Aquatic Species Biological Assessment for the Deer-Iron Cattle and Horse Allotment

SALMON-COBALT RANGER DISTRICT

SALMON-CHALLIS NATIONAL FOREST

LEMHI COUNTY, IDAHO

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TABLE OF CONTENTS

1 INTRODUCTION III

2 BACKGROUND INFORMATION 1

3 PROPOSED ACTION 2

3.1 Project Area 2

3.2 Proposed Action 4

3.2.1 Authorization 4

3.2.2 Grazing System 4

3.2.3 CHANGES FROM PAST management 5

3.2.4 Conservation Measures 5

3.2.5 Resource Objectives and Standards 6

3.2.6 Annual Grazing Use indicators 7

3.2.7 Improvements 8

3.3 Monitoring 8

3.4 ADAPTIVE management 9

3.5 Interdependent Actions 9

3.6 Interrelated Actions 9

4 ESA ACTION AREA DESCRIPTION 9

5 LISTED SPECIES REVIEW 13

5.1 Species Occurrence 13

5.2 Critical Habitat 13

5.2.1 Snake River Spring/Summer Chinook Salmon 13

5.2.2 Sockeye Salmon 13

5.2.3 Snake River Basin Steelhead 13

5.2.4 Columbia River Bull Trout 13

6 ENVIRONMENTAL BASELINE DESCRIPTION 18

6.1 General Description of Listed Fish Populations 18

6.1.1 Chinook Salmon 18

6.1.2 Steelhead 19

6.1.3 Bull Trout 19

6.2 General Description of Habitat Conditions 20

6.2.1 Iron Creek drainage 20

6.2.2 Hat Creek drainage 20

6.2.4 Moyer Creek drainage 21

6.2.5 Lake Creek drainage 21

6.3 Major Limiting Factors 21

6.4 Grazing Focus Indicators *21*
6.4.1 Spawning and Incubation: 22
6.4.1.1 Chinook Salmon Spawning and incubation 22
6.4.1.2 Steelhead spawning and incubation 22
6.4.1.3 Bull Trout spawning and incubation 23
6.4.2 Water Temperature 25
6.4.3 Sediment 25
6.4.4 Width: Depth RatiO 26
6.4.5 Streambank Condition 26
6.4.6 Riparian Conservation Areas 27
6.4.7 Annual Use Indicators and Objectives and their Relationship to Focus Indicators 27
7 ANALYSIS OF EFFECTS 30
7.1 Direct and Indirect Effects *30*
7.1.1 Spawning and Incubation 31
7.1.1.1 Chinook Salmon 31
7.1.1.2 Steelhead 31
7.1.1.3 Bull Trout 33
7.1.2 Water Temperature 34
7.1.3 Sediment 35
7.1.4 Width:Depth Ratio 36
7.1.5 Streambank Condition 36
7.1.6 Riparian Conservation Areas 37
7.2 Cumulative Effects *38*
7.3 Summary of Effects *38*
8 EFFECTS DETERMINATION 40
8.1 Snake River Spring/Summer Chinook Salmon *40*
8.2 Snake River Steelhead *40*
8.3 Columbia River Bull Trout *40*
8.4 Snake River Sockeye Salmon *41*
8.5 Essential Fish Habitat *41*
APPENDIX A REFERENCES A1
APPENDIX B WATERSHED BASELINES B1
APPENDIX C MONITORING DATA AND SUMMARIES C1
APPENDIX D PROTOCOL FOR MAPPING CHINOOK SALMON CRITICAL HABITAT D1
APPENDIX E BULL TROUT PRIMARY CONSTITUENT ELEMENTS E1
APPENDIX F ADAPTIVE MANAGEMENT DIAGRAMS F1

Figures

Figure 1 - Deer-Iron Allotment Vicinity Map 3
Figure 2 - Deer-Iron Allotment Action Area Map 11
Figure 3 - Deer-Iron Allotment Priority Watersheds Map 12
Figure 4 - Chinook Salmon Distribution and Critical Habitat within the Deer-Iron Allotment Action Area .. 15
Figure 5 - Steelhead Distribution Spawning Habitat and Critical Habitat within the Deer-Iron Allotment Action Area 16
Figure 6 - Bull Trout Distribution, Spawning Habitat and Proposed Critical Habitat within the Deer-Iron Allotment Action Area 17
Appendix C Figure 1 - Monitoring locations within the Deer-Iron Allotment Action Area C1
Appendix C Figure 2 - Iron Creek water temperatures 2009 ..... C6
Appendix C Figure 3 - North Fork Iron Creek water temperatures 2009 ..... C6
Appendix C Figure 4 - South Fork Iron Creek water temperatures 2009 ..... C7
Appendix C Figure 5 - West Fork Iron Creek water temperatures 2009 ..... C7
Appendix C Figure 6 – Hat Creek water temperatures 2008 ..... C8
Appendix C Figure 7- Deer Creek water temperatures 2009 ..... C8

