

Aquatic Species Biological Assessment for the Twelvemile Cattle and Horse Allotment

**SALMON-COBALT RANGER DISTRICT
SALMON-CHALLIS NATIONAL FOREST
LEMHI COUNTY, IDAHO**

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1 INTRODUCTION

The Salmon-Cobalt Ranger District of the Salmon-Challis National Forest is proposing to authorize livestock grazing activities associated with the Twelvemile Allotment. This biological assessment describes the proposed action, discusses the probable impacts of that action on listed species and makes an effect determination for any listed species that may be affected by the proposed action. And this biological assessment forms the basis for any necessary consultation with the Fish and Wildlife Service and the National Marine Fisheries Service (Services) pursuant to section 7 of the Endangered Species Act 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, 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

Twelvemile Allotment grazing activities are conducted within portions of the Twelvemile Creek-Salmon River Watershed (HUC 1716020303) of the Middle Salmon-Panther Subbasin. The primary stream encompassed by the allotment is Twelvemile Creek. The allotment also encompasses approximately 0.75 miles of the upper reaches of Meadow Creek within the Warm Spring Creek drainage, and includes short reaches of the uppermost headwaters areas of Dummy Creek, (<0.1 mi), Briney Creek (~0.1 mi), Second Creek (~0.35 mi), Lost Creek (~0.45 mi). Twelvemile Creek is the only fish bearing stream within the allotment.

Elevations range from 8,900 feet on ridgeline areas to approximately 4,500 feet at the lower allotment boundary. Stream reaches within the allotment range from low to high gradient. Estimated Twelvemile Creek stream flows at the lower Forest boundary range between 2.6 cfs in February to over 63 cfs during June runoff periods.

Soils in the watershed are derived primarily from quartzites, with some areas of volcanics within western portions of the Twelvemile Creek drainage, and sedimentary intrusions within the Warm Spring, Waddington/Lost, Second, Briney and Dummy Creek drainages. Landforms include Steep Canyonlands in lower stream reaches, Fluvial, Cryoplanated Basin Lands and Cryoplanated Uplands in mid elevations, and Strongly Glaciated Lands in some headwaters areas of the watershed.

Riparian vegetation consists of various vegetation complexes. Overstories are dominated by various willow species, quaking aspen, cottonwood, water birch, mountain alder, red osier dogwood, or a combination of these species. Understories primarily consist of several or more species of bluegrass, sedge, alpine timothy, blue joint reedgrass, tufted hairgrass, manna grass, wire grass and a variety of forbs.

Grass and sagebrush are the primary upland vegetation on south slopes from valley bottoms to elevations of 8,000 feet or more, with conifer intrusions where microsite conditions are favorable. Timbered vegetation grades from predominately Douglas-fir at the lower elevations to lodgepole pine at mid elevations to whitebark pine and subalpine fir at higher elevations. Rock scree is often found at the highest elevations and on steep slopes. Douglas-fir timber stands predominate in a general elevation range from 6,000 to 9,000 feet. These stands occupy the broadest range of environmental conditions in the Mid Salmon-Panther Subbasin. Stands of lodgepole pine are also generally present on north slopes from as low as 6,400 feet up to approximately 9,000 feet on all slope aspects. Non-timber upland vegetation consists of grasslands, dry meadows, aspen and sagebrush/grass. Grassland vegetation types include bluebunch wheatgrass and Idaho fescue. Dry meadow vegetation consists of Kentucky bluegrass with other grasses and forbs, and is usually found on intermediate elevation slopes between the riparian vegetation and sagebrush/grass or timber. Aspen is found in both large diameter uniform-age stands to mixed stands of various size and age class.

The Twelvemile Creek-Salmon River Watershed includes National Forest System, Bureau of Land Management and private lands. Activities which have occurred or continue to occur within portions of the watershed include, past timber harvest, grazing, roads, trails, water diversions, prescribed and natural fire, noxious weed treatment, and recreation.

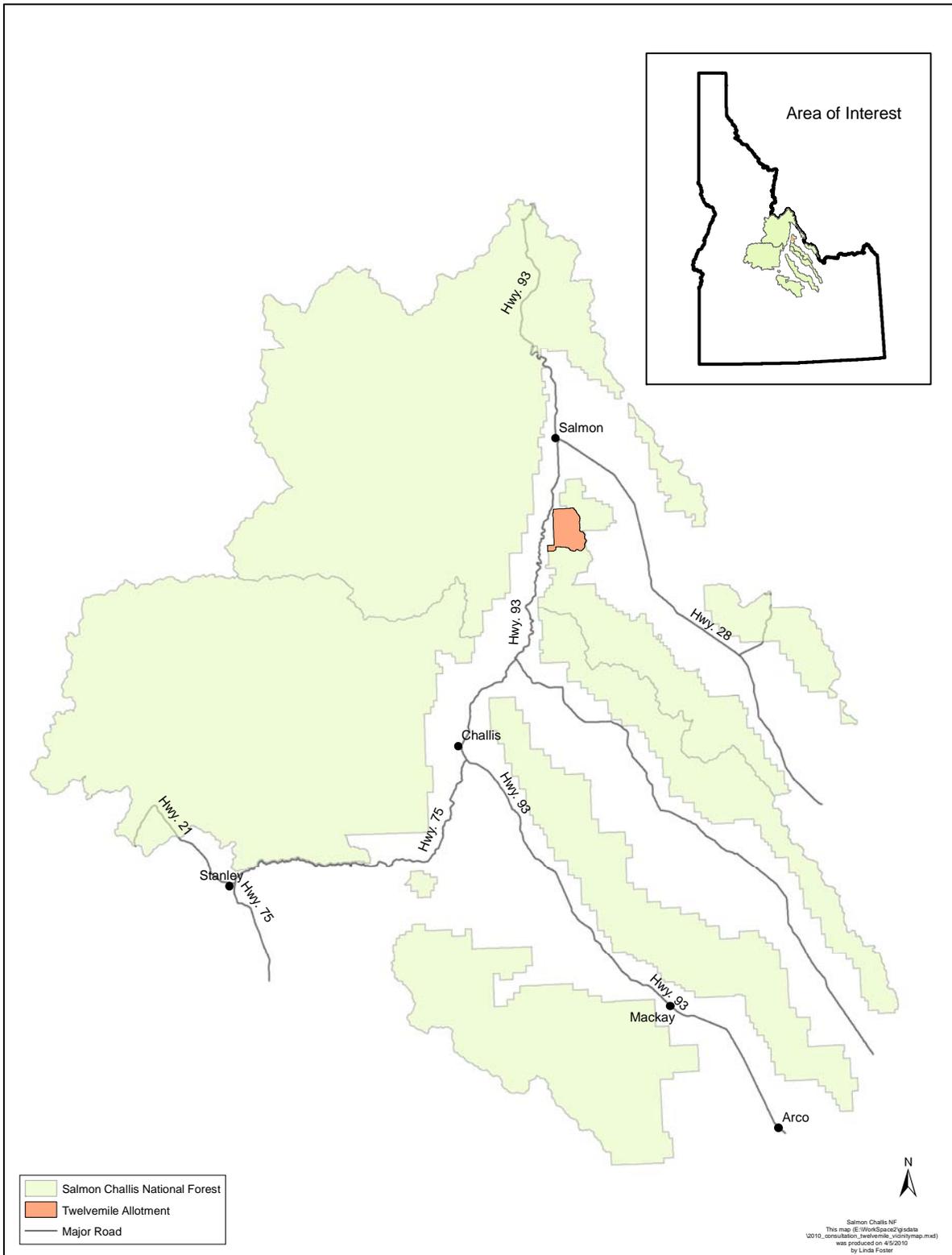
There are no private inholdings within the National Forest System lands encompassed by the allotment.

3 PROPOSED ACTION

3.1 PROJECT AREA

The Twelvemile Allotment is located south of the town of Salmon on National Forest System lands within portions of the Twelvemile, Meadow, Dummy, Second, Briney and Lost Creek drainages of the Twelvemile Creek-Salmon River Watershed (Figure 1). The allotment encompasses 17,199 acres and is divided into three units; Twelvemile Bottoms, Porcupine Springs and Twelvemile Meadows.

FIGURE 1 – TWELVEMILE ALLOTMENT VICINITY MAP



3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The Twelvemile Allotment is currently permitted for 150 cow/calf pairs from 7/16 to 9/23. The permit number is 10552 and expires on 12/31/2012.

3.2.2 GRAZING SYSTEM

- The Twelvemile C&H Allotment's grazing rotation system will continue to use a rest rotational season of use.
- Range readiness (Bluebunch wheatgrass in the first boot stage) will be monitored to determine if the on-date is appropriate and adjusted as necessary. Forest staff and permittee will do the monitoring to determine the on-date.
- Annual use indicators (see section 3.2.6) will dictate when unit moves or the off date occurs with unit move dates being approximate. Permittees are responsible for moving livestock to meet annual use indicators. Annual use indicators will be monitored by Forest Service personnel.

The following rotations will be used on this allotment:

TABLE 1 – UNIT ROTATIONS (SEE FIGURE 2 FOR UNIT LOCATIONS)

Year 1	Year 2
Twelvemile Bottoms Unit	Twelvemile Bottoms Unit
Twelvemile Meadows Unit	Porcupine Springs Unit
Porcupine Springs Unit	Twelvemile Meadows Unit (Rested)

Twelvemile Bottoms Unit:

- Bull Trout: Livestock will be out of the unit before August 15th every year.
- Steelhead: Livestock will not be in the unit before July 7th.
- Trailing: Livestock will be trailed through the upper portion of the unit after August 15th every year

Porcupine Springs Unit:

- No ESA fish present in unit (proposed Critical Habitat for bull trout present in unit).
- Trailing: No trailing impacts.

Twelvemile Meadows Unit:

- No ESA fish, designated critical habitat, or proposed critical habitat in unit.
- Trailing: No trailing impacts.

- **Entry:** Livestock are trailed onto the allotment from the FS Tenmile Allotment into the Twelvemile Bottoms Unit. Initial entry onto the Allotment is on or after July 16.
- **Unit Movements:**
Year 1: Livestock initially enter the Twelvemile Bottoms Unit. Then, livestock are moved to the Twelvemile Meadows Unit. Finally, livestock are moved to the Porcupine Springs Unit. Livestock are moved out of the Twelvemile Bottoms Unit prior to August 15. Duration of each move is approximately one day. See Table 1.

Year 2: Livestock initially enter the Twelvemile Bottoms Unit. Livestock are then moved to the Porcupine Springs Unit prior to August 15. Duration of move is approximately one day. See Table 1.

- **Exit:** Livestock are trailed from the last unit in the rotation off the allotment through the Forest Service's Tenmile Allotment to the Hot Springs Allotment.
- **Total Removal from NFS Lands:** All livestock will be removed by 09/23.

3.2.3 CONSERVATION MEASURES

The following measures will be implemented as part of the Twelvemile Allotment's annual operating instructions (AOI) to avoid and reduce potential impacts to ESA listed fish. Steelhead and bull trout considerations are:

1. A rest rotation grazing system will continue to be used. Resting the Twelvemile Meadows Unit in alternate years provides benefits to riparian vegetation. This will help meet our long term riparian resource objective for greenline successional status.
2. The on date will be varied so that livestock will be placed on the allotment at range readiness. This will reduce potential for bank alteration. This will help meet our long term riparian resource objective for bank stability.
3. Annual use indicators will dictate when livestock are moved between units or off the allotment within the terms of the term grazing permit including moves in response to fish spawning. This will help us meet our long term riparian resource objectives. Annual use indicators will be monitored by Forest Service personnel.
4. Permittees will continue to salt at least ¼ mile away from creeks. This will continue to reduce potential impacts on spawning areas and designated critical habitat.
5. Permittees will continue to distribute livestock away from streams and associated riparian areas (ride) at least once every two weeks, reducing potential impacts on spawning areas and designated critical habitat.
6. Fences and water developments have been placed to reduce livestock use on streams and their associated riparian areas. This will continue to reduce impacts on spawning areas and designated critical habitat.

3.2.4 CHANGES FROM EXISTING MANAGEMENT

The proposed action will be similar to past grazing actions within the allotment. The currently-observed baseline conditions within the allotment have developed under the past grazing strategy and, continuation of this grazing scenario is expected to allow at least equal grazing intensity and duration during the same time periods as has occurred in past years.

Recent grazing management changes associated with the proposed action identified in this Biological Assessment include:

- The monitoring attribute of browse use will be added to the Twelvemile Bottoms Unit MIM site, which is dominated by woody browse species. Greenline stubble will continue to be monitored at this site.
- The monitoring attribute of bank alteration will be added to the Twelvemile Bottoms Unit MIM site.

3.2.5 RESOURCE OBJECTIVES AND STANDARDS

Resource Objectives and Effectiveness Monitoring: The allotment is being managed to achieve the following 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) from PACFISH and its corresponding Biological Opinions (U.S Department of Commerce, National Marine Fisheries Service, 1998). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon and Challis Forest Plans in 1995.

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>).

