

[4] These values are based on the mean values observed for streams in natural condition within the Salmon River (Overton et al 1995) .

3.2.4 MANGEMENT STANDARDS AND GUIDELINES

The following are forest plan standards and guidelines that apply to the management of livestock grazing relative to listed fish and their habitats:

INFISH

GM-1: Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives.

The INFISH environmental assessment defines "Adverse Effects" to include "…short- or long-term, direct or indirect management-related impacts of an individual or cumulative nature, such as mortality, reduced growth, or other adverse physiological changes; harassment of fish; physical disturbance of redds; reduced reproduction success; delayed or premature migration; or other adverse behavioral changes."

GM-2: Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives. Relocate or close facilities where these objectives cannot be met.

GM-3: Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

Land Resource Management Plan for the Challis National Forest – Forest Wide Direction

- Protect anadromous fish spawning areas from disturbance by livestock and other activities.
- Utilize grazing systems on allotments which provide for deferment or rest whenever possible. Season-long grazing or common use will be allowed only where resources can sustain such use.
- Range improvements will be maintained annually by permittees to standards adequate for public safety and established use, and control and proper distribution of livestock. Maintenance will be completed before livestock are allowed on the allotment.
- Rehabilitate existing stock driveways where damage is occurring. Relocate them outside riparian areas if possible.
- Browse utilization within the riparian ecosystem will not exceed 50 percent of new leader production.
- Ensure that all management-induced activities meet State water quality standards, and Forest water quality goals, including sediment constraints.
- Impacts of activities may not increase fine sediment by depth (within critical reaches) of perennial streams by more than 2 percent over existing levels. Where existing levels are at 30% or above new activities that would create additional stream sedimentation would not be allowed. If these levels are reached or exceeded, activities that are contributing sediment will be evaluated and appropriate action will be taken to bring fine sediment within threshold levels.
- Retain at a minimum, 75 percent of natural stream shade provided by woody vegetation.
- Establish forage utilization at levels which will yield 90% inherent bank stability or trends toward 90% where streams or other water bodies are involved.
- Discourage livestock concentrations in riparian areas and within 100 feet of lakes and perennial streams. Restrict livestock grazing in identified problem areas where necessary.
- Livestock driveways and trailing areas will be located away from riparian or streamside areas.

[5] The INFISH environmental assessment did not include a riparian management objective for sediment. However, during consultation a riparian management objective for sediment was established in bull trout spawning and rearing areas within bull trout priority watersheds. This allotment is within a priority watershed.

Land Resource Management Plan for the Challis National Forest – Management Area Specific Direction

- Improve stream habitat quality
- Manage Pass Creek allotment to improve riparian areas
  - S&G – Evaluate the possibility of creating riparian pastures along Wet Creek by 1990
- Emphasis for water quality will be on Pass Creek and Wet Creek
- Improve stream habitat quality
  - S&G – Develop projects to improve streambank stability and cover. Priority is Wet Creek, Pass Creek, East Fork of Pahsimeroi, Burnt Creek, and Long Lost Creek. Complete by 1996.
- Coordinate with soil, wildlife and fish functions on the improvement of riparian acres along Big Creek, East and West Fork of Pahsimeroi, Wet Creek and Pass Creek. Direction will be provided in the appropriate Allotment Management Plan.

3.2.5 USE INDICATORS

Annual use indicators are used to ensure that grazing does not prevent the attainment of the riparian resource objectives. Riparian annual use indicators used on the Salmon-Challis National Forest generally include any combination of greenline stubble height, bank alteration, and woody browse. In general, greenline stubble height is used to regulate grazing impacts to the vegetative components along the stream and the ecological status of those vegetative communities, bank alteration is used to regulate grazing impacts on bank stability, and woody browse is used to regulate impacts to the woody species along the stream, such as willows, which could affect woody recruitment. The specific indicators selected for a specific unit should be those that correspond with the riparian resources that are most sensitive to the impacts of livestock grazing. For example, if bank stability was the riparian feature most likely to be impacted by livestock grazing in a unit, then bank alteration would be selected as the annual use indicator for that unit.

Based on available data and professional experience, the various indicators for this allotment have been established (Table 1).

TABLE 1 – THE ANNUAL USE INDICATORS

Unit	End of Season Indicators			
	Median Greenline Stubble Height	**Bank Alteration**	**Woody Browse**	**Upland Utilization**
South Wet Creek Basin	≥ 4 inches	None [A]	≤ 50%	≤ 50%
North Wet Creek Basin	≥ 6 inches	None [A]	≤ 50%	≤ 50%
Pine Creek (Wet Creek)	≥ 4 inches	None [A]	≤ 50%	≤ 50%
Pine Creek (unnamed trib.)	≥ 4 inches	None [A]	≤ 50%	≤ 50%
Sands/Coal Creek	≥ 4 inches	None [A]	≤ 50%	≤ 50%
Wet Creek	≥ 6 inches	≤ 15%	≤ 50%	≤ 50%
Lower Big Creek	≥ 4 inches	None [A]	≤ 30%	≤ 50%
Upper Big Creek	≥ 4 inches	None [A]	≤ 30%	≤ 50%

[A] Bank stability and bank alteration will be monitored for a period of three years beginning in 2010. If bank stability is below 90% in 2012, a bank alteration standard will be implemented in the 2013 grazing season that is lower than the average bank alteration observed during 2010, 2011, and 2012.

Annual use indicators will be measured at key areas by key species (on uplands) and at DMA greenlines annually. Key areas are monitoring sites chosen to reflect the effects of grazing over a larger area (Burton et al 2008). Key species are preferred by livestock and an important component of a plant community, serving as an indicator of change (Coulloudon et al 1999). The Interagency Technical Reference or other best available science would be used to monitor grazing use. The MIM Interagency Technical Bulletin (Burton et al 2008) or other best available science would be used to monitor grazing use at DMAs. Annual use indicators will be monitored by the Forest Service. Triggers will be used by permittees as a tool to help ensure annual use indicators are met. Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

3.3 IMPROVEMENTS

Planned Improvements: There are no planned improvements within the Wet Creek 5th Field HUC (5th Field HUC: 1704021705). This is the only HUC 5 that contains listed fish within the action area.

Existing Improvements: The allotment contains several existing improvements including fences, ponds, troughs with associated head boxes and pipelines, and a rider's camp (Figure C1). These will be maintained in accordance with the term grazing permit.

New Improvements: No improvements are proposed as part of this consultation.

3.4 CHANGES FROM EXISTION MANAGEMENT

Appendix F displays the different management strategies from 2000-2005, 2009, and the proposed action. Grazing management was changed in 2009 to mitigate significant effects from livestock grazing. The proposed action goes back to a more regular, prior to 2009, management.

Changes to the proposed action from management before 2009:

- Season of use is extended from October 1 to October 10.
- North Wet Basin Creek has changed from a 4" stubble height to a 6" stubble height.
- Pine Creek has changed from 6" stubble height for the unnamed tributary to 4" stubble height.
- A 15% steam bank alteration has been added to the Wet Creek Unit.
- A 50% woody browse has been added to all units except Lower Big Creek and Upper Big Creek which received a 30% woody browse use.
- Another full time rider will be added to make 2 full time riders 7 days per week.

Changes to the proposed action from the 2009 season:

- During the 2009 season this allotment was ran with a rest rotation system. The Proposed Action goes back to a deferred rotation (timed grazing) system.
- Season of use is extended from October 1 to October 10.
- 2009 permitted 943 cow/calf pairs; proposed action permits 1660 cow/calf pairs.
- Pine Creek Unit was rested for the 2009 year. The proposed action will not rest this unit and has a 4" stubble height.
- The Wet Creek Unit was rested for the 2009 year. The proposed action will not rest this unit and has a 6" stubble height.
- Sands/Coal Creek Unit has changed from a 6" stubble height to a 4" stubble height.
- Lower Big Creek has changed from a 6" stubble height to a 4" stubble height.
- A 20% bank alteration across the allotment has been dropped and a 15% bank alteration has been added to the Upper Wet Creek Unit. There is not a bank alteration indicator on any other unit.
- A 30% woody browse use across the allotment is being changed to 50% except in the Lower Big Creek and Upper Big Creek Units where it is being kept at 30%.

3.5 CONSERVATION MEASURES

The following conservation measures will be implemented as part of the proposed action and incorporated into the term grazing permits to avoid and reduce potential impacts to ESA listed fish:

- Livestock grazing will not occur on sections of Wet Creek, Basin Creek, and Big Creek within the exclosures that are on those streams.
- A 6" stubble height indicator is being implemented on the Wet Creek Unit.
- A 15% bank alteration standard is being implemented on the Wet Creek Unit.
- A 30% woody browse indicator is being established on the Upper Big Creek and Lower Big Creek units.
- Livestock grazing will be rotated so that no pasture is continuously grazed early or late in the season.
- Two riders will be required to be on the allotment seven days per week.

3.6 MONITROING

Implementation Monitoring: The designated annual use indicators will be monitoring at Designated Monitoring Areas (DMA's). The designated annual use indicators (e.g. - stubble height, bank alteration, and woody browse) will be periodically monitored while livestock are in each grazing unit to evaluate the status of the indicators and to determine when livestock need to be moved from the unit. The specific triggers for moving livestock from the unit will be based on the time needed to move the livestock from the unit and may vary from unit to unit and year to year. The Forest Service will monitor the designated annual use indicators (e.g. - stubble height, bank alteration, and woody browse) at each DMA at the end of the grazing season to ensure that the indicators have been met. The Multiple Indicator Monitoring Interagency Technical Bulletin (Burton et al 2008) or other best available science will be used to monitor the designated annual use indicators. Results from this monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

Effectiveness Monitoring: Effectiveness monitoring for resource objectives will be monitored every 3-5 years at Designated Monitoring Areas (DMAs) using the Multiple Indicator Monitoring (MIM) technical reference or other best available science as it becomes available. DMAs are areas representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. They should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream (MIM, Technical Manual). Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

Effectiveness monitoring within this allotment will occur in the following manner. Within the South Wet Creek Basin, North Wet Creek Basin, Pine Creek, Wet Creek, Lower Big Creek, and Upper Big Creek units, greenline successional status, bank stability, and woody recruitment will be monitored every three to five years to evaluate resource conditions. This type of monitoring does not appear to be an effective method for monitoring livestock impacts within the Sands/Coal Creek Unit due to intermittent nature of large sections of Sands Creek and Coal Creek and the large amount of coniferous forest on Coal Creek. Therefore, effectiveness monitoring within these units will consist of photopoints which will be established in 2010 and re-photographed every three to five years. These photopoints will be established in areas sensitive to livestock grazing along Sands Creek and Coal Creek.

3.7 INTERDEPENDENT ACTIONS

Interdependent actions are actions that have "no independent utility apart from the action under consideration" (50 CFR§402.02). The Forest has not identified any interdependent actions associated with the proposed action. There are activities associated with the proposed action that could potentially affect fish and could be considered interdependent actions. These include livestock grazing on the adjacent BLM allotment, grazing and other agriculture activities on private property that is owned by the permittees, and diverting water from streams on private and national forest lands for agricultural purposes. However, we believe that these activities would continue to occur in a manner similar to the way they are currently occurring whether or not livestock graze on this allotment. Therefore, these activities will not be considered as interdependent actions.

3.8 INTERRELATED ACTIONS

Interrelated actions are actions that "are part of a larger action and depend on the larger action for their justification" (50 CFR§402.02). The Forest has not identified any interrelated actions associated with the proposed action.

3.9 ADAPTIVE MANAGEMENT

The adaptive management strategy described below and depicted in Appendix E is intended for allotments requiring consultation. It will be used to ensure: 1) sites at desired condition remain in desired condition; 2) sites not in desired condition have an upward trend or an acceptable static trend to be agreed upon with the Services and the Forest Service; and 3) direction from consultation with the Services is met. The overall strategy consists of a long-term adaptive management strategy and an annual adaptive management strategy. The long-term strategy describes how adaptive management will be used to ensure the resource objectives previously stated are achieved and to maintain consistency with Forest Plan level direction. The annual adaptive management strategy describes how adjustments will be made within the grazing season to ensure annual use indicators and other direction from consultation is met. Both strategies describe when and how regulatory agencies will be contacted in the event direction from consultation is not going to be met.

Ideally, the value associated with the annual use indicator is customized to the specific circumstances in each unit and is based on data and experience. However, customizing this value generally requires a significant amount of data and/or experience with a particular unit. When sufficient data and/or experience are not available to establish the annual use indicators values, the forest has provided default recommendations for establishing the values. These recommendations will be used until such time as sufficient data and/or experience are available to customize the annual indicator values. The recommendations that apply to this allotment are:

- When the greenline ecological status is 61 or greater, the end of season median greenline stubble height will be 4 inches.
- When the greenline ecological status objective is less than 61, the end of season median greenline stubble height will be 6 inches.
- In priority watersheds, when bank stability is 90% or greater, the bank alteration indicator will be 20%.
- In priority watersheds, when bank stability is 70-89%, the bank alteration indicator will be set at a value between 10 and 20% depending on the circumstances specific to that unit.
- In priority watersheds, when bank stability is less than 70%, the bank alteration indicator will be 10%.
- When there is sufficient woody recruitment to develop and maintain healthy woody plant populations, the woody browse indicator will be 50% woody browse on multi-stemmed species and 30% woody browse on single-stemmed species.
- When there is not sufficient woody recruitment to develop and maintain healthy woody plant populations, the woody browse indicator will be 30% woody browse on multi-stemmed species and 20% woody browse on single-stemmed species.

4 ESA ACTION AREA DESCRIPTION

The ESA action area is defined as "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). This is the area where the action and any interdependent and interrelated actions will result in direct or indirect affects to listed species or designated critical habitat. Our analysis indicates that the proposed action has the potential to generate direct or indirect affects to aquatic species and aquatic habitats in the area covered by the allotment (Figure 2).

Bull trout priority watersheds are those watersheds that were identified as part of INFISH that are particularly important to bull trout. The consultation associated with INFISH requires a different management strategy within these areas because of their importance to bull trout. With the exception of the Pass Creek Drainage located within the Middle Big Lost River 5th Field HUC (5th Field HUC: 1704021806) the entire action area is within a bull trout priority watershed (Figure 3). The Middle Big Lost River 5th Field HUC does not contain any TES species.