Tables

Table 1 – Deer-Iron Allotment Unit Rotations 4
Table 2 – Deer-Iron Allotment Key Area Attributes, Indicators and Triggers 7
Table 3 – Relationship Matrix 28
Table 4 – Effects Summary for Deer-Iron Allotment Grazing Activities 38
Table 5 – Effects Determination Summary for Deer-Iron Allotment Grazing Activities 41
Appendix C Table 1 - Fish Information 2
Appendix C Table 2 – Chinook Salmon Critical Habitat 3
Appendix C Table 3 - Steelhead Distribution, Spawning Habitat, and Designated Critical Habitat 3
Appendix C Table 4 Bull Trout Distribution, Spawning Habitat and Proposed Critical Habitat 4
Appendix C Table 5 Water Temperature 5
Appendix C Table 6 Sediment - Mean Percent Fines <.25 at Depth 9
Appendix C Table 7 Channel Geometry – Width : Depth Ratio 10
Appendix C Table 8 Streambank Condition – Percent Stable Banks 11
Appendix C Table 10 Multiple Indicators Monitoring (MIM) Data 12

1 INTRODUCTION

The Salmon-Cobalt Ranger District of the Salmon-Challis National Forest is proposing to authorize livestock grazing activities associated with the Deer-Iron 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

Deer-Iron Allotment grazing activities are conducted within portions of four watersheds (Fifth-Field Hydrologic Unit Codes) of the Middle Salmon-Panther Subbasin. The major portion of the allotment lies within the Iron Creek-Salmon River Watershed (HUC 1706020302) with minor portions lying within sections of the Hat Creek-Salmon River Watershed (HUC 1716020301), Twelvemile-Salmon River Watershed (HUC 1716020303) and the Upper Panther Creek Watershed (HUC 1716020309. Primary streams within portions of these watersheds encompassed by the Deer Iron Allotment are Iron Creek and its North, South and West Forks, Hat Creek, North Fork Hat Creek Lake Creek and Moyer Creek. Stream reaches within the allotment range from low to high gradient. Elevations range from 9,800 feet in glaciated headwaters areas of the Hat Creek drainage to 5,000 feet at Iron Creek's lower Forest boundary. Estimated Iron Creek stream flows at the lower Forest boundary range between six cfs in February to over 136 cfs during June runoff periods. Hat Creek flows at the Forest boundary range between five cfs in February to over 71 cfs during runoff.

Soils in the watersheds are derived primarily from, quartzites and volcanics. Quartzites predominate within the Iron Creek drainage while Challis volcanics are found in lower elevation areas to the north, south and west of the Iron Creek drainage. Landforms include fluvial lands in volcanics, and cryoplanated uplands and glacial troughlands in quartzites.

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 fire 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.