Resource Objectives:

- Greenline Successional Status: A greenline successional status value of at least 61 (late seral) or the current value, whichever is greatest (Winward 2000, Burton et al. 2008).
- Woody Species Regeneration: A stable trend at sites with desired condition and an upward trend at sites not at desired condition (Winward 2000, Burton et al. 2008).
- Bank Stability RMO: A bank stability of at least 80% or the current value, whichever is greatest outside of priority watersheds. Within priority watersheds a bank stability of at least 90% or the current value, whichever is greatest (U.S Department of Commerce, National Marine Fisheries Service, 1998).
- Water Temperature RMO: No measureable increase in maximum temperature; <64°F in (Chinook, steelhead) migration and rearing areas and <60°F in spawning areas except in steelhead priority watersheds with a <45°F in spawning area (PACFISH BO; - U.S Department of Commerce, National Marine Fisheries Service, 1998). No measureable increase in maximum water temperature (7 day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period) Maximum water temperatures below 59°F within (bull trout) adult holding habitat and below 48°F within spawning and rearing habitats. (INFISH BO; - U.S. Department of the Interior, U.S. Fish and Wildlife Service, 1998).
- Width:depth ratio RMO: <10 mean wetted width divided by mean depth by channel type (PACFISH BO; - U.S Department of Commerce, National Marine Fisheries Service, 1998). Identification of width:depth ratio objective values will also consider values and ranges identified within the document Descriptions that Represent Natural Conditions in the Salmon River Basin, Idaho (Overton et al, 1995)
- Sediment RMO: <20% surface fine sediment which is substrate <0.25 in (6.4 mm) in diameter in spawning habitat or <30% cobble embeddedness in rearing habitat.

Resource Standards (PACFISH):

- GM-1 - Modify grazing practices (e.g., accessibility of riparian area 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 listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives and avoiding adverse effects on listed anadromous fish (PACFISH).
- 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 or adversely affect listed anadromous fish. 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 will not retard or prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish.

3.2.6 ANNUAL GRAZING USE INDICATORS

Annual Use Indicators and Implementation Monitoring: 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 greenline stubble height, bank alteration, and woody browse. In general, greenline stubble height is used to regulate grazing impacts on

greenline ecological status, bank alteration is used to regulate grazing impacts on bank stability, and woody browse is used to regulate impacts on 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.

Other annual use indicators follow:

- Livestock grazing in the uplands and riparian areas will be limited to 50% use on key herbaceous species within key areas of the allotment during the grazing season.
- When the relevant resource objectives are being met (section 3.2.5) annual use indicators, within riparian areas will be 50% browse on multi-stemmed species, 30% browse on single-stemmed species, and 4" residual stubble height.
- When the relevant resource objectives (see section 3.2.5) are not being met annual endpoint indicators, allowable use, will be 30% browse on multi-stemmed species, 20% browse on single-stemmed species, and 6" residual stubble height.
- When the bank stability objective (RMO) is being met the annual use indicator is 20% streambank alteration.
- When the bank stability is 75-99% of the RMO objective the annual use indicator is 15% streambank alteration.
- When the bank stability is <75% of the RMO objective the annual use indicator is 10% streambank alteration.

TABLE 2 – TWELVEMILE ALLOTMENT KEY AREA ATTRIBUTES, INDICATORS, AND TRIGGERS

Key Area Locations	Unit – Creek	Monitoring Attribute¹	Annual Use Indicator	Key Species	Trigger
MIM M234	Twelvemile Bottoms Unit – Twelvemile Creek	Browse Use	50%	Willow	45%
			30%	Alder	25%
		Greenline stubble	4 in.	Hydric spp.	5 in.
		Bank Alteration	20%	N/A	15%
Upland Sites	All Units	Utilization	50%	Upland grass species	45%
Riparian Areas	All Units	Utilization by Key Species	50%	Riparian grass species	45%

¹Browse use and greenline stubble will be used until next trend reading is completed to determine which attribute will be best suited to attain long term objectives.

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>).

3.2.7 IMPROVEMENTS

New Improvements: There are no new improvements proposed at this time.

Existing Improvements: Existing improvements are shown on Figure 7 and will be maintained in accordance with the term grazing permit.

Potential Future Improvements: Twelvemile Bottoms Upland Trough: This water trough will help pull livestock away from Twelvemile Creek, reducing impacts to ESA fisheries and habitat.

3.3 MONITORING

Implementation monitoring: The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be periodically monitored while livestock are in the Twelvemile Unit to evaluate the status of the standards 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. The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be monitored within each unit at the end of the grazing season to ensure that the standards have been met.

Effectiveness monitoring: The condition of resource objectives will be evaluated in the following manner: greenline successional status, bank stability, width:depth ratio, water temperature, and woody recruitment will be monitored every three to five years to evaluate resource conditions.

Monitoring results will be available at (<http://www.fs.fed.us/r4/sc/projects/range/index.shtml>)

3.4 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.

3.5 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.

3.6 ADAPTIVE MANAGEMENT

The adaptive management strategy described below and depicted in Appendix F diagrams 1.0 (Long-term) and 2.0 (Annual) 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 three 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. 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 general guidelines for establishing the values.

These guidelines will be used until such time as sufficient data and/or experience are available to customize the annual indicator values. The general guidelines are:

- Livestock grazing in the uplands and riparian areas will be limited to 50% use on key herbaceous species within key areas of the allotment during the grazing season.
- When the relevant resource objectives are being met (section 3.2.5) annual use indicators, within riparian areas will be 50% browse on multi-stemmed species, 30% browse on single-stemmed species, and 4" residual stubble height.
- When the relevant resource objectives (see section 3.2.5) are not being met annual endpoint indicators, allowable use, will be 30% browse on multi-stemmed species, 20% browse on single-stemmed species, and 6" residual stubble height.
- In non-priority watersheds, when bank stability is 80% or greater the bank alteration annual use indicator will be 20%
- In non-priority watersheds, when bank stability is 60-79% the bank alteration annual use indicator will be 10-20%
- In non-priority watersheds, when bank stability is less than 60% the bank alteration annual use indicator will be 10%

The annual use indicators and triggers for grazing use in Table 2 below will be used until the next trend reading is completed to determine which annual use indicators address attaining the resource objectives.

Annual Indicator will be adjusted if resource objectives are not being met.

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). In other words, this is the area where the action and any interdependent and interrelated actions will result in direct or indirect effects 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/or aquatic habitats in 1) the Twelvemile Creek drainage from its headwaters areas to the lower allotment boundary at the Forest/private land interface, 2) Upper reaches of the Meadow Creek drainage from its headwaters area downstream to the lower Twelvemile Allotment boundary, and 3) headwaters areas of Lost Creek, Second Creek, Briney Creek, and Dummy Creek within the Twelvemile Allotment boundary. (Figure 2).

Priority Watersheds are those watersheds that have been identified per direction in the 1995 PACFISH Biological Opinion, that require a different management strategy because of their importance to listed fish. Priority Watersheds within the action area are identified in Figure 3. There are no priority watersheds within the Twelvemile Allotment Action Area.

FIGURE 2 – TWELVEMILE ALLOTMENT ACTION AREA

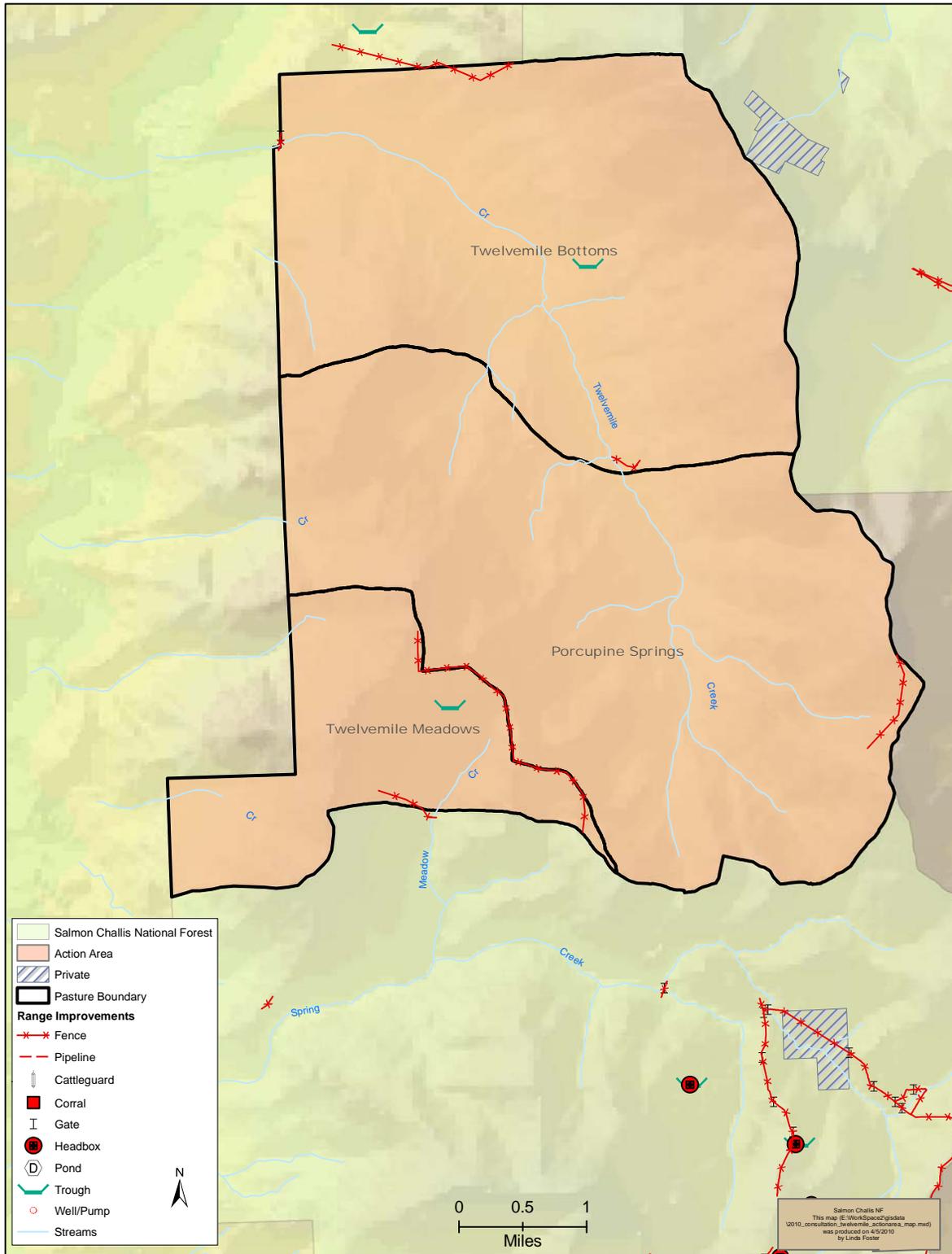
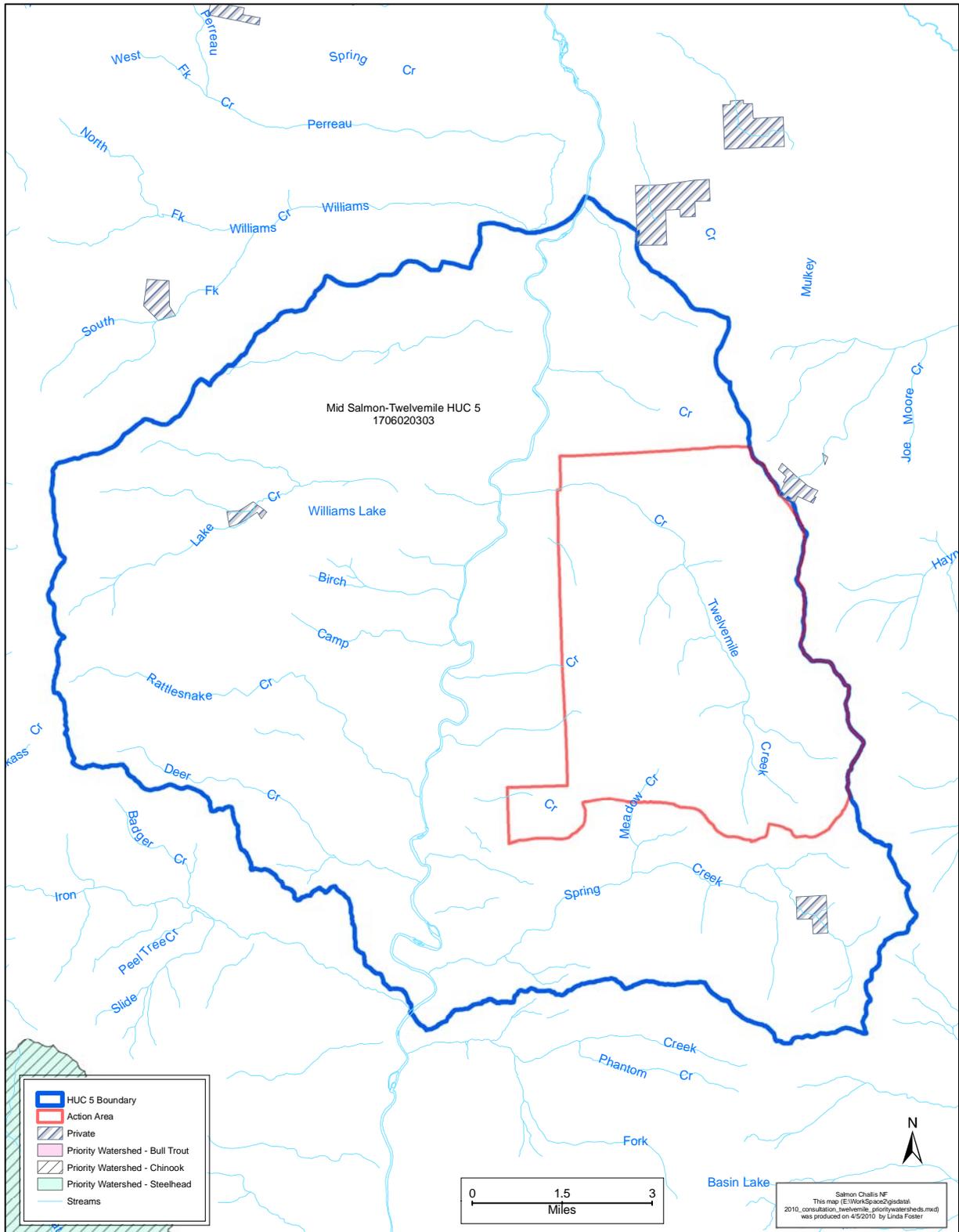


FIGURE 3 –FIFTH-FIELD HUCS AND PRIORITY WATERSHEDS



5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

The current semi-annual Species List issued by the U.S. Fish and Wildlife Service (List #14420-2010-SL-0089, issued December 30, 2009) identifies four ESA listed fish species as occurring on and adjacent to the Salmon-Challis National Forest. These are:

- Snake River Sockeye Salmon (Endangered) (Federal Register 56FR58619)
- Snake River Spring/Summer Chinook Salmon (Threatened) (Federal Register 57FR14653)
- Snake River Steelhead (Threatened) (Federal Register 62FR43937)
- Bull Trout (Threatened) (Federal Register 63FR31647)

Salmon-Challis National Forest and Idaho Department of Fish and Game surveys indicate that two of these species occur within the action area. These species are steelhead (Figure 4) and bull trout (Figure 5). Chinook salmon are not present within waters of the Twelvemile Allotment. Sockeye salmon utilize the mainstem Salmon River corridor as a migration route but do not occur within the action area (Federal Register 56FR58619).