5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

The current semi-annual Species List issued by the U.S. Fish and Wildlife Service (List #CONS-250c, issued July 8, 2010) identifies one ESA listed fish species as potentially occurring within the ESA action area. This is:

- Bull trout (Threatened) (Federal Register 63FR31647)

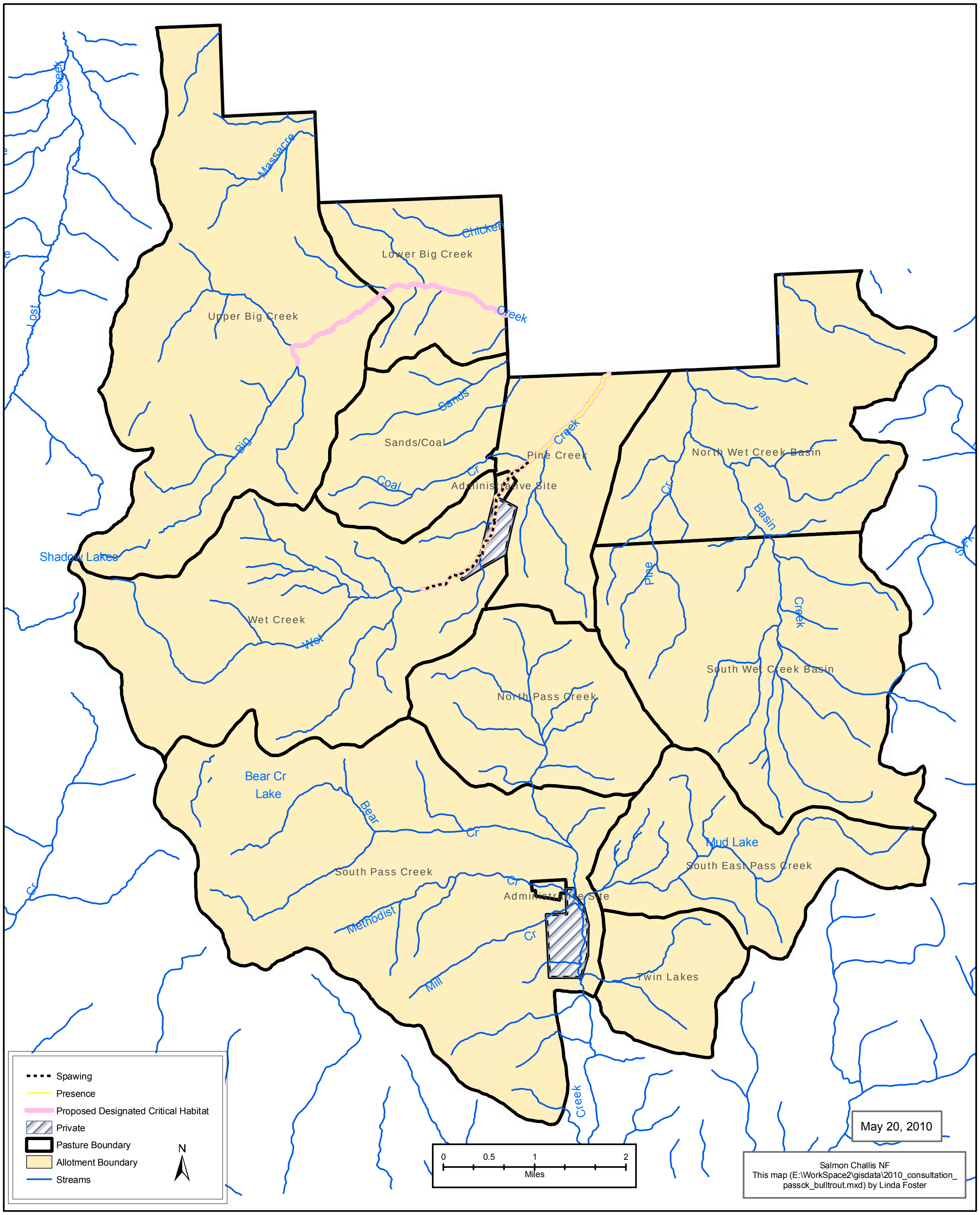
Bull trout are present throughout the ESA action area (Gamett 1999, Garren et al. 2008, Gamett and Bartel 2008) (Figure 4).

5.2 CRITICAL HABITAT

Critical Habitat was designated for bull trout on September 26, 2005 (Federal Register 70FR56212). Currently the USFWS has published a public notice in 2010 (Federal Register 75FR2270) that is proposing to revise the designated critical habitat. While the action area does not contain any currently designated critical habitat, it does contain proposed critical habitat.

This Biological Assessment will assess the potential impact to the Primary Constituent Elements (PCEs) of bull trout proposed critical habitat. These are defined on page 2360 of the referenced Federal register notice. Because these elements are important to the analysis determination for bull trout this Biological Assessment analyzes the potential impacts to the PCEs as they relate to the ESA Action Area (Appendix D).

Figure 4 – Bull Trout



6 ENVIRONMENTAL BASELINE DESCRIPTION

The action area is within the Wet Creek 5th Field HUC (5th Field HUC: 1704021705) and the Middle Big Lost River 5th Field HUC (5th Field HUC: 1704021806) (Figure 3). The Baseline Matrices of Diagnostic Pathways and Indicators for the Wet Creek sub-watershed is provided in Appendix B. The Middle Big Lost River does not contain listed fish. Therefore, the baseline matrix for the Middle Big Lost River sub-watershed is not provided.

Below is a general summary of baseline conditions within the action area. While the baseline matrix included in Appendix B reflects aquatic/riparian condition and trend at the watershed scale, the baseline descriptions provided below focus only on baseline conditions within the action area. This is done to focus analysis emphasis on those habitat parameters most likely to be influenced by grazing activities and set the context for analyzing the effects of the proposed action on these conditions. As these characterizations reflect the more localized site-specific conditions of the action area, identified condition and/or functionality assessments may vary from those identified for the larger watershed-scale baseline (Appendix B).

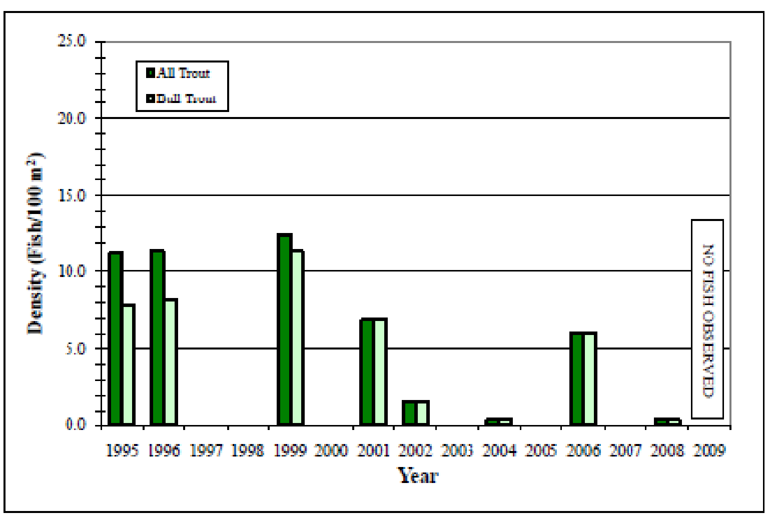
6.1 GENERAL DESCRIPTION OF LISTED FISH POPULATIONS

This section provides a general description of the distribution, status, and trend of listed fish populations within the action area.

Although bull trout are widely distributed in the Lost River drainage, their distribution is fragmented (Gamett 1999). In 1999, Gamett described bull trout as only occurring in the upper reach of Big Creek and Wet Creek within the Pass Creek Allotment. In these streams, bull trout populations were highly localized making the detection of bull trout extremely difficult even with intensive sampling efforts. Currently within the Pass Creek Allotment, bull trout occupy Wet Creek from the Forest Service boundary upstream about 3 miles, ending within a Forest Service grazing enclosure. Bull trout spawning occurs in Wet Creek from Coal Creek up to the headwaters of Wet Creek (Figure 4). Monitoring of bull trout populations in Wet Creek indicate that the numbers and distribution of bull trout are on a downward trend and no bull trout were found in 2009 (Figure 5).

Big Creek, a tributary to Wet Creek, at one time supported the primary bull trout population of bull trout in the watershed. The Forest has not documented bull trout in Big Creek since 1998 and considers Big Creek unoccupied. The Forest electrofished for bull trout in Big Creek in 1999, 2002, and 2006 and did not detect bull trout in its sampling efforts. The Forest found predominantly rainbow and brook trout in Big Creek.

FIGURE 5 – BULL TROUT DENSITY TREND IN WET CREEK (GAMETT 2009, SOUTH ZONE BULL TROUT MANAGEMENT INDICATOR SPECIES MONITORING REPORT)



6.2 GENERAL DESCRIPTION OF HABITAT CONDITIONS

This section provides a general description of the status and trend of bull trout habitat within the action area. More specific information on habitat conditions, including specific habitat data, is provided later in this section and in Appendices B and C.

Habitat within the allotment is in relatively poor condition. Impacts associated with anthropogenic activities have impacted some areas. Past monitoring and management efforts of aquatic habitats have focused on larger streams with smaller more isolated habitats receiving less attention. A review of small isolated streams within the action area was conducted in the fall of 2008 (Gamett 2009). This review found that areas within this allotment were significantly impacted by livestock grazing. Grazing management was changed for the 2009 grazing season to a rest rotation system to help mitigate impacts to habitat within this allotment.

6.3 MAJOR LIMITING FACTORS

This section provides a general description of the major anthropogenic factors impacting listed fish and listed fish habitat in the action area. The biggest impacts that are currently affecting listed fish in the action area are 1) introduced brook trout, 2) reduced habitat quality associated with livestock grazing.

6.4 GRAZING FOCUS INDICATORS

A Framework to assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Subpopulation Watershed Scale is a tool that was developed to assist in describing the condition of watersheds and streams which listed Chinook salmon, steelhead, and bull trout depend on (Appendix 9 in Lee et al., 1997). It is commonly referred to as the Matrix of Pathways and Indicators, and at its most basic level, is a table which identifies the important elements or indicators of listed salmonid habitat. This table assists biologists to consistently organize and assess current conditions and evaluate how those indicators may be impacted by a proposed action (Lee et al. 1997). The Forest has included a matrix for this allotment in Appendix B. Because the Matrix of Pathways and Indicators was developed to operate at several spatial scales (Lee et al. 1997) the Forest has selected six indicators from the matrix table as their "focus indicators" and the analysis of livestock impacts to fish and designated habitat will be based on these focus indicators. The focus indicators are 1) spawning and incubation, 2) temperature, 3) sediment, 4) width: depth ratio, 5) streambank condition, and 6) riparian conservation areas. These are the indicators that the Forest can easily monitor, have the most specificity with a long running data sets, and most closely reflect the aquatic/riparian baseline pathway and indicator elements considered most likely to be impacted by grazing activities within a watershed.

The Forest has utilized this "Focus Indicator" set to characterize the condition of the habitat for listed fish species in the occupied streams in this allotment. If stream specific information is not available, then observational information or information from similar streams was used. If one (or several) of the focus indicators showed a habitat condition was potentially limiting the ability of listed fish species to thrive; the Forest presented an opinion of the most likely causal factor for that limiting condition. By identifying those potentially limiting factors, the Forest and the Service can focus their analysis on the specific indicators.

These indicators encompass the recently published proposed bull trout critical habitat, and therefore our analysis of these elements will serve as an analysis of impacts to designated and proposed critical habitat.

A description of the condition of the Focus Indicators within the action area is provided below.

6.4.1 SPAWNING AND INCUBATION:

Bull trout appear to spawn only in Wet Creek. Available data indicate that bull trout spawn in a total of 0.76 miles within Wet Creek (Figure 4, Table C2 and C3). Bull trout begin spawning on the allotment as early as late August (Lost River Ranger District, unpublished data). The Salmon-Challis National Forest has established August 15 as the date on which bull trout may begin spawning unless site specific information clearly indicates a later date is appropriate.

6.4.2 WATER TEMPERATURE

The resource objective for water temperature is to have a maximum water temperature, as expressed by the 7-day moving average of daily maximum temperatures (7DMMAX), below 15°C within adult holding habitat and below 8.9°C within spawning and rearing habitat. Within this allotment, adult holding habitat is considered to be the lower portions of Wet Creek near the allotment boundary. Upper reaches of Wet Creek occupied by bull trout are considered to be spawning and rearing habitat.

Water temperatures in 2009 in Big Creek met the resource objectives of 7DMMAX below 15.0°C (Figure C1, Table C4) for adult holding, but exceeded the 8.9°C within spawning and rearing habitat. The 7DMMAX was 14.7 and 12.4°C. Prior years in Big Creek have exceeded the resource objective six out of 12 years.

The stream temperature resource objective for the lower portion of Wet Creek is to have a 7DMMAX below 15.0°C. Water temperatures in this area of Wet Creek in all years monitored exceeded the resource objective (Figure C1, Table C4). The stream temperature resource objective for the upper portions of Wet Creek is to have a 7DMMAX below 8.9.0°C due to spawning habitat. All years monitored exceed the resource objective (Figure C1, Table C4) including in 2009 where the 7DMMAX was at 14.8 and 11.0°C.

It should be emphasized that stream temperatures were likely relatively low in 2009. The summer of 2009 was a relatively wet, cold year and this likely resulted in relatively low stream temperatures compared for drier, warmer years. Subsequently, it is likely that stream temperatures throughout this allotment will be somewhat warmer in “normal” or relatively warm, dry years compared to those observed in 2009 as data has shown (Figure C1, Table C4).

Stream temperatures likely exceed the resource objective for a variety of reasons. First, the resource objective may be lower than stream temperature would be naturally. Second, livestock grazing may be having some minor impacts on stream temperatures in some areas.

6.4.3 SEDIMENT

The resource objective for sediment is to have less than 20% fines (< 0.25 inches in diameter). Sediment levels exceed the resource objective in some areas on the allotment. In 2003, the Forest Service evaluated surface fines in several stream reaches in the Pass Creek Allotment (Table C5). Surface fines exceeded 20% in some areas evaluated including sites on Coal Creek and Wet Creek. The Forest Service has also collected depth fine data for several years from various streams on the allotment (Figure C1, Table C6). In 2009, depth fines exceeded 20% in Wet Creek and in Big Creek in 2008. The elevated sediment levels found in streams on this allotment have likely contributed to from livestock grazing.

6.4.4 WIDTH: DEPTH RATIO

The resource objective for width:depth is to have a width:depth ratio of less than 21 in A channel types, 27 in B channel types, and 28 in C channel types. There is very little width:depth data on this allotment. In 2009, the Forest Service evaluated width:depth ratios at several locations on this allotment using the MIM protocol (Figure C1, Table C8). Width:depth ratios meet the resource objective on most of the allotment, but exceed the objective within the Pine Creek Unit on an unnamed tributary. It is likely that livestock grazing has contributed to the high width:depth ratio observed in this stream.

6.4.5 STREAMBANK CONDITION

The analysis of streambank condition focuses on streambank stability. The resource objective for bank stability on this allotment is to have bank stabilities of 90% or greater. Bank stabilities are below the resource objectives in most areas on the allotment. In 2009, the Forest Service evaluated bank stability at several locations on this allotment using the MIM protocol (Figure C1, Table C8). Bank stabilities were 62% and 88% in the Pine Creek Unit on an unnamed tributary, and 74% and 79% within the Pine Creek Unit on Wet Creek and 87% on Wet Creek within an exclosure. Bank stabilities were 63% in the Wet Creek Unit on Wet Creek outside of the exclosure.

The Upper Big Creek Unit had bank stabilities of 46% and 79% on Big Creek. The 46% is now within an exclosure. It is unclear as to why the stability is so low in the exclosure, but it isn't due to effects of livestock. Bank stabilities were 65% and 46% in the Lower Big Creek unit.