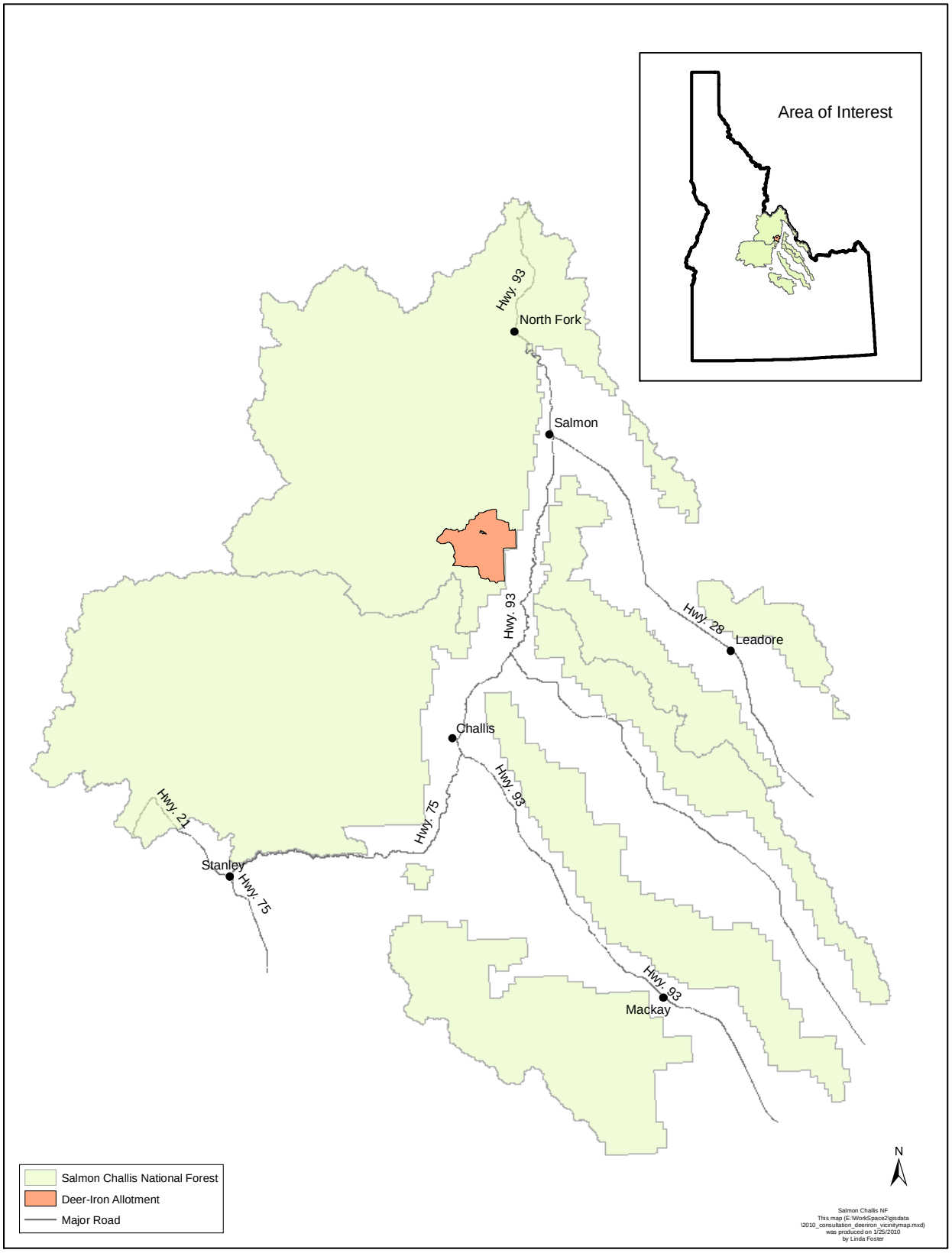
Actions or activities which have occurred or continue to occur within portions of the four watersheds encompassed by the Deer Iron Allotment include historic mining, past timber harvest, grazing, roads, trails, water diversions, prescribed and natural fire, noxious weed treatment, and recreation. There is a 138 acre private inholding with inactive patented mining claims within the North Fork Iron Creek drainage.

3 PROPOSED ACTION

3.1 PROJECT AREA

The Deer Iron Allotment is located south of the town of Salmon on National Forest lands within the Iron Creek, Deer Creek, Rattlesnake Creek, Lake Creek, Hat Creek, and Moyer Creek drainages (Figure 1). within the Iron Creek-Salmon River (HUC 1706020302), Hat Creek-Salmon River (HUC 1706020301), Twelvemile Creek-Salmon River (HUC 1706020303) and Upper Panther Creek (HUC 1706020309) watersheds. The allotment encompasses 49,326 acres, and is divided into four units: Degan Mountain, South Fork, Peel Tree West, and Peel Tree East..

FIGURE 1 - DEER-IRON ALLOTMENT VICINITY MAP



3.2 PROPOSED ACTION

3.2.1 AUTHORIZATION

The Deer-Iron Allotment is currently permitted for 321 cow/calf pairs (137 Head Months) from 6/16 to 6/30 and a total of 421 cow/calf pairs (1208) from 7/01-10/07. The permit number is 10558 and expires 12/31/2012.

3.2.2 GRAZING SYSTEM

- The Deer-Iron C&H Allotment will continue to use a rest rotation season of use grazing system.
- 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 complete 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, with rest scheduled every other year for the Degan Mountain, South Fork, and Peel Tree West Units.

TABLE 1 – DEER-IRON ALLOTMENT UNIT ROTATIONS

Year 1	Year 2
Degan Mountain Unit	Peel Tree West Unit
Peel Tree East Unit	South Fork Unit
Peel Tree West Unit (rest)	Peel Tree East Unit
South Fork Unit (rest)	Degan Mountain Unit (rest)

Degan Mountain Unit

- Steelhead: Livestock will not exit unit before July 7.
- Bull Trout: Livestock will be out of the unit by August 15th every year.
- Trailing: No trailing impacts.

South Fork Unit

- Steelhead: Livestock will not enter unit before July 7.
- Bull Trout: Livestock will be in the unit after August 15th for up to 6 weeks, every other year.
- Trailing: Trailing through South Fork and Peel Tree West, to move from Degan Mountain to Peel Tree East, will not occur prior to July 7 or after August 15.