5.2 CRITICAL HABITAT

5.2.1 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

Critical habitat has been designated for Snake River spring/summer Chinook salmon and includes “river reaches presently or historically accessible...to Snake River spring/summer Chinook salmon” (Federal Register 58FR68543). The Salmon-Challis National Forest has mapped Chinook salmon critical habitat designations within Forest streams following the process identified in Appendix D. It should be emphasized that this process is not to “designate” Chinook salmon critical habitat but to portray the Salmon-Challis National Forest’s interpretation of those areas that have already been designated by the rule. Utilizing this process, the Forest has not identified any Chinook salmon critical habitat within the Twelvemile Allotment action area.

5.2.2 SOCKEYE SALMON

Critical habitat has been designated for Snake River sockeye salmon (Federal Register 58FR68543). This designation does not include any waters within the action area.

5.2.3 SNAKE RIVER BASIN STEELHEAD

Critical habitat has been designated for Snake River Basin steelhead (Federal Register 70FR52630). The Twelvemile Allotment does not support any designated steelhead critical habitat. (Figure 4).

5.2.4 COLUMBIA RIVER BULL TROUT

Critical habitat was designated for bull trout on September 26, 2005. This designation did not include any areas encompassed by the proposed action. Currently, however, the U.S. Fish and Wildlife Service has published public notice (January 13, 2010, Federal Register 75FR2270) that it is proposing to revise the 2005 designated critical habitat. While the Twelvemile Allotment action area does not contain any currently designated critical habitat for bull trout, it does contain proposed critical habitat. Proposed bull trout critical habitat within the Twelvemile Allotment includes mainstem reaches of Twelvemile Creek within the Twelvemile Bottoms and Porcupine Springs Units (Figure 5).

The Forest desires to assess the potential impact to the Primary Constituent Elements (PCEs) of proposed bull trout critical habitat. These are defined on page 2360 of the referenced Federal register notice. Because these elements are important to areas on the Forest where bull trout are present, the

Forest would like to demonstrate that potential impacts to the PCEs have been assessed and considered in the proposed action (Appendix E).

FIGURE 4 – STEELHEAD

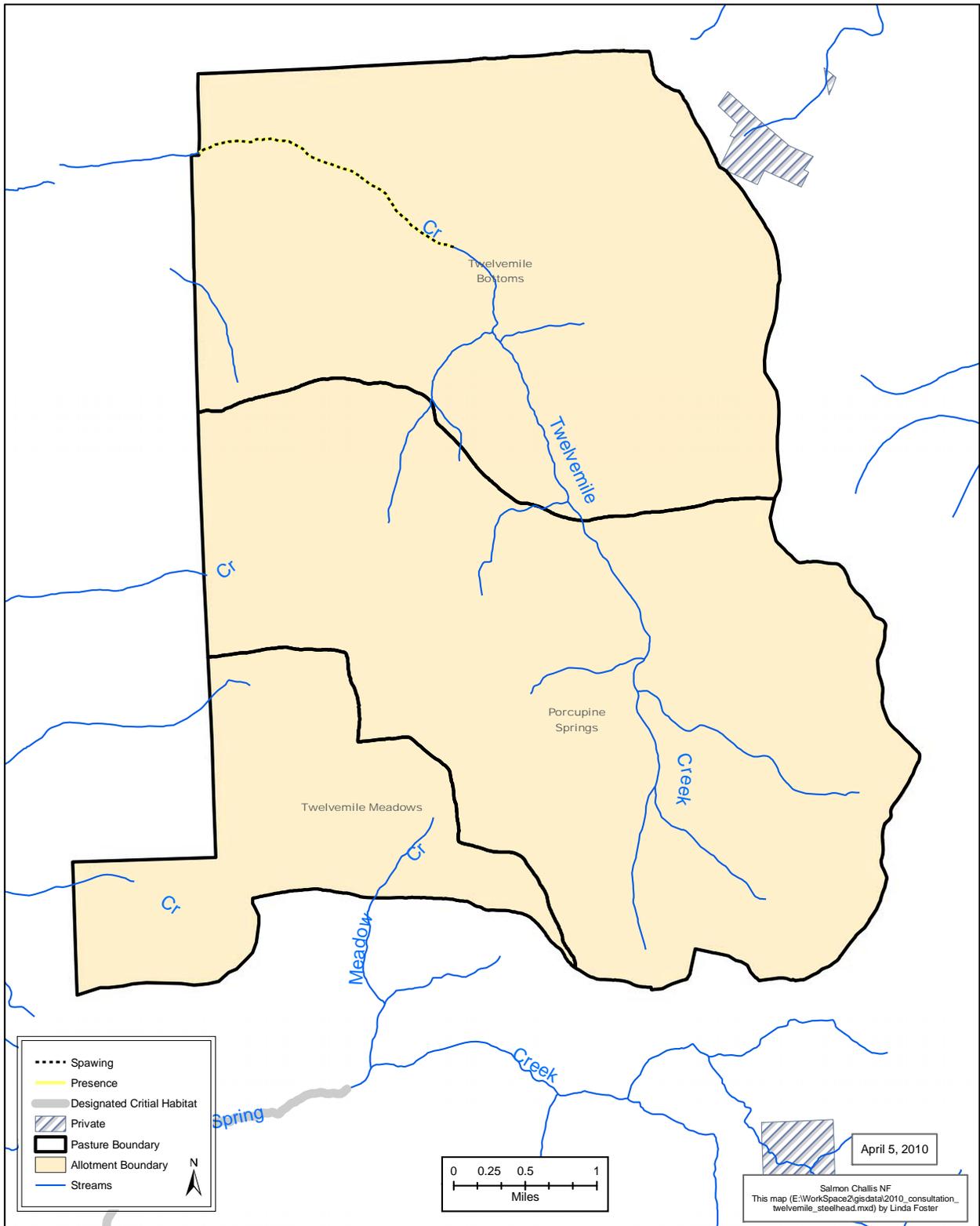
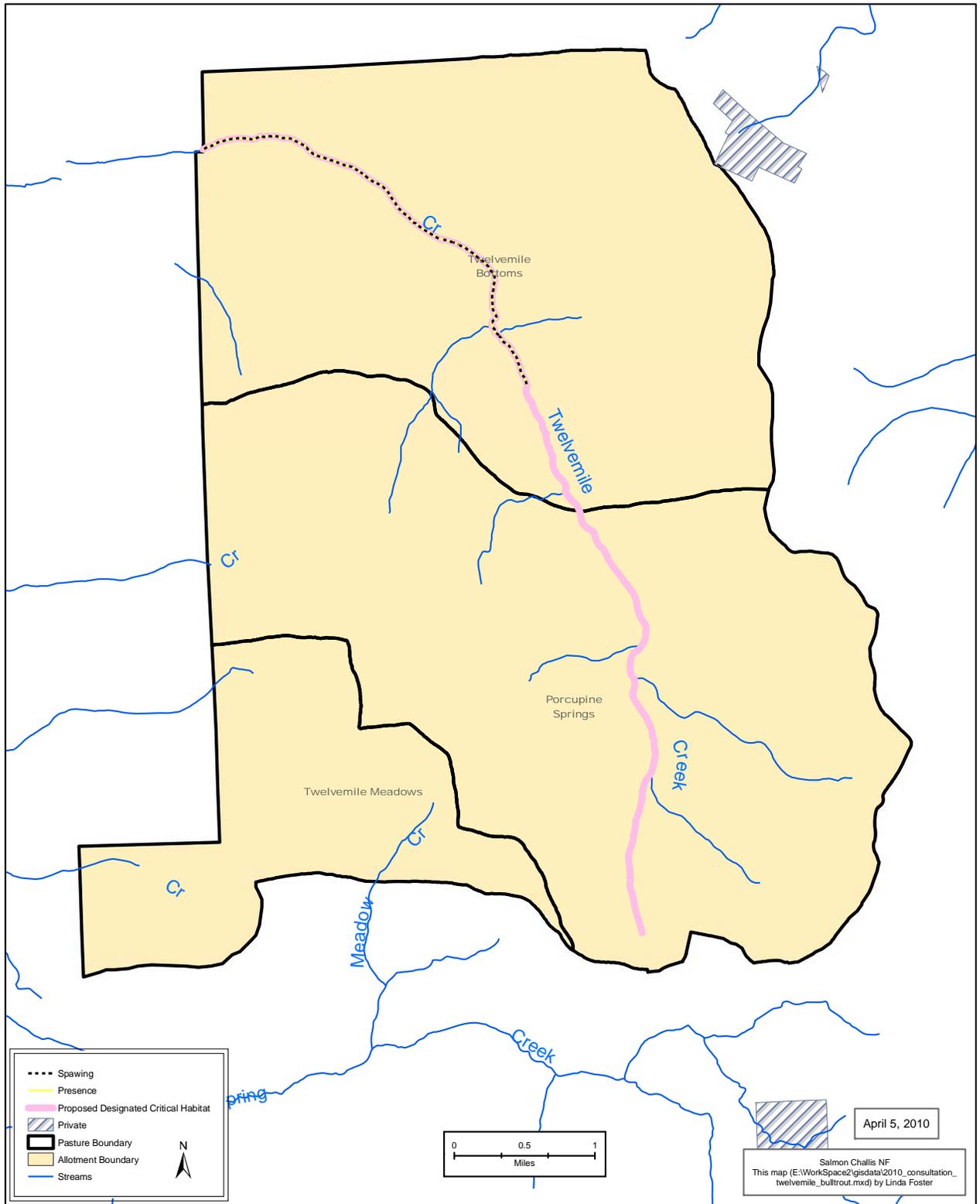


FIGURE 5 – BULL TROUT



6 ENVIRONMENTAL BASELINE DESCRIPTION

The action area is within the Twelvemile Creek-Salmon River HUC5 watershed (HUC 1706020303). Baseline Matrices of Diagnostic Pathways and Indicators for this watershed are provided in Appendix B.

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.

Twelvemile Creek is the only stream within the Twelvemile Allotment action area which supports populations of, and/ or habitat for, listed fish species. All other streams within areas that will be grazed do not contain listed fish or support designated critical habitat. However, livestock grazing in these areas may indirectly affect listed fish and designated critical habitat in other streams within the allotment.

6.1.1 CHINOOK SALMON

Chinook salmon are not present within any streams of the Twelvemile Allotment action area.

6.1.2 STEELHEAD

The lower reaches of mainstem Twelvemile Creek within the Twelvemile Bottoms Unit are known to support populations of steelhead. These fish belong to the Pahsimeroi River Population of the Salmon River Major Population Group. Steelhead were the only fish species observed during Forest Service electroshocking operations (SCNF Fisheries Files, 2009). Distribution of steelhead within Twelvemile Creek is considered to include 2.06 miles of stream within the Twelvemile Allotment action area. Single pass electrofishing operations within the allotment in 2009 identified an estimate of 6.49 fish per 100 meters², with fish ranging between 60 mm (2.3 in) and 205 mm (8.1 in) in length. There have been no observations of utilization of Twelvemile Creek by spawning adult steelhead, despite survey efforts to identify such use (Jim Juza, IDFG, Personal communication; Chuck Warren, IDFG, personal communication). Access to National Forest System lands is limited by seasonal irrigation diversions below the Forest Boundary, and steelhead presence on Forest lands appears to currently be limited to juvenile fish which have migrated from lower drainage areas during non-irrigation periods when passage conditions are favorable

Relatively little is known of the status or trend of steelhead populations within the Twelvemile Creek drainage, and no steelhead redd count information is available.

Steelhead are absent from all other streams or stream reaches within Twelvemile Allotment.