The Forest data (Figure C1, Table C7) shows bank stabilities that are meeting the Forest bank stability objective. These sites were not chosen to represent grazing management within the Pass Creek Allotment, but do show there are some locations that are meeting the objective.

Livestock grazing has likely contributed to bank stabilities not meeting the resource objective across the allotment.

6.4.6 RIPARIAN CONSERVATION AREAS

The analysis of riparian conservation areas focuses on greenline ecological status and woody species recruitment. The resource objective for greenline ecological status is to have a greenline ecological status of 61 or greater. In 2009, the Forest Service evaluated greenline ecological status at several locations on this allotment using the MIM protocol (Figure C1, Table C8). There are four units in the Pass Creek C&H Allotment where livestock grazing could affect either occupied or proposed designated critical bull trout habitat. In recent history bull trout have been located in Wet Creek within the Pine Creek and Wet Creek units, although no bull trout were observed in either unit in 2009. Big Creek, which runs through Lower and Upper Big Creek units, is proposed designated bull trout critical habitat, but is not currently occupied habitat (Figure 4).

The greenline ecological status (GES) measured at 12 different sites across the four units rated late seral or PNC except in two locations – one was in the Upper Big Creek Unit inside an exclosure (early seral) and the other was in an unnamed tributary in the Pine Creek Unit (mid seral).

The resource objective for woody recruitment is to develop and maintain healthy woody plant populations. This objective can be evaluated by examining the total density of woody species, the density of seedlings and young, and the percentage of woody plants that are seedlings and young. In 2009, the Forest Service evaluated these parameters on this allotment using the MIM protocol (Table C8). Woody regeneration is adequate along Wet Creek in both Pine Creek and Wet Creek units where livestock have access. Woody regeneration is adequate along most of Big Creek but there are areas where it might be improved, therefore a 30% browse annual indicator will be implemented.

<u>Pine Creek Unit</u>

Wet Creek 1 (WC1 or M163): M163 is at the lower end of the Pine Creek Unit on Wet Creek. Greenline Ecological Status (GES) for this site is at PNC (88) and was collected using the MIM method. Compared to the existing Winward 2000 data the trend at this site is static for GES. Bank Stability was collected at this site using the MIM method and yielded 74% stable banks while bank stability data collected by the Forest Hydrology crews found 92% stable banks with a static trend just downstream of the M163 monitoring site. Woody regeneration at this site has approximately a 1:1 ratio between young and mature plants, providing adequate woody recruitment for the site.

Wet Creek 2 (WC2 or M164): M164 is located at the DMA below the Pass Creek Rider's Camp. GES is at PNC (99) using MIM and has been improving since the site was established in 1993 (Mid-Seral 54) using Winward. MIM stability shows 59% stable banks, however approximately 0.5 miles upstream Forest Hydrology crew's stability data shows 94% stable banks in 2007 with a static trend at that time. Hydric plant species dominate the greenline at this site and woody regeneration shows a 3:2 ratio of young to mature woody plants providing adequate recruitment for the site.

Unnamed Tributary to Wet Creek 2 (UNT2 or M154): M154 is approximately 0.75 miles up the Unnamed Tributary that lies to the East of Wet Creek. GES is at Mid-Seral (45) using MIM and is trending downward from 2006 (Late-Seral 68) using Winward 2000. MIM stability shows 62% stable banks. Woody regeneration shows almost a 2:1 ratio of young to mature woody plants providing adequate recruitment for the site.

Unnamed Tributary to Wet Creek 3 (UNT3 or M155): M155 is approximately 1 mile up the Unnamed Tributary that lies to the East of Wet Creek. GES is at PNC (99) using MIM and is in a static trend from 2006 using Winward 2000. MIM stability shows 88% stable banks. Woody regeneration shows approximately a 3:2 ratio of young to mature woody plants providing adequate recruitment.

Wet Creek Unit

Wet Creek 3 (WC3 or M166): M166 is located above the Pass Creek Rider's Camp on Wet Creek, inside of an exclosure. GES is at PNC (100) using MIM and is in a static trend from 2002 using Winward 2000. MIM stability shows 87% stable banks. Woody regeneration shows approximately a 4:1 ratio of young to mature woody plants providing adequate recruitment for the site.

Wet Creek 4 (WC4 or M167): M167 is located above the Pass Creek Rider's Camp on Wet Creek, inside of an exclosure. The latest data on WC4 was collected in 2005 using Winward 2000 showing GES is at Late-Seral (68). There is no bank stability data for M167. Woody regeneration showed approximately a 1:4 ratio of young to mature woody plants in 2005 which seems low but it is not a product of cattle grazing given that the monitoring site is within an exclosure.

Wet Creek 4a (WC4a or M168): M168 DMA is located approximately 0.5 miles above M167, outside of the exclosure on Wet Creek. GES is at Late Seral (77) using MIM and is in a static trend from 2005 using Winward 2000. MIM stability shows 63% stable banks. Woody regeneration shows approximately a 1:1 ratio of young to mature woody plants providing adequate recruitment for the site. The implementation monitoring attributes of greenline stubble height and stream bank alteration will be used. The endpoint indicator values of 6 inches of stubble height and 15% streambank alteration will be implemented.

Wet Creek 5 (WC5 or M169): M169 is located approximately 0.3 miles above M168 on Wet Creek. The latest data on M169 was collected in 2005 using Winward 2000 showing GES is at Early-Seral (31) which shows a static trend from 2002 data. There is no bank stability data for M169. Woody regeneration data shows approximately a 2:3 ratio of young to mature woody plants in 2005 which is static from the 2002 data and is providing adequate woody recruitment.

Lower Big Creek Unit:

Lower Big Creek (BC6 or M163): M163 is located approximately 100 yards above the Forest boundary fence. The GES has varied from 82 (LS) in 1999 to 58 (MS) in 2005, both using Winward and back up to 70 (LS) in 2009 using MIM. The first streambank stability reading using MIM was in 2009 and rated 46%. The Forest hydrologist installed a monitoring site upstream but fairly close to this monitoring site and stability rated at 96%. The lower rating at M163 could be attributed to the close proximity to the fenceline. Woody regeneration is about 1:1 and with a significant increase in young plants since 1999.

Lower Big Creek (BC5 or M145): This is the designated monitoring area for the Lower Big Creek Unit. It is located 10-20 feet below Foot Bridge on Big Creek Trail. GES is at static at LS condition. Woody species regeneration is just off the greenline, with 5 percent young to mature. Stream bank stability rated at 65%. Bank alteration is at 17 percent. The monitoring attributes of greenline stubble and woody species use will be used with the endpoint indicators at 4 inches and woody use at 30 percent.

Upper Big Creek Unit

Upper Big Creek (BC3 or M162): This is the DMA for the Upper Big Creek Unit and is located below a large beaver pond. GES has remained at LS over the last 10 years varying from 91 to 78, but was read at 82 in 2009 using the MIM protocol. Woody regeneration is approximately 1:2 which has been consistent for the last several years and is adequate. Streambank stability was rated at 79%.

Upper Big Creek (BC2 or M161): This site is located above M162 inside an exclosure about 50 yards below the upper fence. The GES has remained in early seral since 1999, all that time it was within the exclosure. It does get heavy elk use but they don't seem to be affecting the stream conditions to any large extent. Stream bank stability is at 46% and the woody regeneration is similar to M162 at 2:1. Conditions at this site cannot be attributed to livestock since it has been excluded, fairly effectively, from livestock for the last 10 years.

6.4.7 ANNUAL USE INDICATORS AND OBJECTIVES AND THEIR RELATIONSHIP TO FOCUS INDICATORS

Annual use indicators were selected because of their documented ability to maintain and/or achieve riparian objectives described in section 3.2.5. There is considerable overlap; the riparian system effectively integrates vegetation cover, flow regimes, sediment and nutrients (DeBano 1989). The goal is to manage livestock grazing so as not to prevent the attainment and maintenance of healthy aquatic and riparian communities (Gamett et al 2008).

TABLE 2 – RELATIONSHIP MATRIX

Focus Indicator	Riparian Resource Objective	Related Element Affected by Livestock Grazing	Related Annual Use Indicator
Streambank Condition	Greenline Successional Status	Greenline Status	Greenline Stubble
	Woody Species Regeneration	Woody Species Regeneration	Browse Use
	Bank Stability	Greenline Status, Woody Species Regeneration, Current Year Alteration	Stubble Height, Browse Use, Bank Alteration
Temperature	Water Temperature	Greenline Status, Woody Species Regeneration, Vegetation Overhang	Greenline Stubble, Browse Use, Bank Alteration
Width:Depth	Width:Depth Ratio	Greenline Status, Current Year Alteration	Greenline Stubble, Browse Use, Bank Alteration
Sediment	Sediment	Greenline Status, Bank Stability, Current Year Alteration	Greenline Stubble, Browse Use, Bank Alteration
Riparian Conservation Areas	Greenline Successional Status	Greenline Status	Greenline Stubble
	Woody Species Regeneration	Woody Species Regeneration	Browse Use
	Bank Stability	Greenline Status, Woody Species Regeneration, Current Year Alteration	Stubble Height, Browse Use, Bank Alteration
Spawning and Incubation	N/A	N/A	N/A

Livestock will affect riparian vegetation and physical conditions differently depending on many factors, including the site's physical characteristics and conditions, the stage of plant development, the nature of the plant communities in both the riparian zone and the uplands, and current weather. There are tradeoffs in potential impacts with regard to time of grazing (Erhart and Hansen 1997). These are grazing and livestock management considerations, and while important to implementing sound riparian grazing management, are generally excluded from the following discussion.

The focus of this section is on the annual use indicators and how managing by them will help maintain or achieve the riparian resource objectives and grazing focus indicators.

Annual Use Indicators and Vegetation in Riparian Areas. How much and what type of vegetation exists in a riparian plant community, particularly on the greenline, determines how well the riparian system performs its function of reducing flow velocity, trapping sediment, building banks and protecting against erosion. The susceptibility of streambanks to damage is influenced by vegetation. Woody vegetation has an essential role in maintaining riparian function; reducing browsing pressure on riparian trees and shrubs is a significant benefit. Roots and rhizomes of herbaceous vegetation provide much of the compressive strength and soil stability for streambanks in meadow situations such as on the Challis National Forest (Clary and Kinney 2000).

Streamside vegetation strongly includes the quality of habitat for anadromous and resident coldwater fishes including shade to prevent adverse water temperatures fluctuations, roots that lend stability to overhanging banks, and the capability to filter sediment and debris (Kauffman and Krueger 1984).

Stubble height on the greenline is directly related to the health of herbaceous plants (Burton et al 2008). Dense vegetation on the floodplain during spring flooding events to trap sediment plus vigorous plant growth to stabilize sediment deposits is critical for bank building and maintenance. Residual herbaceous vegetation of six inches in a 20 year comparison study in southwestern Montana resulted in dense vigorous riparian vegetation as well as a diversity of age classes of vigorous woody riparian species (Myers 1989). In Idaho, maintaining stubble heights of 4 to 5.5 inches allowed streambank recovery (Clary 1999). Shorter stubble heights (up to six inches) are most effective in improving sediment entrapment during the deposition phase while even longer lengths retain a larger portion of deposited sediment (Clary and Leininger 2000). Four inch stubble in either late June or early July resulted in no difference in bank angle or stream width compared to no grazing in the Sawtooth Valley (Clary and Kinney 2000).

Most measurements of streamside variables moved closer to those beneficial for salmonid fisheries when pastures were grazed to four inches of graminoid stubble height; virtually all measurements improved when pastures were grazed to six inches stubble height, or when pastures were not grazed (Clary 1999). The residual stubble or regrowth should be at least four to six inches in height to provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, bank and sediment entrapment (Clary and Webster 1989). This is a recommended grazing practice for "B" channel types with medium to fine easily eroded soil materials and most "C" channel types, in mid seral conditions. Special situations may require stubble heights of greater than six inches (Clary and Webster 1989, Myers 1989).

Cattle are destructive to willow stands when they congregate in them (Kovalchik and Elmore 1991, Schulz and Leininger 1990). When herbaceous forage quality diminishes, by either utilization or curing, cattle switch from grazing to browsing (Hall and Bryant 1995, Clary and Leininger 2000). The degree to which browsing of willows is compatible with maintaining willow stands depends on the relative number of willows present. Where willow browsing is light and seedling survival is high the vigor of willows is high. (Kovalchik and Elmore 1991). There is a loop between vigorous willow [and sedge] regrowth, excellent streambank protection and soil and water relationships favorable to continued willow [and sedge] production (Kovalchik and Elmore 1991).

Resistance of common riparian woody plants to defoliation has not been investigated. However, genera commonly represented in riparian areas such as dogwood, maple, cottonwood, willow and birch appear to be more resistant to foliage and twig removal than genera common to xeric uplands (Clary and Webster 1989). Many upland species can tolerate 50 – 60% use, including desirable browse species such as antelope bitterbrush, rose and aspen (Ehrhart and Hansen 1997). Less than half of heavily clipped or browsed willow stems survive into the following year (Smith 1980 and Kindschy 1989 as cited in Kovalchik and Elmore). Willow use is most critical (most likely to occur) when grazing extends into the hot summer season or fall (Myers 1989, Clary and Webster, 1989, Kovalchik and Elmore 1991). Removing cattle before 45 - 50% forage use improves the response of willows (Edwards 2009, Kovalchik and Elmore 1991). The Bureau of Land Management has concluded that exceeding 50% use of current year browse leaders would likely reduce woody vegetation vigor, modify normal growth form, and in the longer-term diminish the age class structure, all of which could affect riparian habitat conditions. Where there is current upward trend of ecological condition it is expected to continue by managing for no more than 50% browse use (USDI BLM 2009).

A study on Stanley Creek in central Idaho (Clary and Kinney 2000) applied three levels of forage use - moderate (50%), light (25%) and no grazing - on mountain meadows in the last half of June. Results were an increase in willow height and cover. Other studies cited in Clary and Kinney show that by maintaining an adequate herbaceous forage supply, and controlling the period of grazing, impacts on the willow community are reduced.

Annual Use Indicators and Streambank Alteration. Grazing along streambanks does as much or more damage to stream-riparian habitats through bank alteration as through changes in vegetation biomass. Overuse by cattle can easily destabilize and break down streambanks as vegetation is weakened and hoofs shear bank segments (Clary and Kinney 2000). A major resource management need is to consider the maintenance of streambank structure and channel form as key factors in fisheries habitat and hydrologic function.

It is widely known that bank alteration by trampling, shearing, and exposure of bare soil can be an important source of stream channel and riparian area degradation (Clary and Webster, 1989, Belsky et al., 1999). Impacts of bank alteration may include channel widening (and loss access to floodplains by peak flows), loss of riparian vegetation (which then makes banks more vulnerable to further erosion), localized lowering of water tables in riparian areas (and loss of water storage in floodplains and stream channels), and changes in sediment transport capacity of stream channels (Clary and Webster 1989).