Peel Tree East Unit

- Steelhead: Livestock will not enter unit before July 7.
- Bull Trout: Livestock will be in the unit after August 15th date between 5 and 8 weeks every year.
- Trailing: No trailing impacts.

Peel Tree West Unit

- Steelhead: Livestock will be in the unit during spawning up to 4 weeks.
- Bull Trout: Livestock will be out of the unit by August 15th every year.
- Trailing: No trailing impacts.

Entry: Dependent on the year, the permittee has two different options for entry onto the allotment depending on the rotation year.

- **Year 1:** Livestock are trailed onto the allotment from the BLM Twin Peaks allotment into the Degan Mountain Unit. The duration of the move is one day.
- **Year 2:** Livestock are trailed onto the allotment from the BLM Beaver Gulch allotment into the Peel Tree West Unit. In the course of this move, livestock are trailed down the North Fork Iron Creek Road (FS RD 045) into the South Fork Unit on FS RD 047, then through the Peel Tree West unit. The duration of the move is one day.

Pasture Movements:

- Year 1: Livestock start in the Degan Mountain Unit. Then, livestock are trailed to Peel Tree East Unit. The duration of the move is one day.
- Year 2: Livestock start in the Peel Tree West Unit, then are trailed to the South Fork Unit. Finally, livestock are trailed to Peel Tree East Unit quickly passing through Peel Tree West Unit. The duration of each move is one day.
- **Exit:** Livestock are trailed (herded by horseback and rider) from the last unit off the allotment through Slide Gulch back to the permittee's home ranch on lower Iron Creek.

Total Removal from NFS Lands: All livestock will be removed by 10/07.

3.2.3 CHANGES FROM PAST MANAGEMENT

- All sites will have a monitoring attribute for bank alteration with an endpoint indicator not to exceed 20%.
- The monitoring attribute of browse use will be added to sites that are dominated by woody browse species. Greenline stubble will continue to be monitored at these sites.

3.2.4 CONSERVATION MEASURES

The following measures will be implemented as part of the Deer-Iron Allotment's Annual Operating Instructions (AOI) to avoid and reduce potential impacts to ESA-listed fish. Chinook salmon, steelhead and bull trout considerations are

1. A rest rotation grazing system will continue to be used. Resting a unit each year 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 l 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.

3.2.5 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 (U.S Department of Commerce, National Marine Fisheries Service, 1998).

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

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.

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 priority watersheds, when bank stability is 90% or greater the bank alteration annual use indicator will be 20%
- In priority watersheds, when bank stability is 70-89% the bank alteration annual use indicator will be 10-20%
- In priority watersheds, when bank stability is less than 70% the bank alteration annual use indicator will be 10%
- 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.

TABLE 2 – DEER-IRON ALLOTMENT KEY AREA ATTRIBUTES, INDICATORS AND TRIGGERS

Key Area Location	Unit – Creek	Monitoring Attribute*	Use Indicator	Key Species	Trigger
MIM M226	South Fork Unit – South Fork Iron Creek	Greenline stubble**	6 inch or 30%	Hydric spp	7 in.
		Bank Alteration	15%	n/a	10%
MIM M262	South Fork Unit – West Fork Iron Creek	Greenline stubble**	4 inch or 50%	Hydric spp	5 in.
		Browse Use*	50%	Willows	45%
		Bank Alteration	20%	n/a	15%
MIM M215	Degan Mountain Unit– North Fork Iron Creek	Greenline stubble**	4 inch or 50%	Hydric spp	5 in.
		Browse Use*	30%	Dogwood	25%
		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%

**Bank alteration/browse use and greenline stubble will be used until next trend reading is completed to determine which attribute will be best suited to for attaining 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 (Utilization Studies and Residual Measurements, Interagency Technical Reference 1734-3). 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 identified in Figure 2 and will be maintained in accordance with the term grazing permit.

Potential Future Improvements: There are no potential future improvements proposed at this time.

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 each grazing 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 between units and years. The designated indicators (e.g. - stubble height, bank alteration, and

woody browse) will be monitored utilizing MIM protocols or other best available science at DMAs 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. Within the South Fork, West Fork, and Degan Mountain Units, 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 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.

3.5 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.

3.6 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.