6.1.3 BULL TROUT

Bull trout are present in mainstem Twelvemile Creek stream reaches within the Twelvemile Allotment. While Forest electroshocking operations did not identify bull trout in Twelvemile Creek, Idaho Fish and Game identifies bull trout presence within stream reaches in the Twelvemile Bottoms Unit of the allotment. Bull trout are considered to be present within the lowermost 3.34 miles of Twelvemile Creek stream reaches within the allotment. These fish belong to the Twelvemile Creek Local Population of the Mid Salmon-Panther Core Area.

Little is known of utilization of Twelvemile Creek by fluvial fish. Migratory access may be limited by irrigation diversions in the lower drainage.

Bull trout are absent from all other streams or stream reaches within Twelvemile Allotment.

6.2 GENERAL DESCRIPTION OF HABITAT CONDITIONS

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

6.2.1 TWELVEMILE CREEK

The Twelvemile Allotment Action Area encompasses all but the lower 0.9 mile of the Twelvemile Creek drainage. Flow regimes of lower mainstem stream reaches below the allotment action have been impacted by irrigation diversions from private lands, which, although not preventing the stream from reaching the Salmon River, have altered natural processes. Within the action area, however, fish habitat conditions in Twelvemile Creek are in generally good condition and meeting most PACFISH standards and Primary Constituent Element criteria. Overall physical habitat quality, including the elements of water quality, flow/hydrology, channel conditions and structural habitat elements is considered good, and exhibiting generally stable trends. .

6.3 MAJOR LIMITING FACTORS

Identified limiting factors of the Twelvemile Creek-Salmon River Watershed include high watershed level road densities (1.8 miles per mile²) and high stream sediment levels within the Lake Creek drainage. Alterations in peak and base flows are occurring in several streams of the watershed due to irrigation and hydropower diversions and may be posing barriers to fish migrations.

Within the Twelvemile Allotment action area, the factor most likely to be limiting fisheries resources from achieving full carrying capacity is peak/base flow alteration within the Twelvemile Creek drainage. Irrigation diversions have reduced peak and base flows in the lower reaches of Twelvemile Creek which impact fish migration capabilities. Quality of upstream aquatic habitats within the action area is not influenced by these lower-drainage withdrawals, however.

More specific details on status and trends of habitat within the action area are provided below.

6.4 GRAZING FOCUS INDICATORS

One tool developed to assist in describing the condition of watersheds and streams which listed Chinook salmon, steelhead and bull trout depend on is; *A Framework to assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Subpopulation Watershed Scale* (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 a listed salmonid habitat. Using this table assists in consistent organization an assessment of current condition and judging how those indicators may be impacted by a proposed action (Lee et al. 1997). The Forest has included a matrix for this allotment as Appendix B of this Biological Assessment. 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", on which analysis of livestock impacts to fish and designated habitat will be based. These 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 set, 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 of the proposed action's effects on that habitat component.

These indicators encompass the recently published draft PCEs for Chinook salmon, steelhead and 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:

6.4.1.1 CHINOOK SALMON SPAWNING AND INCUBATION

Chinook salmon are not present within the Twelvemile Allotment and no Chinook salmon spawning or incubation currently occurs within the allotment action area.

6.4.1.2 STEELHEAD SPAWNING AND INCUBATION

NMFS Intrinsic Potential mapping identifies approximately 2.06 miles of potential steelhead spawning habitat within the Twelvemile Allotment action area (Figure 4 and Appendix C). All potential steelhead spawning habitat is located within lower mainstem Twelvemile Creek stream reaches located in the Twelvemile Bottoms Unit of the allotment. This length reflects a continuous mapping reach and is likely a significant overestimate of actual spawnable area within the stream due to occurrence of high gradient reaches and the discontinuous occurrence of suitable combination of water depth, water velocity and stream substrate composition within lower gradient reaches.

Data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general spawning periodicity for Salmon River tributary streams between Horse Creek and the Pahsimeroi River ranging from March 15 through June 14, with egg incubation through the first week of July.

Information on current steelhead utilization of spawning habitats within the Twelvemile Allotment is largely lacking. As identified in Section 6.1.2, electrofishing surveys have identified juvenile steelhead as being present in reaches of Twelvemile Creek within the allotment, but Idaho Department of Fish and Game surveys have not documented any use of this stream by sea-run adult spawners (Chuck Warren, IDFG, personal communication). Based upon identified access limitations through lower drainage culverts and past private land irrigation diversions, it is not believed that adult steelhead spawning is occurring within the Twelvemile Allotment.

If, in future years, adult steelhead access and spawning is found to extend to Forest lands within the Twelvemile Creek drainage, the Salmon-Challis National Forest will reinitiate consultation for this species.

6.4.1.3 BULL TROUT SPAWNING AND INCUBATION

All bull trout spawning habitat within the Twelvemile Allotment is located within the Twelvemile Bottoms Unit. Mainstem Twelvemile Creek supports approximately 3.34 miles of bull trout spawning habitat in its lower reaches within the allotment. (Figure 5 and Appendix C) These lengths reflect continuous mapping reaches and are likely a significant overestimate of actual spawnable areas within the allotment streams due to occurrence of high gradient reaches and the discontinuous occurrence of suitable combination of water depth, water velocity and stream substrate composition within reaches of the stream.

Data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general bull trout spawning periodicity for Salmon River tributary streams between Horse Creek and the Pahsimeroi River ranging from August 15 through October 14, with egg incubation extending through winter months to the end of April. Available water

temperature data for mainstem Twelvemile Creek indicate generally cool temperature regimes through the summer months, but suggest that seasonal temperature drops to levels conducive to bull trout spawning may typically occur somewhat later than the general August 15 bull trout spawning initiation date identified by the Upper Salmon Basin Watershed Project Technical Team. (see Appendix C, Figure 1).

No bull trout spawning information is available for Twelvemile Creek.

6.4.2 WATER TEMPERATURE

Water temperature influences many aspects of salmonid fish life history, including reproduction, growth, and migration (Bjornn and Reiser, 1991). PACFISH identifies water temperature criteria for salmon and steelhead species of less than 64 degrees F (17.8 degrees C) for rearing, and less than 60 degrees F (15.6 degrees C) for spawning and incubation. In identified steelhead priority watersheds, PACFISH identifies an additional water temperature criteria of less than 45 degrees F (7.2 degrees C) during steelhead spawning periods (U.S Department of Commerce, National Marine Fisheries Service, 1998). PACFISH and INFISH additionally identify a bull trout water temperature criteria of maximum temperatures below 59 degrees F (15 .0 degrees C) within adult holding habitats, and less than 48 degrees F (8.9 degrees C) within spawning and rearing habitats (ibid; U.S. Department of the Interior, U.S. Fish and Wildlife Service, 1998).

Water temperature regimes are considered to be functioning appropriately at the watershed scale within the Twelvemile Creek-Salmon River Watershed (Appendix B). Within the Twelvemile Allotment, water temperatures have been monitored on mainstem Twelvemile Creek near the lower allotment boundary (T100, Figure 6). Monitoring operations indicate that water temperature regimes in Twelvemile Creek are meeting all applicable spawning and rearing temperature criteria. The mean seasonal temperature of 9.1 degrees C observed during the 2009 season (Appendix C, Table 8 and Figure 1) is below the 10 degree C (50 degree F) maximum value identified by Gamett (2002) for optimum habitation by bull trout.

6.4.3 SEDIMENT

Stream sediment conditions can influence fish incubation success as well as rearing habitat quantity and quality and fish food base productivity (Bjornn and Reiser, 1991).

Stream sediment conditions are considered to be functioning at risk at the watershed scale in the Twelvemile Creek-Salmon River Watershed due to elevated sediment levels within the Lake Creek drainage. Sediment levels have been monitored within the Twelvemile Allotment at one site in lower Twelvemile Creek (BD15) since 1993 (Appendix C, Table 9).

Monitoring results at the BD15 monitoring site indicate that stream sediment levels of Twelvemile Creek have met the PACFISH sediment RMO of ≤ 20 percent substrate fines during three of eight samplings, but have been within the Salmon-Challis National Forest's sediment goal level for mixed geology (ie quartzite/volcanic) steams of ≤ 25 percent fines in five of eight samplings and during all surveys since 1998 (Appendix C, Table 9). Review of 2009 core sampling data at the BD15 monitoring site initially suggested elevated levels of fines in Twelvemile Creek, but closer review revealed that the composite value of five samples included one excessive reading in a region of the sample which was not reflective of general spawning habitat criteria and was predominated by a sand lens. Recalculating a composite value without this individual outlying subsample indicated that sediment levels were consistent with past observations, and remained within Forest geology based goal levels. Observations of consistently high streambank stabilities at the sediment monitoring site further suggest that aquatic and riparian habitat conditions are generally in good condition within Twelvemile Creek.

6.4.4 WIDTH: DEPTH RATIO

Stream width:depth ratios influence available living space within stream habitats. Stream channel widening results in shallower depths which reduce habitat suitability (Platts and Nelson, 1989).

Stream channel width:depth ratios have been identified as functioning appropriately at the watershed scale in the Twelvemile Creek-Salmon River Watershed. Little current width:depth information exists for streams within the Twelvemile Allotment action area however. Width:depth ratios have been monitored in association with Forest sediment monitoring operations at one site in lower Twelvemile Creek (BD15) since 1993 (Appendix C, Table 9), but surveys since 2004 have not included channel geometry measurements. No width:depth data has yet been collected at the newly established Twelvemile Creek MIM site (M234)

Past surveys of channel geometry at the Forest's Twelvemile Creek sediment sampling site have identified width:depth ratios between 8.0 and 17.4 between 1993 and 2003, with the most recent reading recording the lowest width:depth ratio value (Appendix C, Table 9).. While only the most recent (2003) reading fell within the PACFISH width:depth ratio RMO of 10, all surveyed values during this period of record have been less than the mean width:depth value of 28 identified by the Natural Condition Database (Overton et al, 1995) for B channel types (Rosgen, 1994; Rosgen, 1996) within metamorphic (eg quartzite) geologies . While available information on width:depth ratios does not include any recent surveys, the Forest is not aware of any significant activities or events which would have been expected to incur a change in channel morphology in action area streams from previously-observed width:depth ratios, and photos taken at the Twelvemile Creek sediment sampling location (BD15) and electrofishing site (E85) in 2009 do not indicate any observable channel geometry changes from previous years.

6.4.5 STREAMBANK CONDITION

Streambank condition can influence the overall stability and resilience of stream channels. Reduced streambank stability can result in reduced structural stability of the stream channel resulting in negative impacts on fish productivity (Platts, 1991).

Streambank conditions are considered to be functioning appropriately at the watershed scale in the Twelvemile Creek-Salmon River Watershed. Most streams are very stable and naturally armored. Streambank stability levels have been monitored within the Twelvemile Allotment at a site in lower Twelvemile Creek (BD15) intermittently between 1993 and 2009 (Appendix C, Table 11).

Monitoring data collected at this site identified streambank stabilities between 74.0 and 97.0 percent during eight sampling periods, with only one year indicating bank stabilities below 90 percent. The 2009 survey of the site identified bank stability at 91.5 percent. With the exception of a dip to a 74.0 percent stability reading in the mid 1990s, general trend at the monitoring site during the period of record has been stable with consistent attainment of the 80 percent PACFISH bank stability RMO.

No streambank stability data has yet been collected at the newly established Twelvemile Creek MIM site (M234). This site is located in very close proximity to the Forest's long established sediment monitoring site BD15 (see Figure 6), and it is expected that streambank stabilities observed at the sediment monitoring location have been and will continue to be similar to conditions at the new MIM site.

6.4.6 RIPARIAN CONSERVATION AREAS

Condition of riparian vegetation can strongly influence aquatic habitat quality and fish productivity.. Removal of riparian vegetation can result in negative impacts to fish populations (Platts and Nelson, 1989).

A MIM monitoring site has only recently been established within the Twelvemile Allotment. Site M234 is located in lower Twelvemile Creek in 2009 with first proposed baseline reading scheduled for the 2010 grazing season.

While no riparian condition data is currently available for this MIM location, initial visit of this site in 2009 indicated that current Greenline Ecological Status (GES) at the site is most likely at Late Seral stage (Ben Goodin, personal communication). Photos taken in association with 2009 electroshocking operations at E85, in the same general location on Twelvemile Creek as M234, support the conclusion of a Late Seral GES in this area (see Appendix C, Photo 1).

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 3 – 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 (Benneyfield, 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 3. Analysis emphasizes effects to the six focus indicators previously identified as being susceptible to impacts of grazing activities.

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).

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 streambank damage, removal of shade-providing vegetation, widening of stream channels, introduction of fine sediment and channel incision.

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:

- Strategic Rotation: Unit rotation strategies designed to move livestock off streams during critical spawning periods can avoid direct impact to spawning fish or their incubating redds.
- 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.
- Salting: Placing salt or mineral supplements in upland areas can decrease the amount of time livestock spend in riparian areas. Ehrhart and Hansen (1997) provide evidence that salt, when used in conjunction with alternate water sources, can help distribute livestock over open range
- 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,
- Herding: Utilizing riders to keep livestock away from riparian areas can avoid direct impacts to spawning fish and incubating redds.
- 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.