Literature such as Clary and Webster (1989) often refers to the indirect effect on streambank trampling. A number of other authors who reviewed the literature summarized that careful control of grazing duration and season results in maintenance of the streambank vegetation and limitation of trampling, hoof slide, and accelerated streambank cave-in (Erhart and Hansen 1997, Clary and Leininger 2000).

Some researchers have concluded that bank alteration, taking natural channel stability into account, is the most important factor to consider in evaluating physical stream channel conditions and impacts from land use. Streambank alterations of 20% or less are expected to allow for upward trend of streams with stream widths narrowing and depths increasing (Bengeyfield, 2006).

In southwestern Montana, stream channels narrowed and deepened when streambank disturbance from cattle did not exceed 30 feet per 100 feet of stream reach (Dallas 1997 cited in Mosley et al., 1997). Based on Cowley's literature review, "it appears that 70 percent unaltered streambanks (i.e., 30 percent altered streambanks) is the minimum level that would maintain stable conditions. All of [the] authors consider both natural and accelerated alteration in the totals". Cowley suggested that 80% unaltered streambanks should allow for "making significant progress" toward stream channel improvement, and that this value should be the maximum allowable streambank alteration (Cowley 2002 cited in Simon 2008).

7 ANALYSIS OF EFFECTS

This section contains the effects analysis. The effects of the proposed action are described below and summarized in Table 4. The analysis emphasizes the expected effects of the proposed action on the six focus indicators.

7.1 DIRECT AND INDIRECT EFFECTS

Direct effects are those effects that are a direct result of the action. Indirect effects are "caused by the proposed action and are later in time, but still are reasonably certain to occur" (50 CFR§402.02).

Direct effects of livestock grazing may occur when livestock enter streams occupied by listed salmonids to loaf, drink, or cross the stream. Livestock entering fish-spawning areas can trample redds, and destroy or dislodge embryos and alevins (Belsky et al. 1997, Gamett et al. 2009).

Improperly managed grazing can additionally have adverse indirect effects to streams and riparian areas (Menke 1977; Clary and Webster 1989; Belsky et al. 1997). These effects can include modifications to stream temperatures, sediment levels, width:depth ratios, bank stability, and riparian vegetation.

A variety of conservation measures can be implemented to minimize or eliminate potential grazing related effects to listed fish and their aquatic and riparian habitats. These include:

- Fencing: Fencing sensitive riparian areas can be an effective way of protecting riparian resources, fish habitat and fish populations. Platts (1991) found that, in 20 of 21 studies, stream and riparian habitats improved when grazing was prohibited in fenced riparian zones.
- Off-Stream Water Development: McInnis and McIver (2001) found that off-stream water and salt can attract cows to the uplands enough to significantly reduce uncovered and unstable streambanks,
- Utilization Standards: Establishing utilization standards for forage utilization and moving livestock when these standards are approached or reached, can help avoid many of the adverse effects that livestock grazing can have on fish and their habitat.

The likely impacts of the proposed action on the six grazing focus indicators are discussed below.

7.1.1 SPAWNING AND INCUBATION

Livestock wading through streams can step on salmonid redds (Gregory and Gamett 2009, Ballard and Krueger 2005a, Ballard and Krueger 2005b). This process has been referred to as redd trampling (Gregory and Gamett 2009) and may result in the death of eggs and alevines which are developing in the gravel. Gregory and Gamett (2009) estimated that livestock grazing under routine conditions on national forest lands could trample up to 78% of bull trout redds. This level of trampling could result in a significant reduction in egg and alevin survival and could significantly reduce the size of the bull trout population.

The proposed action will result in livestock trampling bull trout redds. Bull trout spawn in the Wet Creek and Pine Creek Units and it is believed that they begin spawning in these areas sometime after August 15. The densities of bull trout in Wet Creek have declined to no fish found within this creek during 2009. The reason for the decline is unknown.

There are approximately 0.76 miles of bull trout spawning available in Wet Creek on the allotment. This does not account for available spawning areas on private lands and the spawning area within the Administrative Site (Figure 2). Livestock are excluded from .47 miles of this habitat due to exclosures within the Wet Creek Unit. This leaves no unprotected spawning habitat within the Wet Creek Unit. Livestock will be present within this Unit for up to 2 weeks three out of six years. The chance of livestock trampling bull trout redds is very low and discountable within the Wet Creek Unit due to the exclosure. There will also be no trailing effects to bull trout redds in this unit because trailing through this unit will not take place after August 15.

The Pine Creek Unit has approximately 0.29 miles of bull trout spawning habitat available. This habitat is not within an exclosure and has livestock present within this unit for up to 2 weeks three out of six years after August 15th. Livestock will not trail through this unit at any time after August 15.

7.1.2 WATER TEMPERATURE

Stream temperatures can have a significant impact on bull trout distribution and abundance. Gamett (2002) evaluated the relationship between bull trout distribution and abundance in the Little Lost River basin and found that bull trout were always present in stream reaches where the July-September mean temperature (JSMT) was less than 10.0°C but were never present where the JSMT was greater than 12.0°C. This work also found that bull trout densities (fish >70mm/100 m^2) were highest where the JSMT was 7.0-7.9°C but dropped sharply as the JSMT increased. Specifically, mean bull trout density was 15.0 fish/100 m^2 where the JSMT was 7.0-7.9°C, 10.1 fish/100 m^2 where the JSMT was 8.0-8.9°C, 1.6 fish/100 m^2 where the JSMT was 9.0-9.9°C, 0.4 fish/100 m^2 where the JSMT was 10.0-10.9°C, 0.1 fish/100 m^2 where the JSMT was 11.0-12.0°C, and 0.0 fish/100 m^2 where the JSMT was greater than 12.0°C. This work suggests that even small increases in stream temperature could result in dramatic decreases in bull trout abundance.

Livestock grazing can modify stream temperatures (Armour et al. 1994). Stream temperatures are controlled by a complex interaction between stream shading, width:depth ratio, ground water input, water volume, air temperature, and source water temperature. Livestock can have significant impacts on stream shading, width:depth ratios, groundwater input, and water volume and through these mechanisms they can impact stream temperatures. Subsequently, summer stream temperatures are often higher in grazed areas compared to ungrazed areas (Platts 1991). Isaak and Hubert (2001) found that cattle density was inversely related to maximum summer stream temperatures. Stream temperature modeling completed by Gamett (2002) indicated that changes in water temperature brought about by modifications to streamside shading could have significant impacts on bull trout populations. This work evaluated how water temperature and bull trout abundance might change in a hypothetical stream typical of some streams in the Little Lost River basin when stream shade was reduced from 90% to 10%. This work found that such a change could increase the maximum water temperature observed on August 1 from 10.4°C to 21.6°C and that such a reduction would reduce the probability of bull trout being present from 100% to 6% and would reduce the number of salmonids that were bull trout from 88% to 7%.

Although biologists typically consider the effects of livestock grazing on summer stream temperatures, the impact of livestock grazing on winter temperatures should not be overlooked. While livestock grazing can result in higher summer stream temperatures it can also cause lower stream temperatures in the winter (Armour et al. 1994). This can occur when livestock grazing results in a loss of cover or when livestock grazing increases the width:depth ratio thereby increasing the surface:volume ratio. Either of these affects can reduce the ability of a stream to buffer itself against cold winter air temperatures and can lead to increased icing and a subsequent loss of habitat.

Livestock grazing has likely resulted in elevated summer stream temperatures on this allotment. Stream temperatures currently exceed resource objectives across the allotment and it is likely that livestock grazing is at least partially responsible for these high stream temperatures. Livestock grazing on this allotment has likely modified stream channels and riparian vegetation along several streams in a manner that has resulted in increased stream temperatures. For example, livestock grazing appears to have modified the riparian vegetation and stream channel in Coal Creek in a manner that would increase stream temperatures. These impacts have likely resulted in a small, but measurable, increase in stream temperature in these streams. The work completed by Gamett (2002) suggests that even small increases in summer stream temperature can reduce bull trout abundance in streams. Therefore, it is likely that the small increases in stream temperature that have resulted from livestock grazing on this allotment have reduced the ability of streams to support bull trout. Furthermore, such increases in stream temperature may lead to situation in which brook trout are able to replace bull trout (Gamett 2002). Subsequently, the increases in stream temperature associated with livestock grazing could result in brook trout expanding into additional streams on this allotment where they may eventually replace bull trout.

While livestock grazing has likely increased stream temperatures on this allotment, the proposed action will likely not lead to any additional increases in water temperature. The proposed action 1) allows livestock to graze to a stubble height of four inches in all units except a portion of the Wet Creek Unit where livestock can graze to a stubble height of 6 inches and 2) allows livestock to browse up to 50% on woody plants on all units except of portion of the Lower and Upper Big Creek Units where the browse standard is 30%. There is a 15% bank alteration within the Wet Creek Unit, but no bank alteration standard anywhere else on the allotment. This grazing system will likely result in continued impacts to features that regulate stream temperature such as stream shading and width:depth ratios. However, this grazing system is similar to the one that been used on this allotment over the last ten years. Therefore, it is expected that the effects of the proposed action on stream and riparian habitats, including stream temperature, will be similar to those that have occurred over the last ten years. Therefore, while grazing has and will likely continue to impact stream temperatures, this impact is not expected increase under the proposed action.

7.1.3 SEDIMENT

Increased sediment in streams can reduce the survival of salmonid eggs and alevins that are incubating in the stream substrate. For example, Reiser and White (1988) evaluated the impact of fine (<0.84 mm) and coarse (0.84-4.6 mm) sediment on the survival of Chinook salmon and steelhead eggs in the laboratory. They found that the survival of steelhead eggs was about 85% when fine sediment was 0% but when fine sediment was 10% survival dropped to about 25%. Almost no eggs survived when fine sediments were 30%. With Chinook salmon eggs, they found that the survival was about 65% when fine sediment was 0% but that survival was only about 10% when fine sediment was 10%. Like the steelhead, almost not eggs survived when fine sediments were 30%. Experiments with course sediments also showed a sharp decline in the survival of both Chinook salmon and steelhead eggs as sediment levels increased from 0 to 30%. Similarly, Phillips et al. (1975) found that the survival of steelhead and coho salmon eggs dropped sharply as the amount of fines (1-3 mm) in the substrate increased. Although data relating to relationship between sediment and the survival of bull trout eggs are not available, increased sediment levels undoubtedly reduces the survival of bull trout eggs.

Sediment can also have impacts on trout abundance. For example, Watson and Hillman (1997) found that bull trout densities were negatively correlated with the amount of surface fines (< 2 mm). Similarly, Zoellick and Cade (2006) found that redband trout densities in southwestern Idaho were often greater than 40.0 fish/100 m^2 where surface fines (< 2 mm) were less than 20% but that densities were never greater than 40.0 fish/100 m^2 when surface fines were greater than 40%.

Livestock grazing can significantly increase stream sediment levels. This is done through impacts to upland vegetation thereby increasing sediment generated from the uplands and by impacts that reduce bank stability thereby increasing sediment generated by bank erosion. Subsequently, streams in grazed areas typically have more fine sediment than streams in ungrazed areas (Platts 1991). Lusby (1970) evaluated sediment production in grazed and ungrazed watersheds in Colorado and found that sediment production was about 45% less in ungrazed watersheds compared to grazed watersheds. Dahlem (1979) studied changes in stream sediment levels following the elimination of cattle grazing in the Mahogany Creek watershed in Nevada. He found that just two years after livestock were removed from the watershed, the amount of stream bottom covered by silt had declined from 27% to 11% and that spawning gravels increased from 52% to 70%. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years. They found that the substrate in sections of the stream that were grazed was 22% silt whereas the substrate in sections of stream that had not been grazed for four years was just 13% silt. Since livestock grazing can lead to increased sediment levels in streams and subsequently impact fish populations it is important to consider the effect of livestock grazing on stream sediment levels.

Livestock grazing has likely resulted in elevated sediment level on this allotment. Sediment levels currently exceed resource objectives in both Big Creek and Wet Creek and it is likely that livestock grazing is at least partially responsible for these high sediment levels. Livestock grazing on this allotment has likely modified upland vegetation, riparian vegetation, and stream banks along both Big Creek and Wet Creek in a manner that has resulted in increased sediment levels. For example, livestock grazing appears to have modified riparian and stream channel habitats in an unnamed tributary to Wet Creek in a manner that would increase sediment levels (Figure 7). These impacts have likely resulted in measurable increases in sediment levels in these streams which have likely reduced the ability of these streams to support bull trout.

While livestock grazing has likely increased sediment levels on this allotment, the proposed action will likely not lead to any additional increases in sediment. The proposed action 1) allows livestock to graze to a stubble height of four inches in all units except a portion of the Wet Creek Unit where livestock can graze to a stubble height of 6 inches and 2) allows livestock to browse up to 50% on woody plants on all units except of portion of the Lower and Upper Big Creek Units where the browse standard is 30%. There is a 15% bank alteration within the Wet Creek Unit, but no bank alteration standard anywhere else on the allotment. This grazing system will likely result in continued impacts to features that affect sediment levels such as riparian vegetation and bank stability. However, this grazing system is similar to the one that been used on this allotment over the last ten years. Therefore, it is expected that the effects of the proposed action on stream and riparian habitats, including sediment, will be similar to those that have occurred over the last ten years. Therefore, while grazing has and will likely continue to impact sediment levels, this impact is not expected increase under the proposed action.

7.1.4 WIDTH: DEPTH RATIO

Fish abundance is often negatively correlated with width:depth ratio (Lanka et al. 1987, Scarnecchia and Bergersen 1987). Kozel et al. (1989) studied several streams in Wyoming and found a negative correlation between width:depth ratio and trout biomass. Similarly, Dunham et al. (2002) studied several streams in Nevada and found that Lahontan cutthroat trout densities were often greater than 30 fish/100

m^2 when width:depths ratios were less than 20 but were generally less than 30 fish/100 m^2 when width width:depth ratios were greater than 30.

Livestock grazing can increases width:depth ratios (Platts 1991, Riedel et al. 2006). Hubert et al. (1985) compared sections of a Wyoming stream that were “heavily grazed” and “lightly grazed” and found that the width:depth ratio in the “heavily grazed” section was 43 while in the “lightly grazed” section it was just 21. On another stream they compared sections of stream that were grazed with those that had not been grazed for four years. They found that the width:depth ratio in the grazed sections was 37 whereas the width:depth ratio in the ungrazed sections was just 28.

Clary (1999) studied the effect of livestock grazing on width:depth ratios in Stanley Creek in Idaho. He evaluated the changes in width:depth ratios that occurred when grazing was changed from season long, heavy use (60-65% utilization in dry meadows) to either grazing in late June with medium use (35-50% utilization in dry meadows), grazing in late June with light use (20-25% utilization in dry meadows), and no grazing at all. He found that there was a significant decrease in width:depth ratios with all three grazing strategies but that the decrease was greatest in the areas where livestock were not grazed at all.