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 aquatic habitats in 1) the Iron Creek drainage from it headwaters areas downstream to the point at which mainstem Iron Creek crosses the Lower Deer-Iron Allotment boundary (T18N R20E Sec 2 SE), including tributary streams, 2) North Fork Hat Creek and the northern portions of the North Fork Hat Creek drainage from its headwaters areas downstream to its confluence with Middle Fork Hat Creek (T18N R20E Sec 20 SW), 3) Mainstem Hat Creek and the southwestern portions of the mainstem Hat Creek drainage from the confluence of the forks of Hat Creek downstream to the point at which mainstem Hat Creek crosses the lower Deer Creek Allotment boundary (T17N R20E Sec 3 SW), 4) Northeastern portions of the mainstem Hat Creek drainage from the confluence of the forks of Hat Creek downstream to the boundaries of the Deer-Iron and Cabin Creek Allotments (T18N R20E Sec 28 SW), 5) Moyer Creek and northeastern portions of the upper Moyer Creek drainage within the Deer-Iron Allotment between (T18N R19E Sec 3 SW) and (T19N R19E Sec 30 NE), and 6) Portions of the Deer Creek, Badger Creek, Rattlesnake Creek, Lake Creek, Peel tree Creek and Slide Creek drainages from their headwaters areas downstream to the points at which they cross the lower Deer Iron 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 of the action area are identified in Figure 3. Portions of the South Fork Unit within the Hat Creek drainage lie within a priority watershed for Chinook salmon and steelhead. The remainder of the South Fork Unit, and the Degan Mountain, Peel Tree East and Peel Tree West Units are not within a priority watershed. Management direction for priority watersheds is identified in section 3.2.5.