Information on the effectiveness of the proposed conservation measures is limited. Erhart and Hansen (1997) found mixed success when only one technique was applied. However, when applied collectively, this suite of measures has been shown to be effective in minimizing direct livestock impact to spawning habitats and avoiding indirect impacts to aquatic and associated riparian habitats (ibid). The Forest has integrated each of these six measures into its grazing strategy for the Twelvemile Allotment to reduce the potential for adverse effects to listed fish and aquatic and riparian habitats within the action area.

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

7.1.1 SPAWNING AND INCUBATION

Livestock can trample salmonid redds when grazing occurs at times and places where redds are present (Gregory and Gamett, 2009). Factors which can lessen the degree of effects from grazing include active measures to keep cattle off stream channels such as fencing, off channel salting or employment of riders, or natural inaccessibility of stream channels due to topography or dense riparian vegetation.

Listed fish species spawn within portions of the Twelvemile Allotment, and it is possible that livestock could trample redds in these streams if grazing occurs when fish are spawning or eggs are incubating within stream substrates. Effects to listed-species spawning and incubation within the Twelvemile Allotment are discussed individually below.

7.1.1.1 CHINOOK SALMON

Chinook salmon are not present within the Twelvemile Allotment and no Chinook salmon spawning or incubation occurs within the allotment action area. Grazing operations therefore have no potential to effect Chinook salmon spawning or incubation.

7.1.1.2 STEELHEAD

While suitable steelhead spawning habitat has been identified within the Twelvemile Creek drainage in the Twelvemile Allotment action area, surveys of the lower portions of the drainage by Idaho Fish and Game have not identified utilization of these habitats by adult spawners. Based upon consideration of identified migration limitations past existing stream diversion on private lands below the Forest boundary,

and observed absence of adult spawners in areas above these diversions, it is believed that adult steelhead are currently unable to migrate onto Forest lands within the Twelvemile Creek drainage and are not currently utilizing potential spawning habitats within the Twelvemile Allotment. Additionally, livestock entry into the Twelvemile Bottoms Unit will not occur in any year until after the July 7 conclusion of any potential steelhead incubation in the drainage. Therefore, the proposed grazing operation's potential to affect steelhead spawning and incubation within the Twelvemile Allotment action area is currently considered discountable.

7.1.1.3 BULL TROUT

Mainstem Twelvemile Creek supports populations of bull trout and approximately 3.34 miles of suitable bull trout spawning habitat within the Twelvemile Bottoms Unit of the Twelvemile Allotment. No potential bull trout spawning habitat is identified in other units of the allotment.

During both years of the two year Twelvemile Allotment grazing rotation cycle, livestock initially enter the Twelvemile Bottoms Unit via upland routes from the Salmon-Challis National Forest's Tenmile Allotment in early July and graze within this unit to approximately mid-August. In "Year 1" of the rotation cycle, livestock then move first to the Twelvemile Meadows Unit in late July to early August, then move to the Porcupine Springs Unit in early to mid August. In "Year 2" of the rotation cycle, livestock move from the Twelvemile Bottoms Unit to the Porcupine Springs Unit in early to mid August, and remain in that pasture to late September. In both years of the grazing cycle, livestock are moved out of the Twelvemile Bottoms prior to the August 15 initiation of bull trout spawning activity identified by the Upper Salmon Basin Watershed Project Technical Team.

In both years of the grazing rotation cycle, final livestock trailing from the Porcupine Springs Unit is conducted along approximately 1.4 miles of the Twelvemile Creek road within the upper portions of the Twelvemile Bottoms unit within Township 19N, Range 22E, Section 9, then over upland routes out of the Twelvemile Creek drainage through the Salmon-Challis National Forest's Tenmile Allotment and finally to the Forest's Hot Springs Allotment. The roadway reach of this trailing route is perched on the hillslope above Twelvemile Creek, with the stream being considered inaccessible to livestock over approximately 90 percent of the 1.4 mile length. This final trailing will be comprised only of dry cows, with calves being pulled off within the Porcupine Springs Unit prior to initiation of trailing operations. Duration of trailing operations through the roadway reach is expected to be minimized by the combination of active herding with an absence of calves within the herd. Given consideration of these factors, it is concluded that the potential for livestock access to bull trout spawning habitats within Twelvemile Creek reaches along the roadway reaches of the final trailing route is discountable and unlikely to occur.

In summary, unit movement timing avoids livestock grazing within bull trout spawning habitats of the Twelvemile Allotment in both years of the two year grazing rotation cycle. Grazing of the Twelvemile Unit, which supports all of the potential bull trout spawning habitat within the Twelvemile Allotment, is concluded prior to the August 15 initiation of bull trout spawning, with subsequent seasonal grazing activities conducted within units which do not support bull trout populations or bull trout spawning habitats. The potential for direct livestock impact to bull trout spawning or incubation in association with unit grazing activities is therefore considered discountable. While a portion of the final trailing route of livestock out of the allotment will be along a roadway route along the course of Twelvemile Creek supporting potential bull trout spawning habitats, consideration of up slope road location, trailing duration and the general inaccessibility of the stream to livestock, potential for livestock impact to bull trout redds during trailing operations is additionally considered discountable.

7.1.2 WATER TEMPERATURE

Stream temperatures can have important effects on fish distribution and abundance. Livestock grazing can impact aquatic and riparian habitats by reducing streamside vegetation or reducing stability of streambanks, both of which can result in channel widening and increased solar exposure, leading to elevated stream temperatures (Platts, 1991). Livestock grazing can impact stream temperatures both in areas that are grazed by livestock and in areas downstream from where grazing occurs (see section 6.4.7).

Available monitoring data indicate that water temperatures within the Twelvemile Allotment are meeting all applicable PACFISH and State of Idaho water temperature criteria. Observed mean water temperatures in Twelvemile Creek reflect near-optimum conditions for bull trout occupancy.

While no data currently exists from the recently established Twelvemile Creek MIM site, site photos of the general monitoring area suggest that riparian conditions are currently at a Late Seral stage. Supplemental monitoring information from Forest sediment monitoring operations identify high bank stabilities and width:depth ratios below mean Natural Condition Database values the channel type and geology.

Since Twelvemile Creek appears to display healthy riparian areas and channel conditions, it is unlikely that livestock grazing has produced measureable impacts to water temperatures in the stream. Significant reaches of the stream, including approximately 45 percent of fish occupied reaches, are considered inaccessible to livestock due to steep topography, thick riparian vegetation density or combinations of both factors. In the absence of observed impacts to stream temperature influencing habitat parameters, it is concluded that recent and future livestock grazing within the Twelvemile Allotment has not and will not result in detectable effects to water temperatures or water temperature regimes within the streams of the action area. Conservation measures of the proposed action, including, fencing and off-stream water developments by further minimizing riparian vegetation use and livestock impact to streambanks within allotment streams. Because of the expected effectiveness of the project design and associated Conservation Measures in reducing near-stream livestock activity, grazing along these streams is not expected to generate any measurable increases in water temperatures which could be meaningfully measured, detected or evaluated. We, therefore, expect the impact of livestock grazing on stream temperatures within the Twelvemile Allotment action area to be insignificant, and expect that the proposed action will maintain the condition of the Water Temperature focus indicator.

Livestock will also graze along several tributary streams that are not occupied by listed fish but that flow into streams with listed fish, but these streams are relatively small, generally less than 1.0 m in width, and any potential impacts to water temperatures in these streams resulting from grazing likely could not be meaningfully measured, detected, or evaluated within ESA-occupied or Critical Habitat streams of the Twelvemile Allotment action area.

Future MIM monitoring will be effective in identifying future trends of riparian vegetative status and trend within the action area. In combination with additional periodic water temperature monitoring within the watershed, these monitoring operations will be effective in identifying both the occurrence and causal mechanisms of any changed conditions which would initiate responsive modification of grazing management strategies for the allotment under the adaptive management strategy.

7.1.3 SEDIMENT

Elevated levels of stream sediment can affect the survival of salmonid eggs and alevins (Bjornn, et al, 1998). Livestock grazing can increase sediment levels by altering bank stability, riparian vegetation, and upland vegetation (see section 6.4.7). Livestock grazing and unmanaged trailing activities can impact sediment levels in areas that are grazed by livestock and in areas downstream from where grazing occurs.

Stream sediment levels within the Twelvemile Allotment have shown considerable variability over the course of Forest monitoring, and have fully met the PACFISH sediment RMO during less than half of survey observations. Observed levels since 1998 have, however, met or significantly surpassed the Salmon-Challis National Forest's sediment goal level for mixed geology streams, and have shown an overall improvement in sediment condition over the course of the monitoring period. Current sediment conditions are believed to be at or near capability levels for the landtype.

The proposed grazing action is expected to maintain stream sediment conditions within the Twelvemile Allotment action area. Measures including salting, fencing, and use of range riders to keep livestock in upland areas will contribute to minimizing near stream livestock activity which could result in sediment generation to action area streams through direct streambank impact or reduction of stabilizing riparian vegetation. There will likely be some generation of turbidity in association with incidental livestock crossing of stream channels within the allotment. Turbidities associated with incidental livestock crossing of these sites are expected to be limited to areas immediately below the crossing locations and short-term

in nature. Direct and indirect effects of livestock disturbances associated with stream crossings is not expected to be of a magnitude or duration which could produce meaningfully measured, detected or evaluated effects to surface or at-depth substrate sediment levels in areas the allotment supporting either salmonid spawning or designated or proposed critical habitat for listed species.

Livestock will also graze along tributary streams that are not occupied by listed fish but that flow into streams with listed fish. The grazing standards in place for these areas should limit grazing impacts to sediment levels in these streams. Furthermore, these streams are relatively small, generally less than 1.0 meter in width, and any increases in sediment levels in these streams resulting from grazing likely could not be meaningfully measured, detected, or evaluated in receiving waters supporting designated or proposed critical habitat.

In summary, the proposed action is not expected to generate any measurable increases to sediment levels in streams containing listed fish or supporting designated critical habitat. Overall, it is believed that the impact of livestock grazing on sediment levels within streams supporting ESA listed fish or designated or proposed critical habitat cannot be meaningfully measured, detected, or evaluated. Therefore, we expect the impact of livestock grazing on sediment levels in ESA occupied or critical habitat designated streams of the allotment to be insignificant. Because of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams, we believe any livestock related impacts to sediment would be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. The proposed action is expected to maintain the condition of the Sediment Focus Indicator.

Ongoing sediment monitoring will be employed to continue to identify trends of stream substrate conditions within the Twelvemile Allotment. These monitoring operations, supplemented by ongoing MIM monitoring, will be effective in identifying both the occurrence and causal mechanisms of any significant change in substrate conditions which would initiate responsive modification of grazing management strategies for the allotment under the adaptive management strategy.

7.1.4 WIDTH: DEPTH RATIO

Width:depth ratios can have important effects on fish populations and livestock grazing can impact width:depth ratios. Livestock impact width:depth ratios by altering bank stability (see section 6.4.7). Livestock reduce bank stability through direct bank trampling or by modifying the amount or type of riparian vegetation. As bank stability declines, the banks are more susceptible to lateral erosion which can lead to a wider, shallower stream (Platts and Nelson, 1989). Livestock grazing primarily impacts width:depth ratios in the areas that are grazed by livestock. If localized disturbances are severe, however, effects can additionally occur further downstream, as stream channels respond to upstream impact.

Available data suggests that Twelvemile Creek is functioning appropriately with respect to width:depth ratios. While monitoring data indicates that channel geometry has not generally met PACFISH width:depth RMO over the period of record, all recorded values have been less than mean Natural Condition Database values for the quartzite based "B" channel type. While current channel geometry information for the stream is lacking, the most recently collected width:depth data indicated that the width:depth indicator was meeting the PACFISH RMO value. The Forest is not aware of any significant activities or events which would have been expected to incur a significant change in width:depth ratios in Twelvemile Creek from previously observed values, and recent photos taken in the general vicinity of the newly established MIM monitoring site suggest an unimpacted channel form. The general inaccessibility of most reaches of the Twelvemile Creek stream channel would further suggest that grazing activities would not be expected to produce any observable changes in width:depth ratios in these streams,.

Considering both observed width:depth ratios and consistently high streambank stability values observed within the action area, it is concluded that livestock grazing activities have not directly produced or contributed to any significant impacts on width:depth ratios of streams within the Twelvemile Allotment which can be meaningfully measured, detected or evaluated. The grazing strategies and Conservation Measures of the proposed action serve to minimize potential livestock impacts to channel morphology of action area streams. Use of range riders to keep livestock in upland areas, salting and fencing all

contribute to minimizing near stream livestock activity and the potential for direct streambank impacts which could affect channel morphology.

In summary, it is concluded that direct and indirect effects of the proposed livestock grazing action on channel morphology of allotment area streams are insignificant, and are not expected to have any meaningfully measurable or discernable influence on stream channel width:depth ratios within the action area. We recognize there could be localized impacts to both streambanks and stream sediment levels when livestock occasionally step on streambanks and introduce minor quantities of sediment to the stream. However, because of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams, we believe those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. The proposed action is therefore expected to maintain the condition of the Width:Depth focus indicator.

Future MIM monitoring will be effective in identifying both the occurrence and causal mechanisms of any significant changes in width:depth ratios of action area streams which would initiate responsive modification of grazing management strategies for the allotment under the Adaptive Management Strategy.

7.1.5 STREAMBANK CONDITION

Streambank conditions can have important effects on fish populations and livestock grazing can impact streambank conditions (see section 6.4.7) by direct alteration of the bank or by modifying riparian vegetation (Platts and Nelson, 1989).