Overton et al. (1994) compared width:depth ratios in sections of grazed and ungrazed streams in California. In Coyote Valley Creek, they found that two rested sections of stream had width:depth ratios of 3.5 and 3.0 whereas the three grazed sections had width:depth ratios of 6.8, 7.4, and 7.6. In Silver King Creek, they found that two rested sections had width:depth ratios of 21.4 and 15.4 whereas two grazed sections had width:depth ratios of 27.7 and 16.4. Two ungrazed streams similar to Silver King Creek had width:depth ratios of 15.3 and 14.6.

Livestock grazing has likely resulted in elevated width:depth ratios in some streams on this allotment. Width:depth ratios currently exceed resource objectives in Pine Creek on an unnamed tributary and it is likely that livestock grazing is at least partially responsible for this high width:depth ratios. Livestock grazing on this allotment has likely modified riparian vegetation and stream banks along these streams in a manner that has resulted in measurable increases in width:depth ratios which has likely reduced the ability of these streams to support bull trout.

While livestock grazing has likely increased width:depth ratios on this allotment, the proposed action will likely not lead to any additional increases in width:depth ratios. The proposed action 1) allows livestock to graze to a stubble height of four inches in all units except a portion of the Wet Creek Unit where livestock can graze to a stubble height of 6 inches and 2) allows livestock to browse up to 50% on woody plants on all units except of portion of the Lower and Upper Big Creek Units where the browse standard is 30%. There is a 15% bank alteration within the Wet Creek Unit, but no bank alteration standard anywhere else on the allotment. This grazing system will likely result in continued impacts to features that affect width:depth levels such as riparian vegetation and bank stability. However, this grazing system is similar to the one that been used on this allotment over the last ten years. Therefore, it is expected that the effects of the proposed action on stream and riparian habitats, including width:depth, will be similar to those that have occurred over the last ten years. Therefore, while grazing has and will likely continue to impact width:depth levels, this impact is not expected increase under the proposed action.

7.1.5 STREAMBANK CONDITION

Bank stability can have important affects on fish populations. Zoellick and Cade (2006) found that redband trout densities in southwestern Idaho were often greater than 40.0 fish/100 m^2 in stream reaches where bank stability exceeded 80% but were rarely greater than 40.0 fish/100 m^2 when bank stability was less than 80%.

Livestock grazing can significantly reduce bank stability. This occurs when livestock modify the abundance or composition of riparian vegetation in a manner that makes the bank more vulnerable to erosion or when livestock directly impact the bank through bank trampling. Subsequently, streams in grazed areas often have lower bank stabilities than streams in ungrazed areas (Platts 1991). Riedel et al. (2006) evaluated the impact of livestock grazing on bank stability in the Nemadji River watershed in Minnesota and found that grazing “significantly reduced stream bank stability.” Overton et al. (1994) compared bank stabilities in sections of grazed and ungrazed streams in California. In Coyote Valley Creek, they found that two rested sections of stream had bank stabilities of 92.8 and 98.9% whereas three grazed sections had bank stabilities of 62.2, 45.6, and 42.5%. In Silver King Creek, they found that the two rested sections had bank stabilities of 82.4 and 63.7% whereas the two grazed sections had bank stabilities of 60.0 and 60.2%. Two ungrazed streams similar to Silver King Creek had bank stabilities of 91.5 and 100%. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years. They found that banks in grazed sections had 23% bare soil whereas banks in sections that had not been grazed for four years had just 12% bare soil. Since livestock grazing can reduce bank stability and subsequently impact fish populations it is important to consider the effect of livestock grazing on bank stability.

Livestock grazing has likely reduced bank stability in several streams on this allotment. Bank stabilities are currently well below resource objectives in Wet Creek and Big Creek. It is likely that livestock grazing is at least partially responsible for these low bank stabilities. Livestock grazing on this allotment has likely modified riparian vegetation and stream banks along these streams in a manner that has resulted in measurable reductions in bank stability which has likely reduced the ability of these streams to support bull trout.

While livestock grazing has likely reduced bank stability on this allotment, the proposed action will likely not lead to any additional reductions in bank stability. The proposed action 1) allows livestock to graze to a stubble height of four inches in all units except a portion of the Wet Creek Unit where livestock can graze to a stubble height of 6 inches and 2) allows livestock to browse up to 50% on woody plants on all units except of portion of the Lower and Upper Big Creek Units where the browse standard is 30%. There is a 15% bank alteration within the Wet Creek Unit, but no bank alteration standard anywhere else on the allotment. This grazing system will likely result in continued impacts to features that affect bank stability such as riparian vegetation. However, this grazing system is similar to the one that been used on this allotment over the last ten years. Therefore, it is expected that the effects of the proposed action on stream and riparian habitats, including bank stability, will be similar to those that have occurred over the last ten years. Therefore, while grazing has and will likely continue to impact bank stability levels, this impact is not expected increase under the proposed action.

7.1.6 RIPARIAN CONSERVATION AREAS

Modifications to riparian habitat can have significant impacts on fish populations. Changes in riparian vegetation caused by livestock grazing can 1) increase the ability of livestock to access the stream thereby increasing redd trampling, 2) increase stream temperatures in the summer and lower streams temperatures in the winter, 3) increase stream sediment levels, 4) increase width:depth ratios, and 5) reduce bank stability. All of these modifications can have negative impacts on fish populations.

In addition, modifications to riparian vegetation can modify cover for fish. Boussu (1954) studied the effects of cover on trout abundance in a stream in Montana and found that when willow cover was added to sections of stream that post treatment fish numbers more than doubled and fish biomass more than tripled compared to pre-treatment levels. In sections of stream where cover was removed, post treatment fish numbers remained relatively unchanged but post treatment fish biomass declined by nearly half. Likewise, Kozel et al. (1989) found a positive correlation between the amount of overhanging vegetation along the stream and trout biomass in several streams in Wyoming.

Livestock grazing can have important impacts on riparian vegetation (Armour et al.1994). Schulz and Leininger (1990) studied the effects of cattle grazing on riparian vegetation in the Sheep Creek watershed in Colorado and found considerable differences in the riparian vegetation between grazed and ungrazed areas. For example, they found considerable differences in the composition of some plants species between grazed and ungrazed areas and also found that vascular vegetation provided 26% more ground cover in ungrazed areas. They also observed about five times as much bare ground ungrazed areas and that the mean standing crop of vegetation was 2,410 kg/ha in ungrazed areas and but was only 1,217 kg/ha inside caged plots within the grazed areas. Clary (1999) studied the effect of livestock grazing on riparian vegetation on Stanley Creek in Idaho. He evaluated the response of riparian vegetation when grazing was changed from season long, heavy use (60-65% utilization in dry meadows) to either grazing in late June with medium use (35-50% utilization in dry meadows), grazing in late June with light use (20-25% utilization in dry meadows), and no grazing at all. He found that there was a significant increase in late seral species in both lightly grazed and ungrazed areas whereas late seral species decreased in the areas with medium use.

Livestock grazing can also have a pronounced impact on woody species. For example, Schulz and Leininger (1990) found 5.5 times more shrub cover and 8.5 times more willow cover in ungrazed areas compared to grazed areas. They also found that willows were older and larger in ungrazed areas compared to grazed areas. Clary (1999), found that willow cover increased by 29% in areas with medium use, 37% in areas with light use, and 56% in areas that were not grazed at all. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years and found that while woody vegetation was abundant in both grazed and ungrazed areas that cottonwoods were not present in the grazed area but were present along the ungrazed sections of stream. Gunderson (1968) studied the effects of livestock grazing on riparian and stream habitat in Rock Creek, Montana and found that stream cover provided by overhanging brush was twice as high in ungrazed areas compared to grazed areas.

While livestock grazing has likely affected riparian vegetation over most of this allotment, greenline ecological status and woody recruitment resource objectives are being met over most of the allotment. The greenline ecological status objective is not being met on an unnamed tributary of Wet Creek in the Pine Creek Unit and on a site on Wet Creek in the Wet Creek Unit. Woody recruitment levels appear low in portions of the Wet Creek Unit, but this site is located within an exclosure so the low numbers are not a result of livestock grazing. It is likely that livestock grazing is at least partially responsible for the greenline objectives not being met. These impacts have likely resulted in measurable reductions in greenline successional status and which has likely reduced the ability of these streams to support bull trout.

While livestock grazing has likely reduced greenline successional status on this allotment, the proposed action will likely not lead to any additional reductions greenline successional status and woody recruitment. The proposed action 1) allows livestock to graze to a stubble height of four inches in all units except a portion of the Wet Creek Unit where livestock can graze to a stubble height of 6 inches and 2) allows livestock to browse up to 50% on woody plants on all units except of portion of the Lower and Upper Big Creek Units where the browse standard is 30%. There is a 15% bank alteration within the Wet Creek Unit, but no bank alteration standard anywhere else on the allotment. This grazing system will likely result in continued impacts to features that affect greenline successional status and woody recruitment such as riparian vegetation. However, this grazing system is similar to the one that been used on this allotment over the last ten years. Therefore, it is expected that the effects of the proposed action on greenline successional status and woody recruitment will be similar to those that have occurred over the last ten years. Therefore, while grazing has and will likely continue to impact greenline successional status and woody recruitment, this impact is not expected increase under the proposed action.

7.2 CUMULATIVE EFFECTS

Cumulative effects as used for Section 7 consultation under the Endangered Species Act are “those effects of *future State or private activities*, not involving Federal activities, that are *reasonably certain to occur* within the action area” (50 CFR§402.02, emphasis added). This definition should not be confused with the broader definition that is used under the National Environmental Policy Act and other environmental laws. In this context, cumulative effects apply only to future state and private activities that are reasonably certain to occur. Furthermore, if an activity is currently occurring and will likely continue to occur in the future with similar effects, it is not considered under cumulative effects because it has already been considered in the description of baseline conditions. There are no known future state or private activities that will occur in the action area that are not already occurring.

7.3 SUMMARY OF EFFECTS

The proceeding analysis has described the likely effects of the proposed action on the six focus indicators. The effects of the proposed action on the pathways and indicators are provided in Table 3. The effects analysis concluded that the proposed action will likely result in the death of bull trout eggs.

Furthermore, the proposed action will continue to impact stream temperatures, sediment levels, width:depth ratios, bank stabilities, greenline successional status, and woody recruitment. These effects are not discountable and will likely reduce the ability of streams on this allotment to support bull trout.

8 EFFECTS DETERMINATION

The effects determination for bull trout was made using the above analysis and the effects determination key (Table 3). The specific determinations are identified below and summarized in Table 4.

The effects analysis concluded that the proposed action may have direct effects to bull trout redds which will likely lead to the death of bull trout eggs. Although the conservation measures limit the number of redds that will be impacted, the proposed action will still results in some redds being trampled and the likely death of some bull trout eggs. Therefore, the proposed action results in a "MAY AFFECT, LIKELY TO ADVERSELY AFFECT" determination for bull trout.

The effects analysis concluded that the proposed action may have some effects on proposed bull trout critical habitat. These impacts are expected to be more than be insignificant or discountable and will likely limit the ability of the habitat to support bull trout. Therefore, the proposed action results in a "MAY AFFECT, LIKELY TO ADVERSELY AFFECT" determination for proposed bull trout critical habitat.

TABLE 3 – SUMMARY OF EFFECTS (INDICATORS ASSOCIATED WITH THE SIX "FOCUS INDICATORS" HAVE BEEN SHADED).

Pathway	Indicators	Functionality Of Baseline	**Response Column A** Will the proposed action or any interrelated or interdependent actions likely generate any direct or indirect effects to this indicator?			**Response Column B** Are these effects expected to exceed beneficial, insignificant, or discountable?		
			CH	SH	BT	CH	SH	BT
Subpopulation Characteristics	Subpopulation Size	FUR	na	na	YES	na	na	YES
	Growth and Survival (including incubation survival)	FUR	na	na	YES	na	na	YES
	Life History Diversity and Isolation	FUR	na	na	NO	na	na	NO
	Persistence and Genetic Integrity	FUR	na	na	NO	na	na	NO
Water Quality	Temperature	FR	na	na	YES	na	na	YES
	Sediment	FR	na	na	YES	na	na	YES
	Chemical Characteristics	FA	na	na	NO	na	na	NO
Habitat Access	Physical Barriers	FA	na	na	NO	na	na	NO

Habitat Elements	Substrate Embed.	FR	na	na	NO	na	na	NO
	LWD	FA	na	na	NO	na	na	NO
	Pool Frequency and Quality	FR	na	na	YES	na	na	YES
	Off-channel Habitat	FR	na	na	YES	na	na	YES
	Refugia	FUR	na	na	NO	na	na	NO
Channel Condition and Dynamics	Width:Depth Ratio	FR	na	na	YES	na	na	YES
	Streambank Condition	FR	na	na	YES	na	na	YES
	Floodplain Connectivity	FR	na	na	YES	na	na	YES
Flow/Hydrology	Change in Peak/Base Flows	FR	na	na	NO	na	na	NO
	Increase in Drainage Networks	FA	na	na	NO	na	na	NO
Watershed Conditions	Road Density and Location	FR	na	na	NO	na	na	NO
	Disturbance History	FR	na	na	NO	na	na	NO
	Riparian Conservation Areas	FR	na	na	YES	na	na	YES
	Disturbance Regime	FR	na	na	NO	na	na	NO
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FUR	na	na	YES	na	na	YES

TABLE 4 – EFFECTS DETERMINATION SUMMARY

	Chinook Salmon		**Steelhead**		**Bull Trout**	
	Species	**Designated Critical Habitat**	**Species**	**Designated Critical Habitat**	**Species**	**Designated Critical Habitat**
Determination[1]	na	na	na	na	Likely to Adversely Affect	Likely to Adversely Affect

[1] The ‘Species’ column is for determining effects to the species. The ‘Habitat’ column is for determining effects to designated or proposed critical habitat. The species determinations are made as follows: No Effect (NE) if the species is not present in the action area or the proposed action or any interrelated or interdependent actions will not affect any individuals, May Affect- Not Likely to Adversely Affect (MA-NLAA) if the proposed action or any interrelated or interdependent actions may affect but will likely not adversely affect any individuals, and May Affect- Likely to Adversely Affect (MA-LAA) if the proposed action or any interrelated or interdependent actions will result in take of individuals. The habitat determinations are made as follows: NE if the action area does not contain designated critical habitat or all of the responses associated with habitat in ‘Response Column A’ are ‘NO’, NLAA if all of the responses associated with habitat in ‘Response Column B’ are ‘NO’, LAA if any of the responses associated with habitat in ‘Response Column B’ are ‘YES’.