FIGURE 2 - DEER-IRON ALLOTMENT ACTION AREA MAP

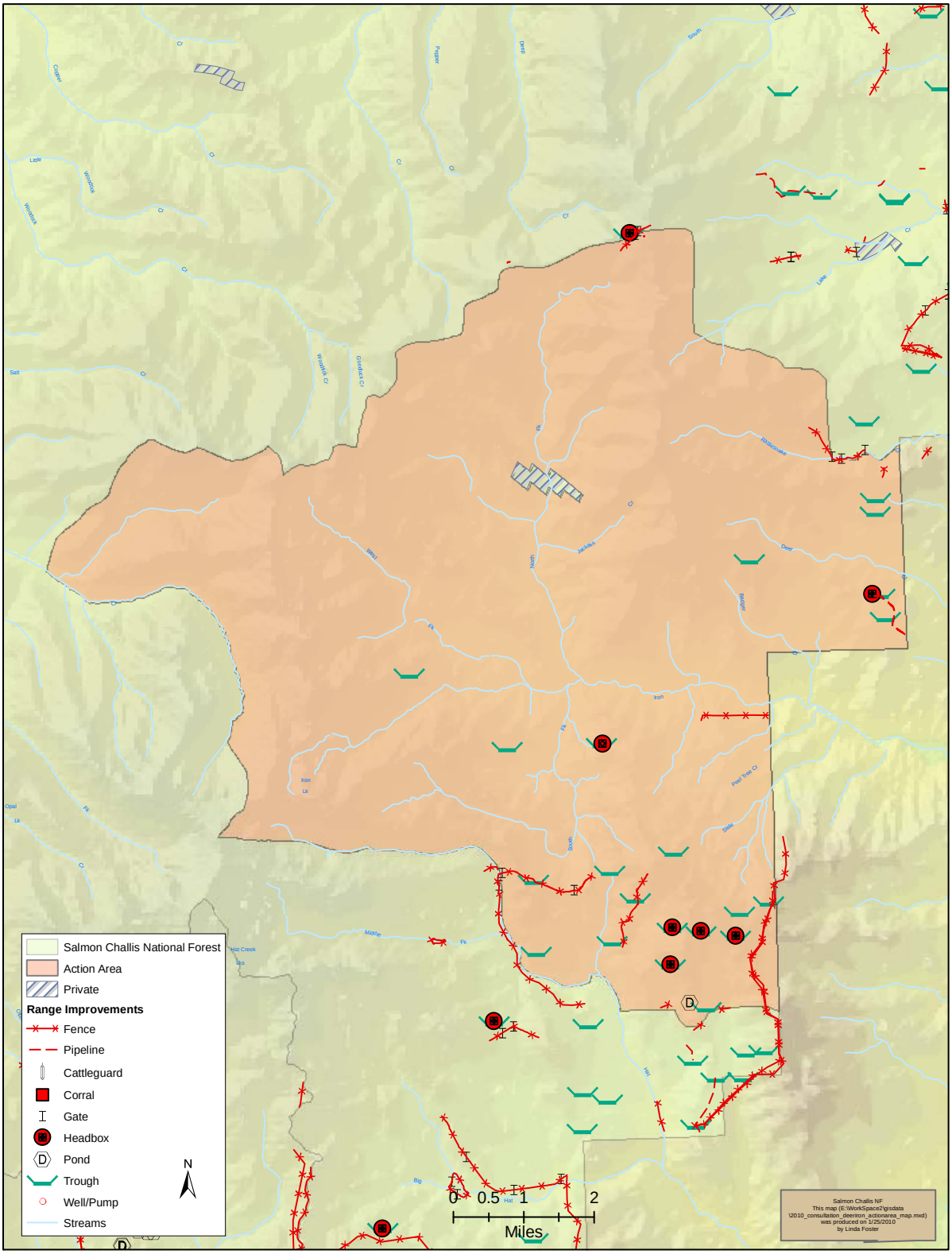
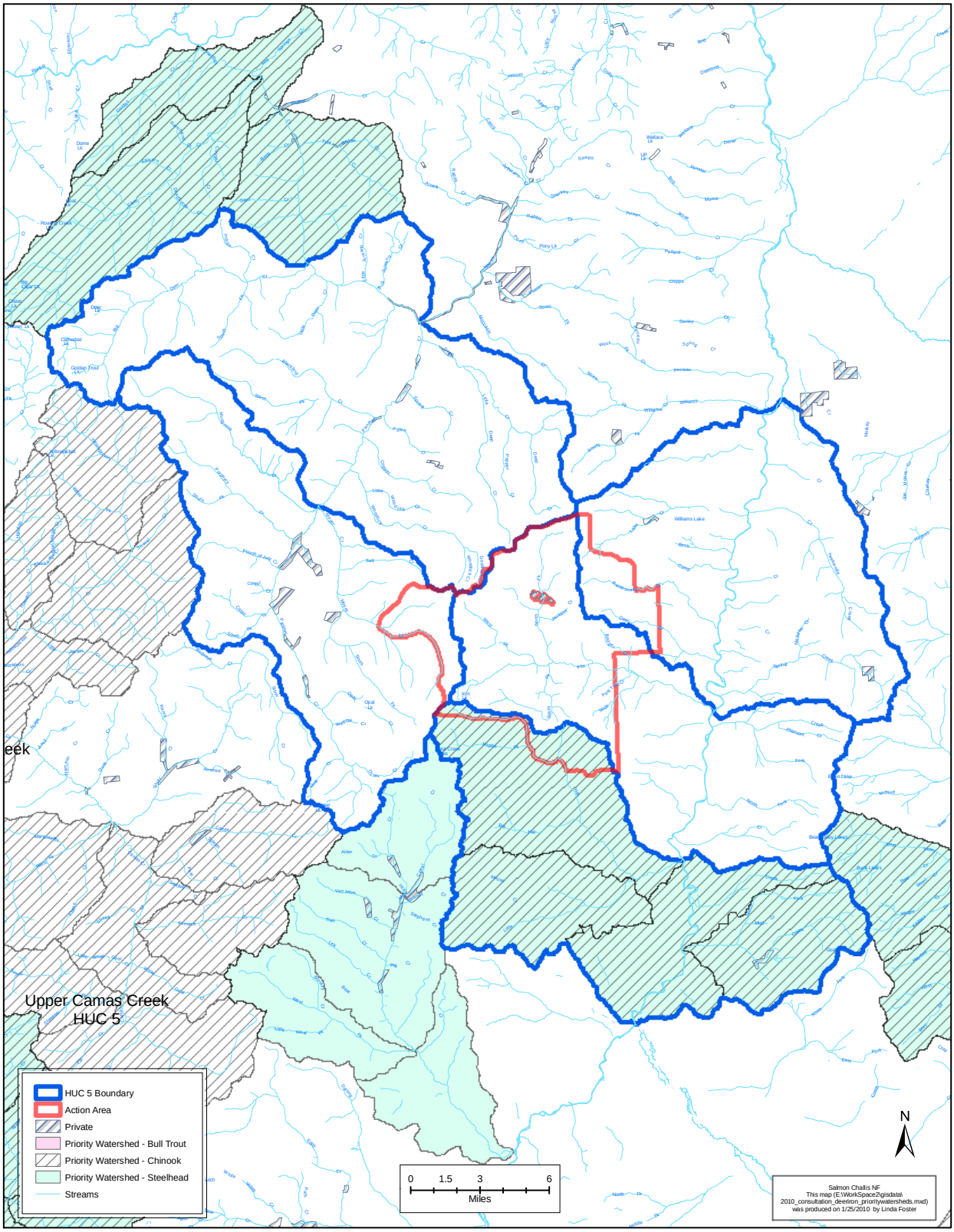


FIGURE 3 - DEER-IRON ALLOTMENT PRIORITY WATERSHEDS MAP



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 and bull trout. Chinook salmon utilize the lower reaches of Iron Creek for spawning and rearing but do not currently utilize any on- Forest habitats for spawning or rearing. Recent cooperative agreements with private landowners in have improved stream connectivity and opportunities for greater Chinook salmon utilization of the Iron Creek drainage. If, in future years, Chinook salmon utilization of the Iron Creek drainage is found to extend to Forest lands within the Deer-Iron Allotment, the Salmon-Challis National Forest will reinitiate consultation for this species Sockeye salmon utilize the mainstem Salmon River as a migration corridor to and from spawning and juvenile rearing areas within lakes of the Salmon River headwaters, but do not occupy or use off-river habitats within the Middle Salmon-Panther Subbasin (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. Utilizing this process, the Forest has identified mainstem Iron Creek to the confluence of its West Fork as supporting Chinook salmon critical habitat within the action area (Figure 4).