Overall, streambank conditions are considered functioning appropriately within the Twelvemile Creek-Salmon River Watershed. Within the Twelvemile Allotment action area, streambanks in Twelvemile Creek have, with only one recorded exception, met and significantly surpassed the PACFISH bank stability RMO, displaying stabilities in excess of 90 percent during seven of eight survey periods including a 2009 reading.

The proposed grazing action is expected to maintain streambank conditions within the Twelvemile Allotment. Livestock will continue to be naturally precluded from significant reaches of Twelvemile Creek by steep topography and or thick riparian vegetation density. Measures including salting, fencing, and use of range riders to keep livestock in upland areas will contribute to minimizing near stream livestock activity which could result in streambank impact or reduction of stabilizing riparian vegetation. Direct and indirect effects of livestock disturbances associated with stream crossings is not expected to be of a magnitude or duration which could produce meaningfully measured, detected or evaluated effects to streambank conditions in areas of the allotment supporting either salmonid spawning or designated or proposed critical habitat for listed species.

In summary, the proposed action is not expected to generate measurable impacts to streambank stabilities in stream reaches containing listed fish or supporting designated critical habitat. Overall, it is believed that the impact of livestock grazing on streambank conditions within streams supporting ESA listed fish or designated or proposed critical habitat cannot be meaningfully measured, detected, or evaluated. Therefore, we expect the impact of livestock grazing on streambank conditions in ESA occupied or critical habitat designated streams of the allotment to be insignificant. Because natural topographical exclusion, and the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams, we believe any livestock related impacts to streambank conditions would be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. The proposed action is therefore expected to maintain the condition of the Streambank Condition Focus Indicator.

Ongoing bank stability monitoring will be employed in association with Forest sediment monitoring operations to identify trends of streambank conditions within the Twelvemile Allotment. These monitoring operations, supplemented by future MIM monitoring, will be effective in identifying both the occurrence and causal mechanisms of any significant change in streambank conditions which would initiate responsive modification of grazing management strategies for the allotment under the adaptive management strategy.

7.1.6 RIPARIAN CONSERVATION AREAS

The condition of riparian areas can have important affects on fish populations. Livestock grazing can impact riparian areas by direct reduction or altering of riparian vegetation and/or by impacting protective streambank cover (Platts and Nelson, 1989). Livestock grazing primarily impacts the riparian conditions in the areas that are grazed by livestock.

While the Twelvemile Allotments MIM riparian monitoring site has only recently been established, and no greenline data has yet been collected at the site, 2009 photos of the Twelvemile Creek stream channel at the nearby E85 electrofishing site suggest Greenline Ecological Status to be in Late Seral stage (see Appendix C Photo 1). Supplemental monitoring data from nearby sediment monitoring site B15, including channel width:depth ratios and streambank stability levels, additionally suggest healthy overall condition of riparian areas within the Twelvemile Creek drainage, which supports all listed fish populations as well as all proposed critical habitat within the Twelvemile Allotment. Given consideration of apparent current riparian vegetation conditions within the watershed, supporting channel and streambank condition, and the expected effectiveness of identified conservation measures in preventing or minimizing livestock impacts to allotment stream channels, it is expected that the direct and indirect effects of the proposed actions on riparian conservation areas within allotment streams supporting ESA listed fish or critical habitats are not able to be meaningfully measured, detected or evaluated, and are therefore insignificant. The proposed action is expected to maintain the condition of the Riparian Conservation Area focus indicator within allotment streams supporting ESA-listed fish and designated or proposed critical habitat.

It is recognized that there could be localized impacts when livestock graze within riparian conservations areas. However, because of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence within riparian areas, we believe those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale.

Future MIM monitoring will continue to identify trends of riparian vegetation conditions within the Twelvemile Allotment. These monitoring operations will be effective in identifying any significant change in riparian conditions which would initiate responsive modification of grazing management strategies for the allotment under the Adaptive Management Strategy.

7.2 CUMULATIVE EFFECTS

The definition of 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 definition that is used for 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 private or state land inholdings within areas encompassed by the Twelvemile Allotment action. Therefore there are no potential cumulative effects to the proposed grazing action.

7.3 SUMMARY OF EFFECTS

Grazing activities under the proposed action for the Twelvemile Allotment will not result in direct effects on listed fish species. Chinook salmon are not present in any allotment streams, and no Chinook salmon spawning is considered to be occurring within the allotment action area. While portions of the Twelvemile Allotment currently support juvenile steelhead rearing, available information suggests that adult steelhead spawning is not currently occurring within the action area. While there may exist a non-discountable potential for future adult steelhead utilization of spawning habitats within the Twelvemile Creek drainage of the Twelvemile Allotment, the proposed grazing action defers initial livestock entry onto the allotment until after the conclusion of any potential steelhead incubation within the action area. The allotment supports both bull trout populations and bull trout spawning within the Twelvemile Bottoms Unit. This unit

is grazed early during both years of the two year Twelvemile Allotment grazing rotation cycle, and livestock are moved from the Twelvemile Bottoms unit to Units which do not support bull trout or bull trout spawning habitat prior to the August 15 initiation of bull trout spawning activity. Final trailing operations in both years of the two year grazing rotation cycle utilize a one mile reach of roadway trailing through upper portions of the Twelvemile Bottoms unit while moving dry cows off the allotment, but upslope road location, steep topography and dense riparian vegetation reduce potential livestock impact to incubating bull trout redds to a discountable level during these operations.

The Twelvemile Allotment action area does not support critical habitat for Chinook salmon or steelhead, but supports proposed critical habitat for bull trout within two of the allotment's three units. Impacts of proposed grazing activities to aquatic and riparian habitat focus indicators water temperature, width:depth ratio, streambank condition and riparian habitat conservation areas are all identified as insignificant or discountable within ESA critical habitats of the action area. The proposed action is expected to maintain these indicators at their current levels of functionality.

Table 4 summarizes effects of proposed Twelvemile Allotment grazing operations on aquatic/riparian Pathways and Indicators, including the six identified Focus Indicators (highlighted) addressed in the Effects section of this document

TABLE 4 – EFFECTS SUMMARY FOR TWELVEMILE ALLOTMENT GRAZING ACTIVITIES

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

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

8 EFFECTS DETERMINATION

The effects determination for each species was made using the above analysis and the effects determination key (Table 4). The specific determinations are identified below and summarized in Table 5.

8.1 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

The action area does not support Chinook salmon, and it is considered that no Chinook salmon spawning is occurring within the action area. The proposed action therefore results in a “NO EFFECT” determination for Chinook salmon. The Forest’s critical habitat identification process for Chinook salmon indicates that the action area does not support Designated Critical Habitat for Chinook salmon. Therefore the proposed action results in a NO EFFECT determination for designated Chinook salmon critical habitat.

8.2 SNAKE RIVER STEELHEAD

Available information suggests that adult steelhead spawning is not currently occurring within the action area. While there may exist a non discountable potential for future adult steelhead utilization of spawning habitats within the Twelvemile Creek drainage of the Twelvemile Allotment, initial livestock entry onto the allotment does not occur until after the conclusion of any potential steelhead incubation within the action area. Potential for direct impact to incubating steelhead redds within the allotment action area is therefore considered discountable and the proposed action for the Twelvemile Allotment results in a MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT” determination for steelhead.

There is no designated critical habitat for steelhead within the Twelvemile Allotment action area. Therefore, the proposed action results in a NO EFFECT” determination for designated steelhead critical habitat.

8.3 COLUMBIA RIVER BULL TROUT

The Twelvemile Allotment action area supports bull trout populations and spawning habitat for bull trout. Livestock rotation strategies under the proposed grazing action avoid livestock grazing in any units supporting bull trout or potential bull trout spawning habitats during spawning or incubation periods. Final end of season trailing operations, while reentering a portion of a unit supporting bull trout spawning habitats, are considered to have a discountable potential for impact to incubating bull trout redds. Therefore, the proposed action results in a “MAY AFFECT, NOT 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. However, these effects are expected to be insignificant or discountable. Therefore, the proposed action results in a “MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT” determination for proposed bull trout critical habitat.

8.4 SNAKE RIVER SOCKEYE SALMON

The action area does not contain sockeye salmon or sockeye salmon designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for sockeye salmon and a “NO EFFECT” determination for designated sockeye salmon critical habitat.

8.5 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to evaluate the impact of actions authorized, funded, or undertaken by the agency that may adversely affect the essential fish habitat of commercially harvested species. Within the scope of this action this includes Chinook salmon. Based on the above analysis, the proposed action will have NO EFFECT on Chinook salmon Essential Fish Habitat.

TABLE 5 – EFFECTS DETERMINATION SUMMARY FOR TWELVEMILE ALLOTMENT GRAZING ACTIVITIES

	Chinook Salmon		Steelhead		Bull Trout	
	Species	Designated Critical Habitat	Species	Designated Critical Habitat	Species	Proposed Critical Habitat
Determination ¹	No Effect	No Effect	Not Likely to Adversely Affect	No Effect	Not Likely to Adversely Affect	Not 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

Twelvemile Creek – Salmon River Watershed Baseline

Matrix of Diagnostic Pathways and Indicators

Agency: USDA Forest Service, Salmon-Challis National Forest

HU Code and Name: 1706020303 Twelvemile Creek – Salmon River

Unit: Salmon-Cobalt Ranger District

Spacial Scale of Matrix: One 5th HUC

Fish Species Present: Bull Trout, Steelhead

Proposed/ Designated Critical Habitat Present: Bull Trout, Steelhead

Steelhead Major Population Group: Salmon River

Steelhead Population: Pahsimeroi River

Bull Trout Core Area: Mid Salmon-Panther

Local Population: Twelvemile Creek

Management Actions: Ongoing

Updated: 11-20-09

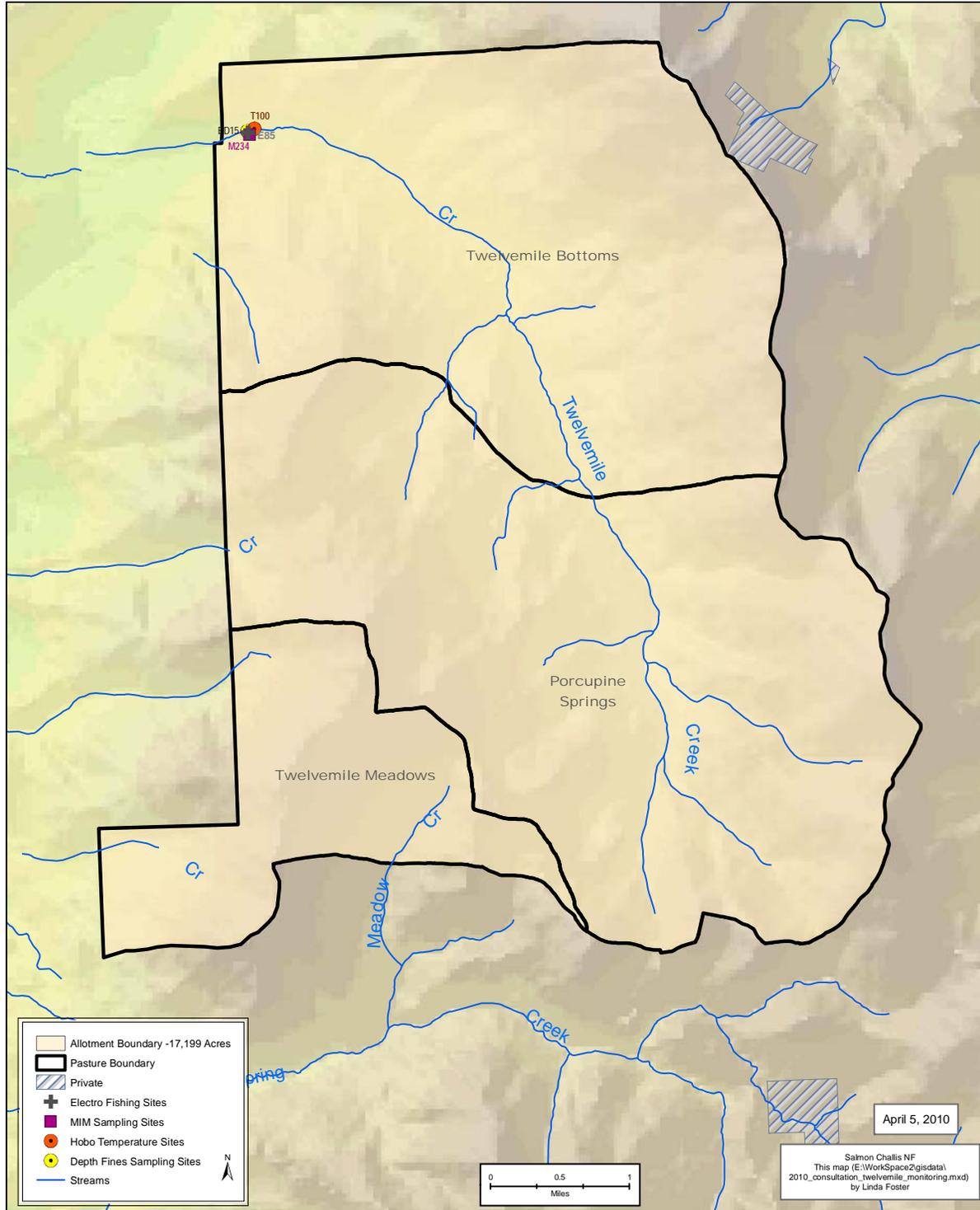
Subpopulation Characteristics		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Subpopulation Size	FA	Twelvemile and Lake Creeks are the only streams with bull trout. PJ that there is a strong resident population due to habitat; status of fluvial population unknown but potential exists.
Growth and Survival	FA	PJ; migratory population is likely.
Life History Diversity and Isolation	FR	There are irrigation diversion structures that may be barriers to migration, but Twelvemile Creek does reach Salmon River. Lake Creek population is isolated in and above Williams Lake
Persistence and Genetic Integrity	FA	Potential exists for fluvial population; no brook trout.
Water Quality		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Temperature (7day average. Maximum, oC)	FA	Meets standards on federal lands; data available