APPENDIX A
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APPENDIX B

WATERSHED BASELINES WITH

MATRICES OF DIAGNOSTIC PATHWAYS AND INDICATORS

Baseline Conditions for Wet Creek Sub-Watershed

Agency: USDA Forest Service, Salmon-Challis National Forest	**5th Field HUC and Name: 1704021705, Wet Creek**
Unit: Lost River Ranger District	**Spacial Scale of Matrix:** One 5th HUC
Fish Species Present: Bull Trout	**Designated Critical Habitat Present:** Bull Trout (proposed)
Anadromous Species Population: na	**Anadromous Species Subpopulation:** na
Bull Trout Core Area: Little Lost River	**Local Population:** Wet Creek, Big Creek
Management Actions: Ongoing	**Updated:** 4-20-2010

Pathway	Indicators	Functionality Of Baseline	Description
Subpopulation Characteristics	**Subpopulation Size**	**FUR**	Bull trout populations have experienced major declines in this sub-watershed. Within this sub-watershed, bull trout are known to have been historically present in Wet Creek, Big Creek, and the lower reach of Squaw Creek (Gamett 1999). Big Creek historically had large numbers of bull trout and likely had a fluvial bull trout population. However, it appears that bull trout completely disappeared from this stream by the late 1990's. The disappearance of bull trout in Big Creek was likely caused by the introduction of brook trout into the stream in 1978 but impacts associated with livestock grazing may have also played a role in the disappearance of bull trout from the stream. Small numbers of bull trout have been observed in the lower reaches of Squaw Creek in the past but it is unknown if they still occur in this stream. Wet Creek historically supported relatively large numbers of bull trout and likely had a fluvial bull trout population. Sampling completed in the 1990's indicated that the adult bull trout (≥ 180 mm) population in Wet Creek was approximately 600 fish (USFWS 2002) with most of these fish occurring in Wet Creek above the Forest boundary. However, sampling completed between 2001 and 2004 indicated that bull trout numbers had declined substantially from those observed in the 1990's (Bartel and Gamett 2010) and that the adult population in Wet Creek at that time may have been less than 50 fish. Extensive sampling was completed in Wet Creek above the Forest boundary in 2010 and no trout, including bull trout, were observed (Lost

			River Ranger District, unpublished data). This indicates that bull trout may have completely disappeared from Wet Creek above the Forest boundary. The cause of the decline in Wet Creek is not known.
	Growth and Survival	**FUR**	The significant declines in the bull trout population indicates that survival is inhibited. Despite efforts to identify the cause for the decline it remains unknown.
	Life History Diversity and Isolation	**FUR**	This sub-watershed historically supported both resident and fluvial forms of bull trout. However, it is unclear if either form still occurs in this sub-watershed.
	Persistence and Genetic Integrity	**FUR**	Bull trout within the Wet Creek sub-watershed are at a relatively high risk of extinction. This is due to at least five factors. First, the adult bull trout population is comprised of very few individuals, probably less than 50. Second, bull trout distribution has been greatly reduced. Third, the migratory component of the population has likely been lost. Fourth, brook trout are present in the sub-watershed. Fifth, habitat alterations have reduced the ability of the sub-watershed to support bull trout. These factors place bull trout in the Wet Creek sub-watershed at a relatively high risk of extinction from both natural and anthropogenic disturbances.
Water Quality	**Temperature**	**FR**	The INFISH RMO for temperature is a 7-day moving maximum below 59°F (15°C) within adult holding habitat and below 48°F (8.9°C) within spawning and rearing habitats. Stream temperatures exceed these levels over most of the sub-watershed. Revised management appears to be restoring impacts to stream temperature that have resulted from past grazing practices. Irrigation diversions and inflow from the Dry Creek hydroelectric project continue to alter the stream temperature regime in the lower 7 km of Wet Creek.
	Sediment	**FR**	The INFISH RMO for fines is less than 20% fines. Those streams on national forest lands within this sub-watershed would naturally have surface fines around 25-27%. On national forest lands, sediment is generally within natural levels. Surface fine data were collected from 11 sites in the Wet Creek sub-watershed on national forest lands in 2003 (Lost River Ranger District, unpublished data). All but three sites had surface fines below the INFISH RMO and the expected natural level. The site in Wet Creek within the exclosure above Hilts Creek had 33% surface fines, the site in Wet Creek above the Forest boundary had 32% surface fines, and the site in Coal Creek had 100% surface fines. It is likely that Coal Creek is contributing excessive amounts of sediment to Wet Creek. It is

			also likely that degraded habitat conditions associated with livestock grazing in the upper reaches of Wet Creek are also contributing excessive amounts of sediment to Wet Creek. Depth fine data are collected from four sites on the national forest. Three sites are at or exceed the INFISH RMO for fines. The site on Big Creek had 27% depth fines, the site on Wet Creek near the Forest boundary had 25% depth fines, and the site on Wet Creek within the exclosure had 20% depth fines.
	Chemical Characteristics	**FA**	The chemical characteristics of water within this sub-watershed are believed to be functioning at natural levels (B. Gamett, professional judgment).
Habitat Access	**Physical Barriers**	**FA**	There are two diversions that historically impacted bull trout movement in the sub-watershed. The first is the Waymire Diversion which is located on Wet Creek approximately 500 m above the Little Lost River. This diversion was recently rebuilt to provide for fish passage. The second is the Pancheri Diversion which is located on Wet Creek approximately 2 km above the Little Lost River. Fish passage was provided at this diversion in the early 1990's. There are no other artificial barriers in this sub-watershed.
Habitat Elements	**Substrate Embed.**	**FR**	This indicator is likely at or near natural levels in this sub-watershed except in areas where sediment levels are elevated (B. Gamett, personal observation).
	LWD	**FA**	Nearly all of the perennial streams within this sub-watershed are located in a sagebrush steppe environment and the woody species within the riparian areas are primarily willow and water birch. Therefore, large woody debris is not an issue in this sub-watershed.
	Pool Frequency and Quality	**FR**	The status of this indicator is unknown. Most streams within the sub-watershed provide quality pools but the number and quality of pools relative to natural conditions is unknown. Livestock grazing has likely impacted this indicator in at least some areas and flow alterations associated with the Dry Creek hydroelectric project have likely impacted this indicator in the lower 7 km of Wet Creek (B. Gamett, personal observation).
	Off-channel Habitat	**FR**	The status of this indicator is unknown. Most streams within the sub-watershed provide off-channel habitat but the amount and quality relative to natural conditions is unknown. Livestock grazing has likely impacted this indicator in at least some areas and flow alterations associated with the Dry Creek hydroelectric project have likely impacted this indicator in the lower 7 km of Wet

			Creek (B. Gamett, personal observation).
	Refugia	**FUR**	There is not adequate habitat to support strong and significant populations of bull trout in this sub-watershed. The primary limiting factor is high water temperatures although other habitat features may also be limiting bull trout as well (B. Gamett, personal observation).
Channel Condition and Dynamics	**Width:Depth Ratio**	**FR**	The INFISH RMO for this indicator is <10 or <21 for A channels, <27 for B channels, and <28 for C channels. Width:depth ratios appear to be below these levels for stream on the national forest.
	Streambank Condition	**FR**	The INFISH RMO for this indicator is ≥90%. Bank stability data collected by the Forest at depth fine monitoring sites indicate bank stabilities exceed these levels. However, bank stability data collected from 14 sites on the Pass Creek Allotment within this sub-watershed indicated that bank stability was below 90% at every site. Livestock grazing has likely impacted this indicator over much of the sub-watershed and flow alterations associated with the Dry Creek hydroelectric project have likely impacted this indicator in the lower 7 km of Wet Creek (B. Gamett, personal observation).
	Floodplain Connectivity	**FR**	The status of this indicator is unknown. Most streams within the sub-watershed have at least some floodplain connectivity but the amount relative to natural conditions is unknown. Livestock grazing has likely impacted this indicator in at least some areas and flow alterations associated with the Dry Creek hydroelectric project have likely impacted this indicator in the lower 7 km of Wet Creek (B. Gamett, personal observation).
Flow/Hydrology	**Change in Peak/Base Flows**	**FR**	This indicator is thought to be functioning at near natural levels throughout the sub-watershed with the exception of the lower 7 km of Wet Creek (B. Gamett, personal observation). Inflows from the Dry Creek hydroelectric project and diversions for agricultural purposes have significantly altered flow regimes in this stream reach.
	Increase in Drainage Networks	**FA**	This indicator is thought to be functioning at near natural levels throughout the sub-watershed (B. Gamett, personal observation).
Watershed Conditions	**Road Density and Location**	**FR**	Road density and location is a significant concern in portions of the sub-watershed. Significant portions of the Coal Creek Road and Wet Creek Road are located within the riparian habitat conservation area and are degrading

			stream conditions.
	Disturbance History	**FR**	The natural disturbance history within the sub-watershed has been altered by recreation, livestock grazing, timber harvest, water diversion, roads, and fire suppression.
	Riparian Conservation Areas	**FR**	Riparian vegetation has been impacted over much of the sub-watershed by livestock grazing, logging, and road building. In some areas this impact has been severe. However, revised management appears to be resulting in the recovery of riparian vegetation over most of the sub-watershed (B. Gamett, personal observation).
	Disturbance Regime	**FR**	Human related disturbances within the sub-watershed have included recreation, livestock grazing, timber harvest, water diversion, roads, and fire suppression. Collectively these activities have altered the disturbance regime in this sub-watershed.
Integration of Species and Habitat Conditions	**Habitat Quality and Connectivity**	**FUR**	Habitat conditions within this sub-watershed are in generally fair condition. However, bull trout within the Wet Creek sub-watershed are at a relatively high risk of extinction. This is due to at least five factors. First, the adult bull trout population is comprised of only about 50 fish. Second, bull trout distribution has been greatly reduced and they are now confined to a single stem section of stream. Third, the migratory component of the population has been lost. Fourth, brook trout are present in the sub-watershed. Fifth, habitat alterations have reduced the ability of the sub-watershed to support bull trout. These factors place bull trout in the Wet Creek sub-watershed at a relatively high risk of extinction from both natural and anthropogenic disturbances. It is doubtful that bull trout will persist in this sub-watershed.

APPENDIX C

MONITORING AND DATA SUMMARIES

FIGURE C1 – PASS CREEK ALLOTMENT MONITORING SITES

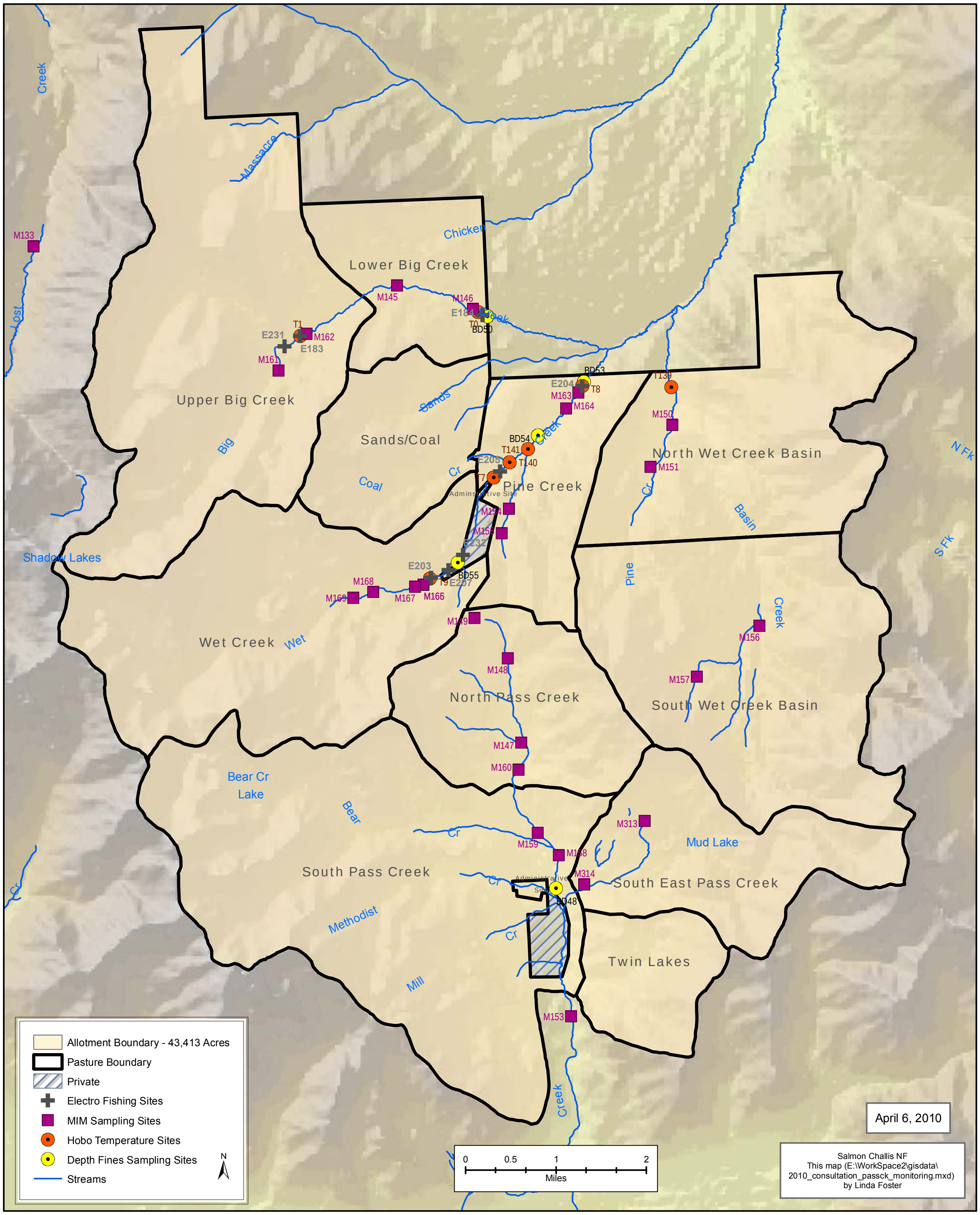


Table C1 – Selected data from fish population monitoring sites on the Pass Creek Allotment

Stream (Site ID)	Date	Length (m)	Mean Width (m)	Abundance (Fish ≥ 70 mm/100 m^2)					
				All Trout	Rainbow Trout	Brook Trout	Bull Trout	Cutthroat Trout	Brook x Bull Trout [A]
Big Creek (E231)	8/8/2002	100	1.3	26.1	4.6	21.5	0	0	0
	11/23/1999	104	2.4	55.6	0.4	55.2	0	0	0
	9/15/1994	73	1.6	159	20.5	132.5	0	0	6.0 [B]
Big Creek (E183)	7/9/2009	87	3.6	12.8	1.3	11.5	0	0	0
	8/2/2006	87	4.8	44.9	13.6	31.3	0	0	0
	8/8/2002	30	3.3	67.7	8.1	59.6	0	0	0
	8/11/1994	91	4.0	40.3	24.7	14.8	0.5	0	0.3
Big Creek (E184)	7/9/2009	115	2.3	4.2	1.9 [C]	2.3	0	0	0
	8/2/2006	100	2.3	15.2	7.8	7.4	0	0	0
	8/7/2002	100	2.0	6.0	4.0	2.0	0	0	0
	8/10/1999	116	3.0	7.5	3.2	4.3	0	0	0
Wet Creek (E204)	9/21/2009	200	-	0	0	0	0	0	0
	8/6/2002	100	-	0	0	0	0	0	0
	8/9/1999	105	2.6	2.2	2.2	0	0	0	0
	7/25/1995[D]	192	2.2	9.5	9.5	0	0	0	0
Wet Creek (E209)	8/14/2009	100	2.2	0	0	0	0	0	0
	8/2/2006	100	2.5	0	0	0	0	0	0
	8/6/1999	100	2.6	4.3	3.1	0	1.2 [E]	0	0

Wet Creek (E232)	9/24/2009	102	2.0	0	0	0	0	0	0
	8/18/1995	102	3.6	18.5	6.5	0	12.0	0	0
Wet Creek (E207)	9/24/2009	150	2.1	0	0	0	0	0	0
	8/7/1995	151	3.5	2.3	1.7	0	0.6	0	0
Wet Creek (E203)	7/22/2009	140	2.7	0	0	0	0	0	0
	7/29/2008	120	2.9	0.3	0	0	0.3	0	0
	8/2/2006	100	2.8	6.1	0	0	6.1	0	0
	8/17/2004	147	2.4	0.3	0	0	0.3	0	0
	8/6/2002	143	3.6	1.6	0	0	1.6	0	0
	7/2001	100	3.6 [F]	6.9	0	0	6.9	0	0
	8/16/1999	114	3.3	12.5	1.1	0	11.4	0	0
	6/26/1996	138	3.6	11.4	3.2	0	8.2	0	0
	8/7/1995	95	2.8	11.3	3.4	0	7.9	0	0

[A] Brook trout x bull trout hybrids may not have always been correctly differentiated from brook trout and bull trout prior to 1999. Beginning in 1999, improved identification methods allowed for more consistent identification of brook trout x bull trout hybrids.