Sediment	FR	Meets standards on federal lands; data available
Chemical Contaminants/Nutrients	FA	No streams on 303(d) list; No known sources for potential pollutants except via home sites on private land
Habitat Access		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Physical Barriers	FR	There are irrigation diversion structures on private which may be barriers to migration.
Habitat Elements		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Substrate Embeddedness	FA	PJ; no data available.
Large Woody Debris	FA	Meets federal standards; data available.
Large Pools or Pool Frequency and Quality	FA	High gradient system; A-B channel types; meets federal standards; data available.
Off-Channel Habitat	FR	Bull Trout and Steelhead: PJ; high quality habitat impacted only in portions by road in the valley bottom (<½ mile).
Refugia	FR	Bull Trout and Steelhead: PJ; high quality habitat impacted only in portions by road in the valley bottom (<½ mile).
Channel Condition & Dynamics		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Average Wetted Width/Maximum Depth Ratio	FA	Meets federal standards; data available
Streambank Condition	FA	Meets federal standards;, data available; very stable, naturally armored
Floodplain Connectivity	FA	Good except where impacted by road in historic floodplain (<1/2 mile). The watershed has approximately 38.5 miles of roads within an RHCA, which is 16.6% of the roads within the watershed.

Flow/Hydrology		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Change in Peak/Base Flows	FR	Most of stream has natural flow regime; only impacted on lowermost reaches by private irrigation practices.
Increase in Drainage Network	FA	PJ due to limited roading and disturbance.
Watershed Condition		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Road Density and Location	FR	Road density is 1.8 mi/mi ² . The watershed has approximately 38.5 miles of roads within an RHCA, which is 16.6% of the roads within the watershed.
Disturbance History	FA	Overall ECA is 4.5%.
Riparian Conservation Areas	FA	PJ; unimpacted by major disturbances that would affect this parameter except for road in limited areas.
Disturbance Regime	FA	High quality habitat in a very stable system.
Integration of Species and Habitat Conditions		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Habitat Quality and Connectivity	FA	<p>As noted above, this system has a strong resident population with potential for migratory form. Stream is not dewatered, but diversion structures may be barriers to migration. Livestock grazing has potential to impact very small portions of the stream due to topography and thickly vegetated riparian corridor. Where access is available, vegetation is very healthy, with regeneration, and streambanks are very stable.</p> <p>Twelvemile Creek is very stable with good riparian and aquatic habitats, supporting natural processes and a healthy resident bull trout population.</p> <p>Current management, will maintain this excellent habitat and provide the necessary habitat parameters to sustain healthy bull trout populations.</p>

APPENDIX C
MONITORING DATA AND SUMMARIES

APPENDIX C FIGURE 1 – TWELVEMILE ALLOTMENT MONITORING SITES



APPENDIX C TABLE 1 – TWELVEMILE ALLOTMENT FISH PRESENCE

Steelhead Presence		Bull Trout Presence	
STREAM	SUM of LENGTH (mi)	STREAM	SUM of LENGTH (mi)
Twelvemile Creek	2.06	Twelvemile Creek	3.34
Grand Total	2.06	Grand Total	3.34

APPENDIX C TABLE 2 – TWELVEMILE UNITS FISH PRESENCE

Steelhead Presence		Bull Trout Presence	
UNIT/STREAM	SUM of LENGTH (mi)	UNIT/STREAM	SUM of LENGTH (mi)
Twelvemile Bottoms	Present	Twelvemile Bottoms	Present
McKim Creek	2.06	McKim Creek	3.34
Porcupine Springs	Not Present	Porcupine Springs	Not Present
Twelvemile Meadows	Not Present	Twelvemile Meadows	Not Present
Grand Total	2.06	Grand Total	3.34

APPENDIX C TABLE 3 – TWELVEMILE ALLOTMENT FISH SPAWNING

Steelhead Spawning		Bull Trout Spawning	
STREAM	SUM of LENGTH (mi)	STREAM	SUM of LENGTH (mi)
McKim Creek	2.06	McKim Creek	3.34
Grand Total	2.06	Grand Total	3.34

APPENDIX C TABLE 4 – TWELVEMILE UNITS FISH SPAWNING

Steelhead Spawning		Bull Trout Spawning	
UNIT/STREAM	SUM of LENGTH (mi)	UNIT/STREAM	SUM of LENGTH (mi)
Twelvemile Bottoms		Twelvemile Bottoms	
McKim Creek	2.06	McKim Creek	3.34
Porcupine Springs	0	Porcupine Springs	0
Twelvemile Meadows	0	Twelvemile Meadows	0
Grand Total	2.06	Grand Total	3.34

APPENDIX C TABLE 5 – TWELVEMILE ALLOTMENT DESIGNATED AND POTENTIAL CRITICAL HABITAT

Bull Trout Potential Critical Habitat	
ALLOTMENT/STREAM	SUM of LENGTH (mi)
Twelvemile Allotment	
Twelvemile Creek	7.64
Grand Total	7.64

APPENDIX C TABLE 6 – TWELVEMILE UNITS DESIGNATED AND POTENTIAL CRITICAL HABITAT

Bull Trout Potential Critical Habitat

UNIT/STREAM	SUM of LENGTH (mi)
Twelvemile Bottoms	
McKim Creek	4.35
Porcupine Springs	
McKim Creek	3.29
Twelvemile Meadows	0
Grand Total	7.64

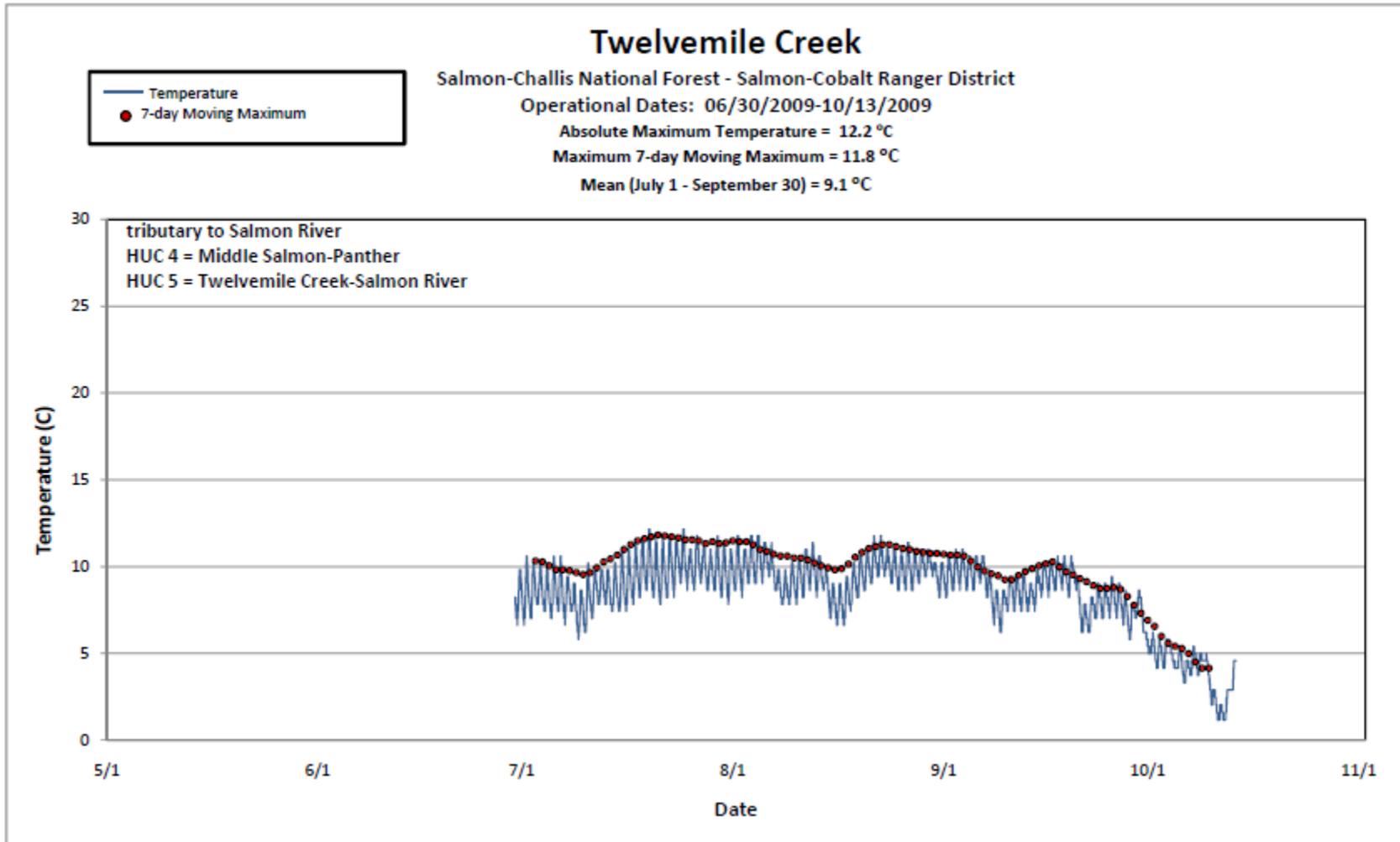
APPENDIX C TABLE 7 – FISH SAMPLING

Stream	Site-ID	Sample Date	Sampling Method
McKim Creek	E85	2009	Electroshock

APPENDIX C TABLE 8 – WATER TEMPERATURE 2009

Unit	Site ID	Monitoring Period	Maximum Daily Temperature	Maximum of 7 day Moving Maximum	Mean Temperature 7/1 to 9/30
Twelvemile Bottoms	T100 Twelvemile Creek	6/30/09 – 10/13/09	12.2	11.8.	9.1

APPENDIX C FIGURE 2 – TWELVEMILE CREEK WATER TEMPERATURE 2009



APPENDIX C TABLE 9 - SEDIMENT - MEAN PERCENT FINES <.25" AT DEPTH

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Twelvemile Bottoms	BD15 Twelvemile Creek	26.3	29.4		26.9		12.6				17.9	24.7	12.2					24.8

APPENDIX C TABLE 10 - CHANNEL GEOMETRY – WIDTH: DEPTH RATIO

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Twelvemile Bottoms	BD15 Twelvemile Creek			10.5	10.4		17.4				13.1	8.0						

APPENDIX C TABLE 11 - STREAMBANK CONDITION – PERCENT STABLE BANKS

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Twelvemile Bottoms	BD15 Twelvemile Creek		92.0	94.0	74.0		93.5				93.5	96.5	97.0					91.5

APPENDIX C TABLE 12 - MULTIPLE INDICATORS MONITORING (MIM) DATA

Unit	Site ID	Year	Width:Depth Ratio	Bank Stability (%)	Woody Species Regeneration		Greenline Ecological Status (GES)*	Trend in GES
					Seedling/Young (#/%)	Mature/Dead (#/%)		
Twelvemile Bottoms	M234 Twelvemile Creek		--					

APPENDIX C FIGURE 3 – TWELVEMILE CREEK STREAM AND RIPARIAN CONDITIONS (08/2009)



APPENDIX D

**PROTOCOL FOR MAPPING CHINOOK SALMON CRITICAL HABITAT
CURRENTLY DESIGNATED
ON THE SALMON-CHALLIS NATIONAL FOREST**

Protocol for Mapping Chinook Salmon Critical Habitat Currently Designated on the Salmon-Challis National Forest

This document summarizes the process that will be used by the Salmon-Challis National Forest (SCNF) to map Chinook salmon critical habitat (CSCH) as currently designated by NOAA Fisheries on the SCNF. Critical habitat has been designated for Snake River spring/summer Chinook salmon and includes “river reaches presently or historically accessible...to Snake River spring/summer Chinook salmon” (Federal Register 58(247):68543-68554). However, this designation did not provide a detailed description of the specific areas included in the designation. Such a description is essential when completing site specific consultations to determine if CSCH is present within the action areas. The purpose of this project is to create a GIS layer that delineates the specific areas that are designated as CSCH in this rule. It should be emphasized that this process is not to “designate” CSCH but to portray the SCNF’s interpretation, using the identified process, of those areas that have already been designated by the rule. For the purposes of the project, we assume CSCH to be all areas currently or historically occupied by Chinook salmon. This process includes only those areas within the administrative boundary of the SCNF.

The process will use the NHD stream layer as the base layer. By default, all streams will initially be considered to not be CSCH. The following steps will then be used to map designated CSCH.

Step 1: Add reaches identified by the Intrinsic Potential Model

An Intrinsic Potential Model (IPM) developed by the National Marine Fisheries Service (Cooney and Holzer 2006) has been used to model potential spawning and rearing habitat within the SCNF. All stream reaches identified by the IPM shall be mapped as CSCH.