[B] The removal pattern for brook trout x bull trout hybrids was 2 fish on the first pass, 5 fish on the second pass. We assumed the population estimate to be the number of fish captured.

[C] The removal pattern for rainbow trout was 1 fish on the first pass, 4 fish on the second pass. We assumed the population estimate to be the number of fish captured.

[D] The site that was monitored in 1995 was not in the same location as the site that was monitored in 1999, 2002, and 2009. However, the 1995 site was relatively close to the site that was monitored in 1999, 2002, and 2009.

[E] The removal pattern for bull trout was 0 fish on the first pass, 2 fish on the second pass and 1 fish on the third pass. We assumed the population estimate to be the number of fish captured.

[F] Widths were not collected in 2001. Assumed same mean width as 2002.

Table C2 – Fish presence, spawning, and proposed critical habitat by stream

Stream	Bull Trout Present (miles)	Bull Trout Spawning (miles)	Bull Trout Proposed Critical Habitat (miles)
Big Creek	0.00	0.00	2.77
Wet Creek	2.66	1.23	2.66
Total	2.66	1.23	5.43

Table C3 – Fish presence, spawning, and proposed critical habitat by unit

***Unit*-Stream**	Bull Trout Present (miles)	Bull Trout Spawning (miles)	Bull Trout Proposed Critical Habitat (miles)
Administrative Site (Rider's Camp)	0.32	0.32	0.32
Wet Creek	0.32	0.32	0.32
Lower Big Creek Unit	0.00	0.00	1.58
Big Creek	0.00	0.00	1.58
Pine Creek Unit	1.71	0.29	1.71
Wet Creek	1.71	0.29	1.71
Upper Big Creek Unit	0.00	0.00	1.42
Big Creek	0.00	0.00	1.42
Wet Creek Unit	0.47	0.47	0.47
Wet Creek	0.47	0.47	0.47
Total	2.51	1.08	5.50

TABLE C4 – SELECTED STREAM TEMPERATURE DATA FROM THE PASS CREEK ALLOTMENT

Stream (Site ID)	Year	Temperature		
		Maximum °C	7-day Moving Maximum °C	Mean °C (July 1-Sept 30)
Basin Creek (T139)	2000	24.1	22.9	11.4
	1999	19.7	18.4	10.1
Big Creek (T0)	2009[A]	16.0	14.7	9.1
	2002[A]	19.0	18.1	9.9
	2001[A]	18.7	17.6	10.2
	2000[A]	17.1	16.4	9.9
	1999[A]	14.8	14.2	8.6
	1998[A]	15.6	15.1	9.2
	1997[A]	15.9	14.7	9.1
Big Creek (T1)	2009	13.6	12.4	8.3
	2002	17.1	16.5	9.0
	2001	16.5	15.7	9.1
	2000	15.2	14.1	8.7
	1999	12.5	12.0	7.9
	1998	12.9	12.5	8.0
	1997	12.5	12.0	8.0
Coal Creek (T140)	2002	23.6	22.0	11.0

	2001	22.1	20.6	11.4
	2000	22.1	20.8	11.0
	1998	19.8	18.4	10.2
	1997	21.3	20.4	10.5
Wet Creek (T8)	2009[B]	18.4	17.1	9.8
	2002[B]	21.0	19.8	12.7
	2001[B]	19.8	19.1	12.6
	2000[B]	18.8	18.0	11.7
	1999[B]	17.6	16.5	9.4
	1998[B]	18.6	17.8	10.3
	1997[B]	17.8	16.3	10.3
	1996[B]	18.8	18.1	insufficient data
Wet Creek (T7)	2009[C]	16.0	14.8	8.4
	2002[C]	19.8	18.8	9.9
	2001[C]	19.3	18.5	10.0
	2000[C]	17.4	16.1	8.9
	1999[C]	14.6	13.6	7.7
Wet Creek (T9)	2009	11.5	11.0	7.1
	2002	15.9	15.3	8.1
	2001	14.7	14.0	8.0

	2000	13.7	13.0	7.6
	1999	11.1	10.7	6.7
	1998	12.0	11.1	7.3
	1997	11.7	11.4	7.3
	1996	12.2	11.7	7.1

[A] The 1997 and 1998 monitoring sites were located 2 m above the Forest boundary fence whereas the 1999, 2000, 2001, and 2002 monitoring sites were located approximately 200 m above the Forest boundary fence

[B] The 1996, 1997, and 1998 monitoring sites were located at the Forest boundary fence whereas the 1999, 2000, 2001, and 2002 monitoring sites were located approximately 250 m above the Forest boundary fence

TABLE C5 – SURFACE FINE (< 0.25 INCHES) DATA COLLECTED IN 2003 FROM THE PASS CREEK ALLOTMENT

Stream	Reach	Channel Type	Geology	Surface Fines (%)	Natural Condition Mean for this Stream/Geology Type (%)	Exceeds Natural Conditions Level	Exceeds INFISH Criteria of 20%
Big Creek	Approximately 100 m above beaver pond	B	V	13	27	No	No
Big Creek	Approximately 100 m below beaver pond	B	V	18	27	No	No
Big Creek	At end of road	B	V	11	27	No	No
Big Creek	Approximately 100m above forest boundary	A	V	12	25	No	No
Coal Creek	Approximately 100m above Wet Creek	B	V	100	27	Yes	Yes
Wet Creek	Above Wet Creek Trail crossing	A	V	7	25	No	No
Wet Creek	In meadow in exclosure	A	V	33	25	Yes	Yes
Wet Creek	Between Coal Creek and the cow camp	B	V	8	27	No	No
Wet Creek	Between unnamed tributary and Wet Creek road	B	V	5	27	No	No
Wet Creek	Approximately 100 m below unnamed tributary	B	V	12	27	No	No
Wet Creek	Approximately 100 m above forest boundary	B	V	32	27	Yes	Yes

TABLE C6 – DEPTH FINE (< 0.25 INCHES) DATA FROM THE PASS CREEK ALLOTMENT

Stream (Site ID)	**Depth Fines (< 0.25 inches) (%)**														
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Big Creek (BD50)						21.2			26.8	22.7				27.4	
Wet Creek (BD53)						20.9			15.2	23.6					25.2
Wet Creek (BD54)	31.2	28.4	39.5	21.5	25.3	15.5	17.0	17.7	19.9	17.3	6.1		18.0		
Wet Creek (BD55) (inside exclosure)			43.4	25.4	41.9	39.7	43.3	44.0	38.3	44.1				30.6	20.1

TABLE C7 – BANK STABILITY DATA FROM THE PASS CREEK ALLOTMENT (SEE TABLE C8 FOR ADDITIONAL BANK STABILITY DATA)

Stream (Site ID)	**Bank Stability (%)**														
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Big Creek (BD50)						50.0			91.0	87.5	89.0		95.5	75	96
Wet Creek (BD53)						92.0			84.5	91.5					92
Wet Creek (BD54)	58.5	76.5	87.5	87.0	81.0	84.0	87.5	81.0	88.0	81.5	91.0		94.0		
Wet Creek (BD55) (inside exclosure)			79.0	44.0	59.0	64.0	66.5	33.5	35.5	56.5				79	94

TABLE C8 – MULTIPLE INDICATOR MONITORING (MIM) DATA FROM THE PASS CREEK ALLOTMENT

Unit	Stream (Site ID)	Year	Width: Depth Ratio	Bank Stability (%)	Woody Species Abundance			GES[A]	Trend in GES[B]
					Total (#/acre)	Seedling-Young (#/acre)	Seedling-Young (%)		
South Wet Creek Basin	Basin Creek 1 (M156)	2009	na	58	0	0	0	58 (MS)	Down [C]
		2005						82 (LS)	Static
		2002						81 (LS)	Static
		1999						73 (LS)	Up
		1993						63 (LS)	Baseline
South Wet Creek Basin	Basin Creek 2 (M157)	2009	na	50	1294	176	14	72 (LS)	Up [C]
		2005					6	61 (LS)	Static
		2002					5	63 (LS)	Down
		1999						80 (LS)	Static
		1993						87 (PNC)	Baseline
North Wet Creek Basin	Basin Creek 3 (M150) (inside exclosure)	2009	na	73	1707	379	22	69 (LS)	Up [C]
		2005					24	52 (MS)	Static
		2002					9	47 (MS)	Up
		1999					30	26 (ES)	Baseline
North Wet Creek Basin	Basin Creek 4 (M151)	2009	na	63	896	53	6	64 (LS)	Static [C]
		2005					41	68 (LS)	Baseline

Pine Creek	Unnamed Tributary to Wet Creek 2 (M154)	2009	1.4	62	4434	2810	63	45 (MS)	Down [C]
		2006					78	68 (LS)	Up
		1994						20 (ES)	Baseline
Pine Creek	Unnamed Tributary to Wet Creek 3 (M155)	2009	39.4	88	1194	227	19	99 (PNC)	Static [C]
		2006					9	96 (PNC)	Up
		1994						23 (ES)	Baseline
Upper Big Creek	Big Creek 2 (M161) (inside exclosure)	2009	na	46	1566	542	35	16 (ES)	Static [C]
		2005					10	15 (VES)	Static
		2002					13	14 (VES)	Static
	(prior to exclosure)	1998					19	15 (VES)	Static
		1993						10 (VES)	Baseline
Upper Big Creek	Big Creek 3 (M162)	2009	10.2	79	397	149	38	82 (LS)	Static [C]
		2005					33	78 (LS)	Down
		2002					33	92 (PNC)	Static
		1998					80	88 (PNC)	Static
		1993						86 (PNC)	Baseline
Lower Big Creek	Big Creek 5 (M145)	2009	12.6	65	770	55	7	77 (LS)	Static [C]
		2005					37	81 (LS)	Static
		2002					50	82 (LS)	Up

		1998					57	62 (LS)	Static
		1993						58 (MS)	Baseline
Lower Big Creek	Big Creek 6 (M146)	2009	9.3	46	2011	1036	52	70 (LS)	Up [C]
		2005					57	58 (MS)	Down
		2002					18	70 (LS)	Down
		1999					0	82 (LS)	Baseline
Pine Creek	Wet Creek 1 (M163)	2009	9.6	74	14227	7398	52	88 (PNC)	Static [C]
		2005					46	na	na
		2002					53	91 (PNC)	Static
		1999					58	82 (LS)	Baseline
Pine Creek	Wet Creek 2 (M164)	2009	8.1	59	3604	2150	60	99 (PNC)	Static/Up [C,D]
		2005					46	90 (PNC)	Static/Up [D]
		2002					48	81 (LS)	Static
		1998					na	75 (LS)	Up
		1993					15	54 (MS)	Baseline
Wet Creek	Wet Creek 3 (M166) (inside exclosure)	2009	8.1	87	1914	1595	83	100 (PNC)	Static [C]
		2002					na	104 (PNC)	Up
	(prior to exclosure)	1998					na	80 (LS)	Down
		1993					na	99 (PNC)	Baseline

Wet Creek	Wet Creek 4 (M167) (inside exclosure)	2005					na	68 (LS)	Up
		2002					na	56 (MS)	Static
		1999					na	56 (MS)	Baseline
Wet Creek	Wet Creek 4a (M168)	2009	5.3	63	1581	759	48	77 (LS)	Static [C]
		2005					76	70 (LS)	Baseline
Wet Creek	Wet Creek 5 (M169)	2005					42	31 (ES)	Static
		2002					41	30 (ES)	Up
		1998					16	15 (VES)	Static
		1993					na	15 (VES)	Baseline

[A] Greenline ecological status where 0-15=Very Early Seral (VES), 16-40=Early Seral (ES), 41-60=Mid Seral (MS), 61-85=Late Seral (LS), ≥86 Potential Natural Community (PNC)

[B] Greenline ecological status trend where an increase of 10 points or more is considered an upward trend, a decrease of 10 points or more is considered a downward trend, and a change of less than 10 points is considered a static trend.

[C] Prior to 2009, the Greenline Ecological Status data were collected using the protocol described by Winward (2000). Beginning in 2009, the Greenline Ecological Status data were collected using the MIM protocol. There are differences in these two protocols which can result in different values for Greenline Ecological Status. Therefore, the 2009 trend determination should be viewed with caution.

[D] The “Static” trend is based on the change observed between the current reading and the previous reading whereas the “Up” trend is based on the change observed between the current reading and two readings prior

APPENDIX D

PRIMARY CONSTITUENT ELEMENTS OF CRITICAL HABITAT

Primary Constituent Elements of Critical Habitat

The Forest has utilized six "Focus Indicators" to characterize the condition of the habitat for listed fish species on streams within allotments on the Salmon-Challis National Forest. These are: 1) spawning and incubation, 2) temperature, 3) sediment, 4) width: depth ratio, 5) streambank condition, and 6) riparian conservation areas. These indicators also serve to form the basis for potential impacts to the Primary Constituent Elements (PCEs) for Chinook salmon, steelhead and proposed bull trout critical habitat.

The following are the specific PCEs for the proposed bull trout critical habitat (January13, 2010, Federal Register 75FR2270) and examples of habitat indicators that can be used to assess the condition of the PCEs. Many of the Forest "focus indicators" match the examples (highlighted in the Associated Habitat Indicators). They have been thoroughly addressed within the environmental baseline conditions and the site specific effects analysis. Therefore, they form the basis for the Forest's determination for effects to the species and potential critical habitat.

PRIMARY CONSTITUENT ELEMENTS FOR PROPOSED BULL TROUT CRITICAL HABITAT AND ASSOCIATED HABITAT INDICATORS

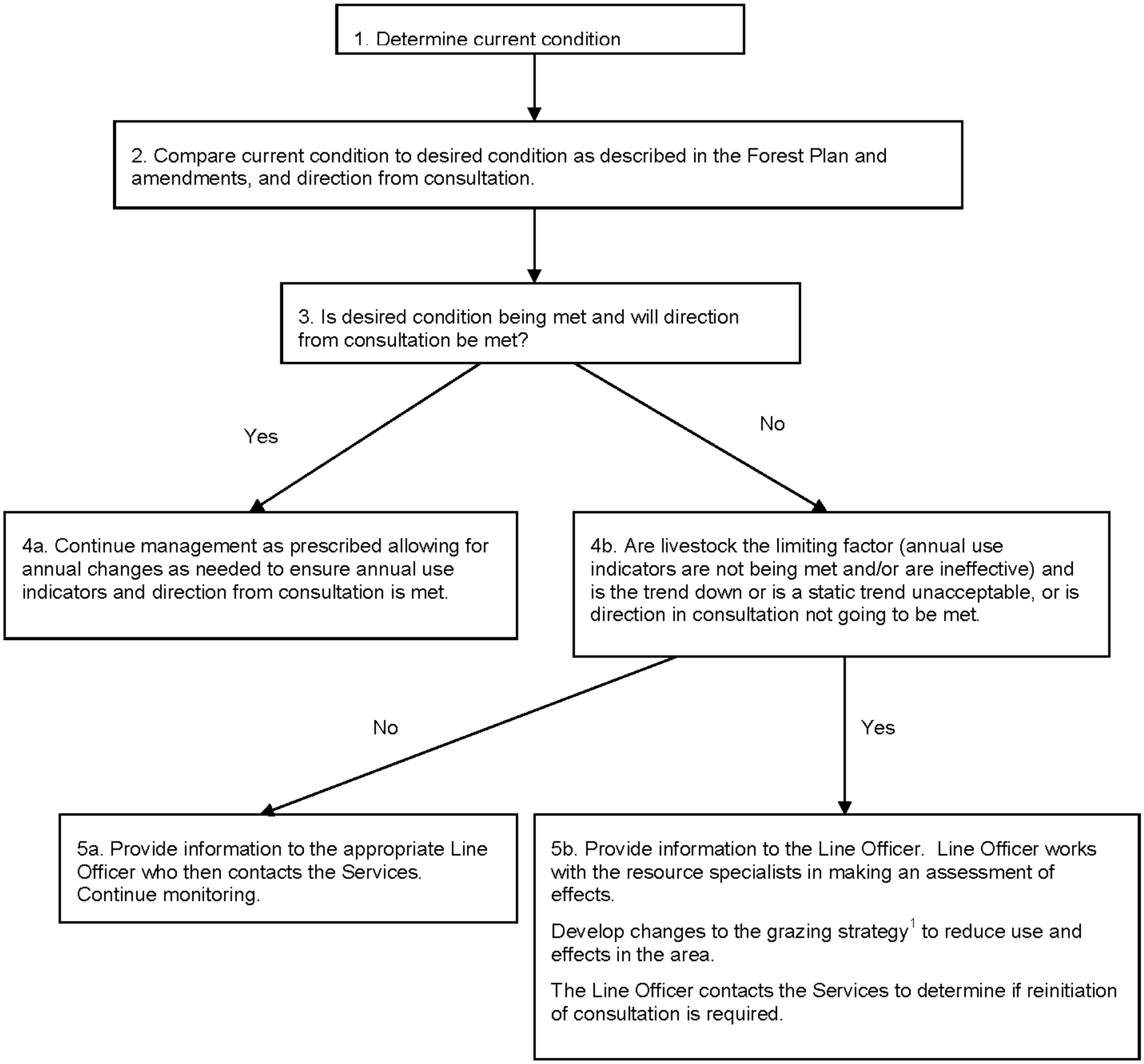
PCE #	PCE Description	Associated Habitat Indicators
1.	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	floodplain connectivity, change in peak/base flows, increase in drainage network, **riparian conservation areas**, chemical contamination/nutrients
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.	life history diversity and isolation, persistence and genetic integrity, **temperature**, chemical contamination/nutrients, physical barriers, **average wetted width/maximum depth ratio in scour pools in a reach**, change in peak/base flows, refugia
3.	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	growth and survival, life history diversity and isolation, **riparian conservation areas**, floodplain connectivity (importance of aquatic habitat condition indirectly covered by previous seven PCEs)
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, pool frequency and quality, large pools, off channel habitat, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, **streambank condition**, floodplain connectivity, **riparian conservation areas**
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.	**temperature**, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, streambank **condition**, change in peak/base flows, **riparian conservation areas**, floodplain connectivity

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.	**sediment**, **substrate embeddedness**, large woody debris, pool frequency and quality
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.	change in pea k/base flows, increase in drainage network, disturbance history*, disturbance regime (* Information relative to disturbance history is often found in the baseline narrative)
8.	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	**sediment**, chemical contamination/nutrients, change in peak/base flows
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.	persistence and genetic integrity, physical*barriers* (* Information relative to disturbance history is often found in the baseline narrative)

APPENDIX E

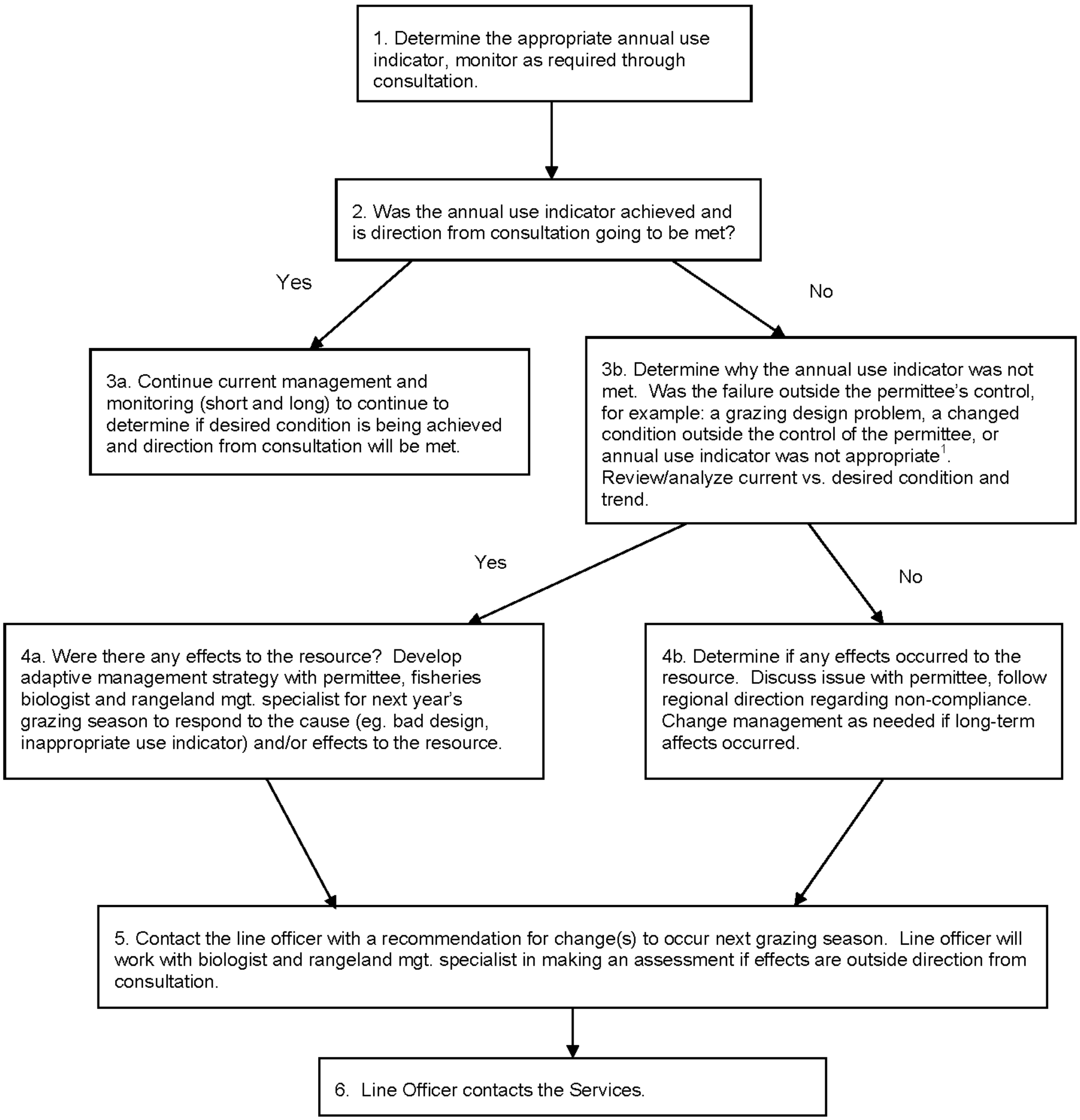
ADAPTIVE MANAGEMENT DIAGRAMS

Diagram 1.0 – Implementation of Long-Term Adaptive Management Strategy for Allotments Requiring Consultation.



[1]Management actions will initially reduce use in the area. It is expected this may occur in any number of ways including but not limited to changing the season of use, reducing numbers, changing amount of use on annual indicator, changing herding practices, changing salting practices and/or reconstructing/constructing range improvements. If use can't be reduced and livestock continue to be the limiting factor total removal of livestock from the area may be necessary. Effectiveness of changed management will be monitored through adjusted annual use indicators and effectiveness monitoring.

Diagram 2.0 - Implementation of Annual Adaptive Management Strategy for Allotments Requiring Consultation.



[1]An inappropriate annual use indicator is an indicator that does not most accurately identify the weak link or first attribute that would indicate excessive livestock impacts. In this situation, changing to a more appropriate indicator will help achieve or maintain desired conditions.

APPENDIX F

PAST MANAGEMENT AND PROPOSED ACTION COMPARISON

2010 PASS CREEK ALLOTMENT

Proposed Action for the Biological Assessment

2000-2005 Allotment Management Plan	2009 Management with Amended Biological Assessment and letter of concurrence	2010 Proposed Action
Permittee involvement necessary. Includes permittee involvement in monitoring allowable use standards and allotment objectives.	Permittee involvement necessary. Includes permittee involvement in monitoring allowable use standards and allotment objectives.	Permittee involvement necessary. Includes permittee involvement in monitoring allowable use standards and allotment objectives.
Ensure trailing outside riparian areas and wet meadows is accomplished where possible.	Ensure trailing outside riparian areas and wet meadows is accomplished where possible.	Ensure trailing outside riparian areas and wet meadows is accomplished where possible.
Grazing System: Deferred Rotation (timed grazing)	Grazing System: Rest Rotation	Grazing System: Deferred Rotation (timed grazing)
Season of Use: July 15 to October 1. These dates are ultimately determined by the use standards described below. Therefore, adjustments in these dates will be made based on available forage.	Season of Use: July 15 to October 1. These dates are ultimately determined by the use standards described below. Therefore, adjustments in these dates will be made based on available forage.	Season of Use: July 15 to October 10. These dates are ultimately determined by the use standards described below. Therefore, adjustments in these dates will be made based on available forage.
Permitted Cattle Numbers: 1660 Cow/calf pairs	Permitted Cattle Numbers: 943 Cow/calf pairs	Permitted Cattle Numbers: 1660 Cow/calf pairs
Hydric Species: Stubble height use standards will be applied to hydric species along the greenline. The Pass Creek standard will be 4 inches. Use standards in the Wet Creek drainage will be determined by ecological status. Those pastures or portions of pastures with an ecological status of less than late seral will have an end of growing season stubble height standard of 6 inches. Those pastures or portions of pastures with an ecological status of late seral or greater will have an end of growing season riparian stubble height standard of 4 inches. Therefore, the following end of growing season stubble height standards will apply: Northeast Pass Creek – 4 inches Northwest Pass Creek – 4 inches Southeast Pass Creek – 4 inches Southwest Pass Creek – 4 inches Twin Lakes – 4 inches	Hydric Species: Stubble height use standards will be applied to hydric species along the greenline. Therefore, the following end of growing season stubble height standards will apply: Northeast Pass Creek – 4 inches Northwest Pass Creek – 4 inches Southeast Pass Creek – 4 inches Southwest Pass Creek – 4 inches Twin Lakes – 4 inches South Wet Creek Basin – 4 inches North Wet Creek Basin – 6 inches Pine Creek – REST Sands/Coal Creek – 6 inches Upper Wet Creek – REST Lower Big Creek – 6 inches	Hydric Species: Stubble height use standards will be applied to hydric species along the greenline. Therefore, the following end of growing season stubble height standards will apply: South Wet Creek Basin – 4 inches North Wet Creek Basin – 6 inches Pine Creek – 4 inches Wet Creek-4 inches Sands/Coal Creek – 4 inches Upper Wet Creek – 6 inches Lower Big Creek – 4 inches Upper Big Creek – 4 inches

South Wet Creek Basin – 4 inches North Wet Creek Basin – 4 inches Pine Creek – 6 inches for unnamed tributary, 4 inches rest of unit Sands/Coal Creek – 4 inches Wet Creek – 6 inches Lower Big Creek – 4 inches Upper Big Creek – 4 inches	Upper Big Creek – 6 inches	
Grazing season use monitoring will include only hydric species unless a willow incidence of use trigger is established in the future (see Implementation Monitoring Evaluation).	Woody species utilization level 30% incidence of use.	Woody species utilization level 50% incidence of use, accept: Lower Big Creek -30% Upper Big Creek -30%
Bank stabilities within the natural range of variability	Bank stabilities within the natural range of variability	Bank stabilities within the natural range of variability.
No Streambank Alteration standard	Streambank Alteration level 20%	Streambank Alteration standard where appropriate, accept: Upper Wet Creek-15%
Permittees/riders shall ensure that cattle do not congregate in riparian areas and incidental use areas. Cattle will be dispersed off of riparian areas and incidental use areas as part of riding responsibilities. Permittees will be in charge of backriding. One full time rider.	Permittees/riders shall ensure that cattle do not congregate in riparian areas and incidental use areas. Cattle will be dispersed off of riparian areas and incidental use areas as part of riding responsibilities. Permittees will be in charge of backriding. Two full time riders.	Permittees/riders shall ensure that cattle do not congregate in riparian areas and incidental use areas. Cattle will be dispersed off of riparian areas and incidental use areas as part of riding responsibilities. Permittees will be in charge of backriding. Two full time riders 7 days per week.

Maintain existing range improvements to Forest Service standards	Maintain existing range improvements to Forest Service standards Construct 1.5 miles of 4-strand eclectic fence to exclude the lower portion of Wet Creek Basin from cattle. Install temporary water pump, pipeline and trough from the exclosure to adjacent upland bench. Construct .25 miles of 4-strand barbwire fence to move the perennial portion of Coal Creek from the Sands Creek Unit to the Pine Creek Unit and Rest for the 2009 grazing season. Relocate 1.50 miles of 4-strand barbed wire to 4-strand electric to the bench above Wet Creek and install a temporary water pump, pipeline and trough.	Maintain existing range improvements to Forest Service standards