Step 2: Remove reaches that were inappropriately identified by the IPM

The IPM has the potential to identify streams or portions of streams where Chinook salmon could not have occurred. This step involves identifying these reaches and removing them from the CSCH layer. Forest fish staff will review stream reaches selected by the IPM and identify those that were inappropriately included. This may include, but not be limited to, stream reaches that are a) ephemeral, b) above natural barriers, or c) too small to support Chinook salmon. Documentation supporting the removal of each stream reach must be provided.

Step 3: Add reaches where Chinook salmon have occurred based on redd data, but have not been identified in previous steps as CSCH

Chinook salmon redd surveys have been conducted by various organizations. These data will be reviewed by Forest fish staff and all sites where Chinook salmon redds have occurred that have not already been identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 4: Add reaches where Chinook salmon have been observed during SCNF fisheries assessments, but have not been identified in previous steps as CSCH

The SCNF has conducted various fisheries assessments and resulting data contain site-specific information regarding Chinook presence in streams. These data may include, but not be limited to, a) general fish population assessments, b) fish population monitoring, c) project specific monitoring, d) observation by Forest Service personnel, and e) R1/R4 surveys. These data will be reviewed by Forest fish staff and all sites where Chinook salmon have occurred that have not already been

identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 5: Add reaches where Chinook salmon have been observed during fisheries assessments conducted by external organizations, but have not been identified in previous steps as CSCH

Various organizations other than the SCNF have conducted fisheries assessments and resulting data are valuable for identifying areas where Chinook salmon have occurred within the SCNF. Such organizations may include, but not be limited to a) the Idaho Department of Fish and Game, b) the Department of Environmental Quality, and c) Native American Tribes. These data will be reviewed by Forest fish staff and all sites where Chinook salmon have occurred that have not already been identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 6: Add reaches that may provide or may have provided tributary refugia to Chinook salmon, but have not been identified in previous steps as CSCH

Chinook salmon may occupy portions of tributary streams that are not directly associated with spawning areas. Chinook salmon can encounter water temperature or turbidity conditions that are temporarily less than optimal or are lethal (Torgersen et al. 1999; Scrivener et al. 1993). When this occurs, the fish may move to tributary streams that have more suitable conditions but that the fish would not otherwise occupy. We refer to these areas as tributary refugia.

It is important to know how far Chinook salmon may move up tributary refugia. However, most of the information that we found (e.g. – Scrivener et al. 1994, Malsin et al. 1996-1999, Murray and Rosenau 1989) was not directly applicable to the set of conditions present on the SCNF in central Idaho. Those studies with data most closely representing conditions found in central Idaho show that fish seeking refugia primarily use confluence areas (Strange 2007; Torgersen et al. 1999). Since we were not able to locate information on use-patterns in tributary refugia, we used professional judgment to estimate how far up these tributaries Chinook salmon might move. Based on our review of fish population and stream habitat data from the Salmon River basin, we concluded that Chinook salmon likely do not move more than 0.25 miles up a tributary if the only reason they are in the stream is to seek refugia.

Although the previous steps in this process have likely identified most stream reaches that are tributary refugia, it is possible that some of these areas have still not yet been included. This step allows the addition of tributary refugia using the following set of criteria as a guideline for mapping. Professional judgment shall be used and documentation supporting the addition of each stream reach must be provided.

- a) **Proximity to CSCH:** The tributary must connect to a stream or river currently included as CSCH.
- b) **Watershed Size:** An evaluation of the smallest tributaries where Chinook salmon presence was confirmed within the SCNF can be useful in estimating the lower limits to watershed size constraining use of streams by Chinook. The average lower limit to watershed size where Chinook were present or presumed likely to use as refuge on the South Zone of the SCNF was approximately seven square miles. This value or a value that is appropriate for a given geographic area may be used to identify tributaries where it is reasonable to assume that Chinook salmon can access and use as refuge.

- c) **Fish-Bearing Streams:** Streams accessible to other salmonids can reasonably be assumed to be accessible to Chinook. Tributaries that contain other salmonids and are not smaller than the lower limit to watershed size shall be considered for inclusion as CSCH for 0.25 miles upstream from the confluence. Tributaries meeting this criterion, but exhibiting barriers to migration at the confluence shall be considered for exclusion from CSCH.
- d) **Non-Fish-Bearing Streams:** Streams inaccessible to other salmonids can reasonably be assumed to be inaccessible to Chinook and shall generally be considered for exclusion from CSCH.

* Streams lacking fish occurrence data shall be evaluated for inclusion in or exclusion from CSCH based upon the watershed size and professional judgment.

Step 7: Add reaches that, based on professional judgment, may be currently or may have been historically occupied by Chinook salmon, but have not been identified in previous steps as CSCH

It is possible that the previous steps have not identified all reaches that either currently contain or historically contained Chinook salmon. This step allows Forest fish staff to use professional judgment to identify any additional CSCH that may have been missed in the previous steps. Documentation supporting the addition of each stream reach must be provided.

Step 8: Add reaches that are downstream from CSCH identified in the previous steps

Since Chinook salmon migrate to the Pacific Ocean, they will occur at least seasonally in all areas downstream of the stream reaches identified as CSCH in the previous steps. Therefore, all reaches downstream of areas identified in the previous steps as CSCH shall also be mapped as CSCH.

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APPENDIX E
BULL TROUT 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 (January 13, 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.

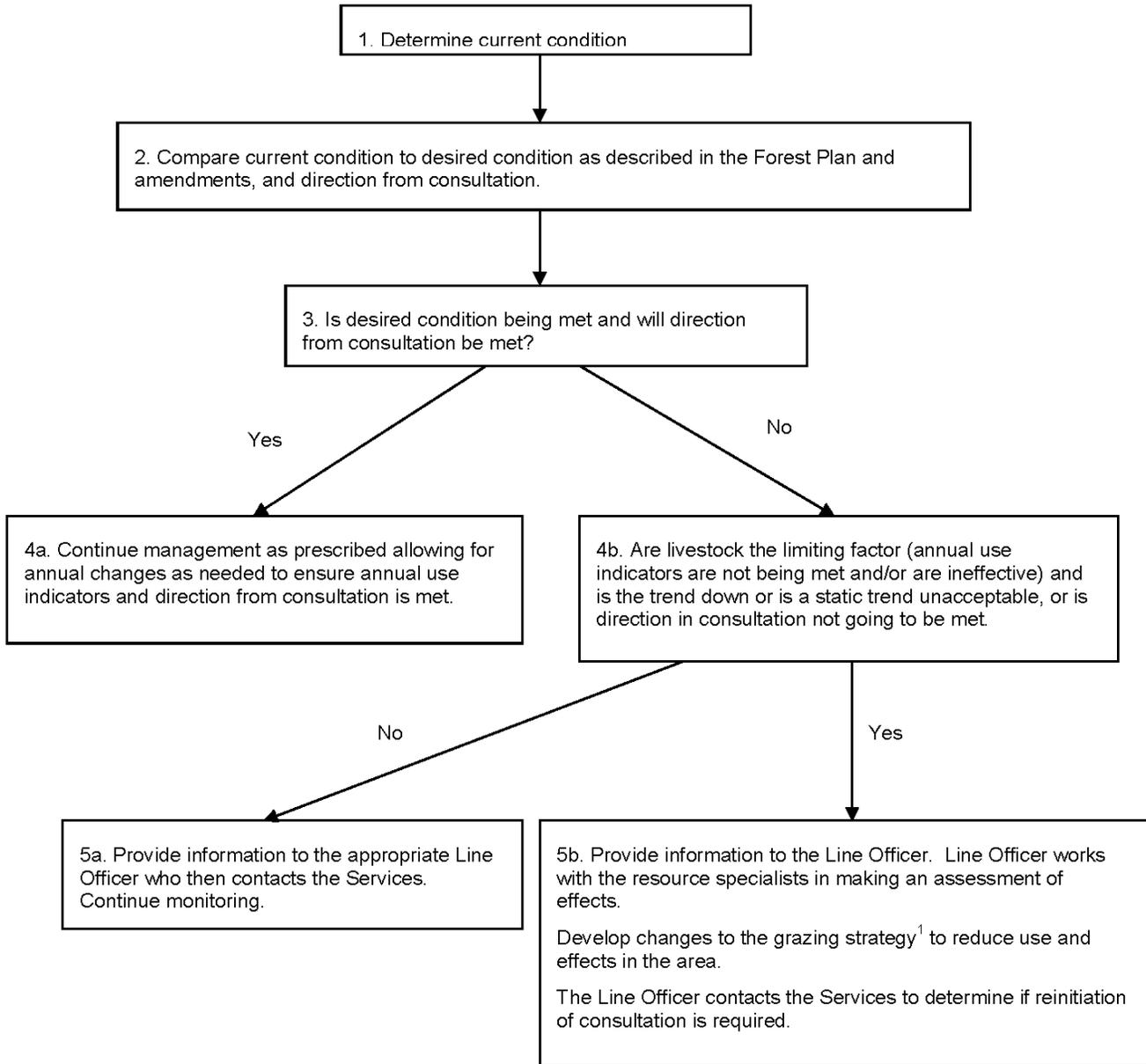
Primary Constituent Elements for Proposed Bull Trout Critical Habitat and Associated Habitat Indicators

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	sediment , substrate embeddedness , large woody debris, pool frequency and quality

	in larger substrates are characteristic of these conditions.	
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 peak/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)

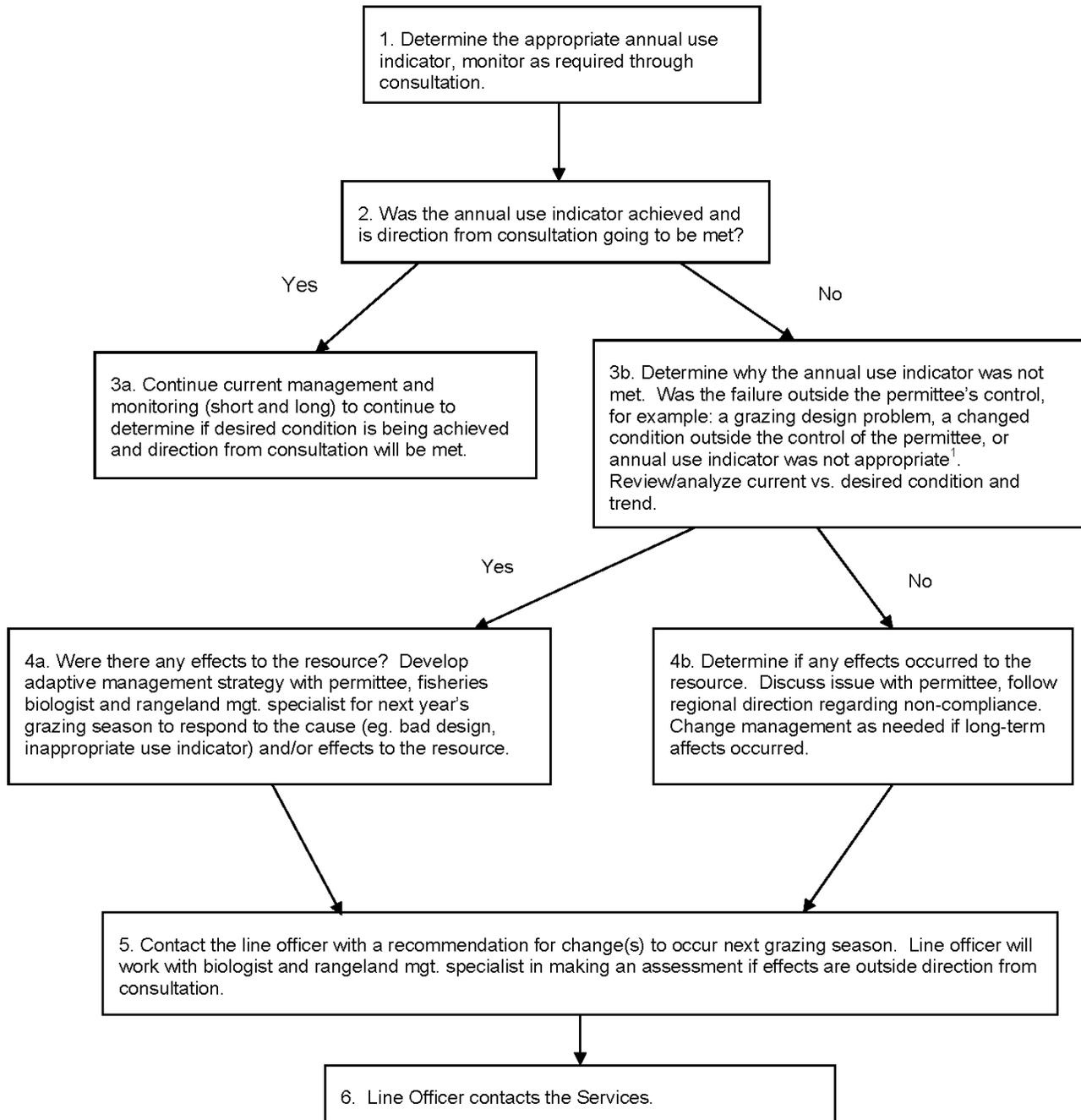
APPENDIX F
ADAPTIVE MANAGEMENT DIAGRAMS

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



¹Management 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.



¹An 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.