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). Steelhead designated critical habitat is present within the action area and includes mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek and West Fork Iron Creek (Figure 5).

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 (January13, 2010, Federal Register 75FR2270) that it is proposing to revise the 2005 designated critical habitat. While the Deer-Iron 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 Deer-Iron Allotment action area includes Iron Creek, North Fork Iron Creek, South Fork

Iron Creek, West Fork Iron Creek, Hat Creek, North Fork Hat Creek, Lake Creek, and Moyer Creek (Figure 6).

The Forest desires to assess the potential impact to the Primary Constituent Elements (PCEs) of that proposed bull trout critical habitat. These PCEs 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 - CHINOOK SALMON DISTRIBUTION AND CRITICAL HABITAT WITHIN THE DEER-IRON ALLOTMENT ACTION AREA

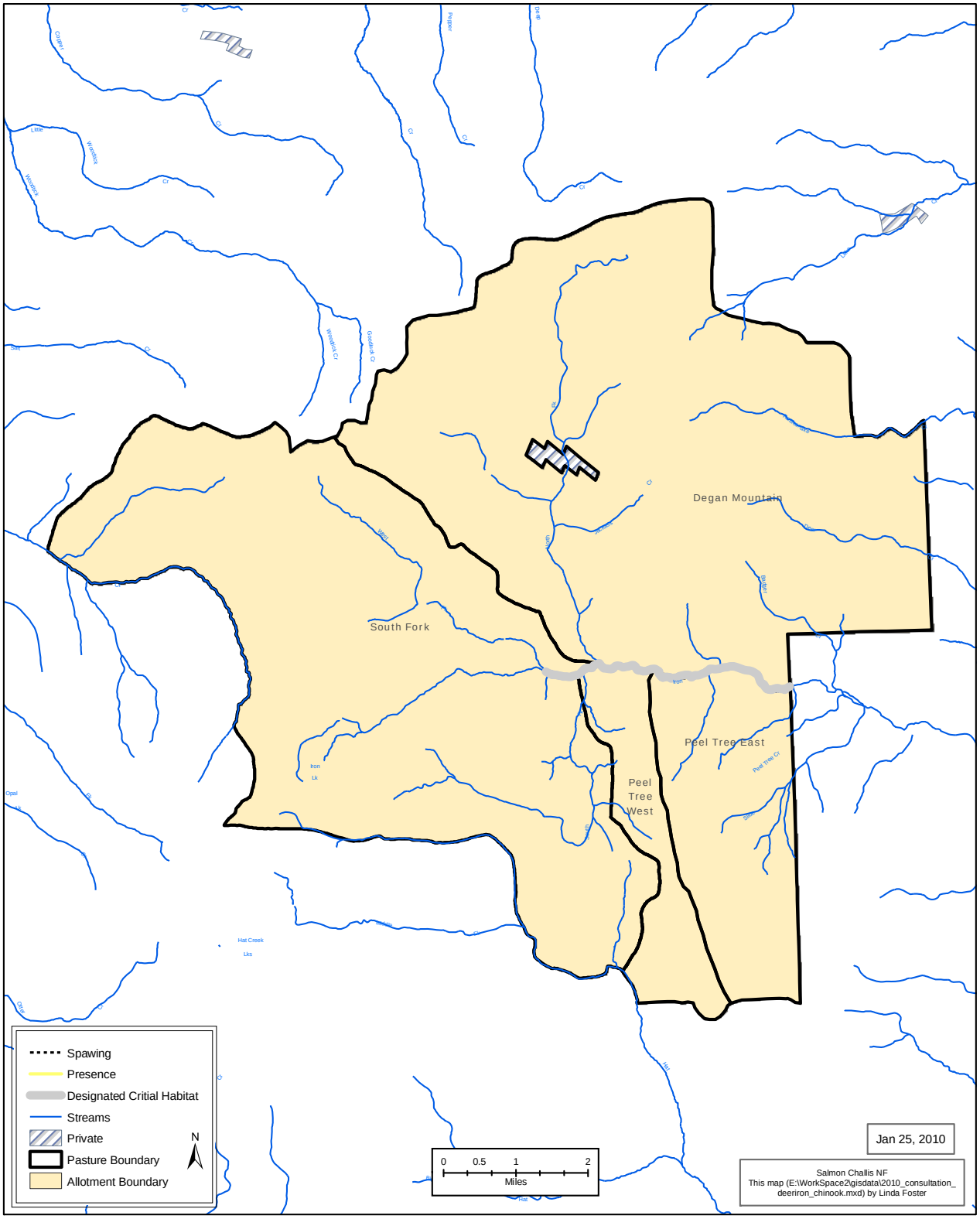


FIGURE 5 - STEELHEAD DISTRIBUTION SPAWNING HABITAT AND CRITICAL HABITAT WITHIN THE DEER-IRON ALLOTMENT ACTION AREA

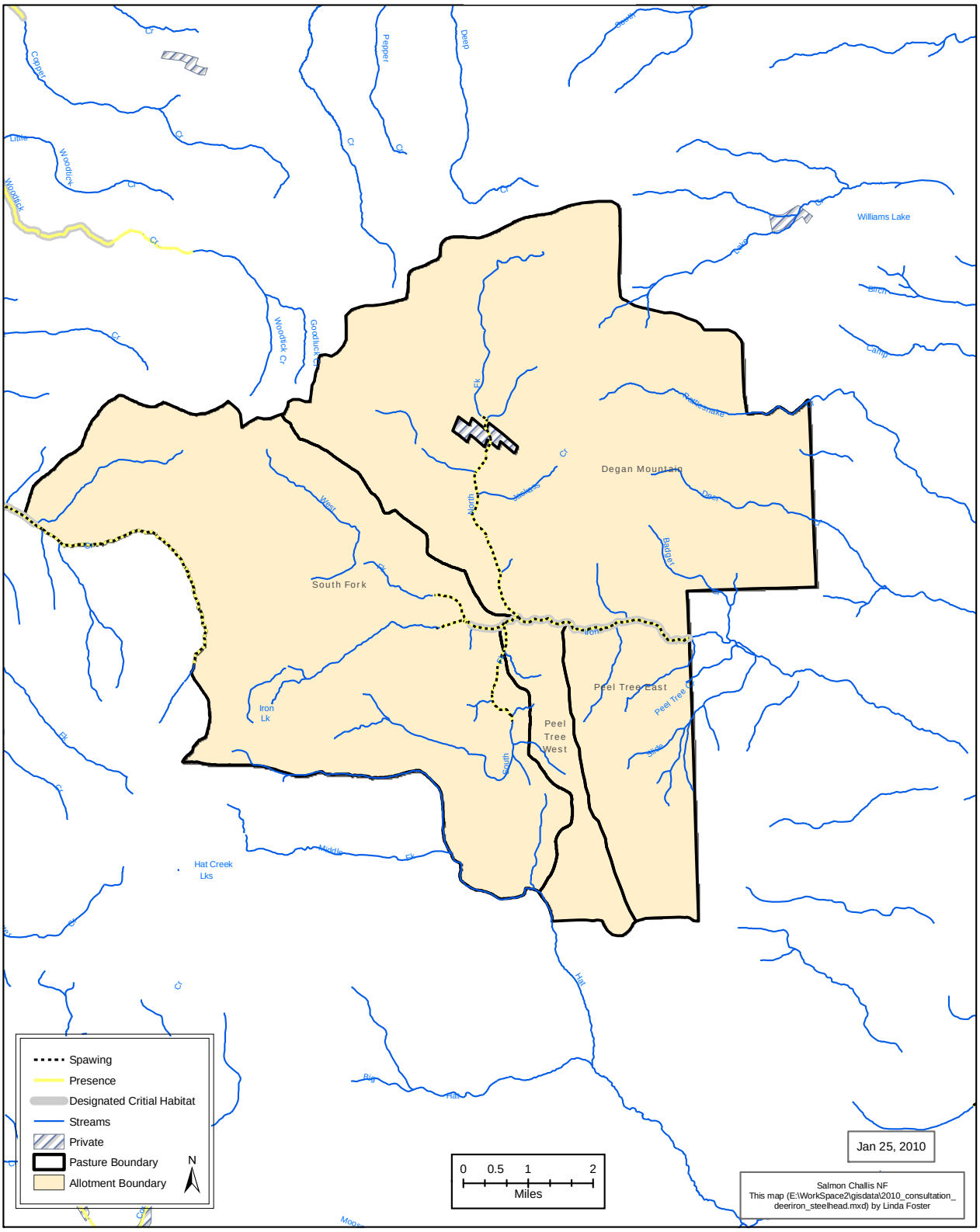
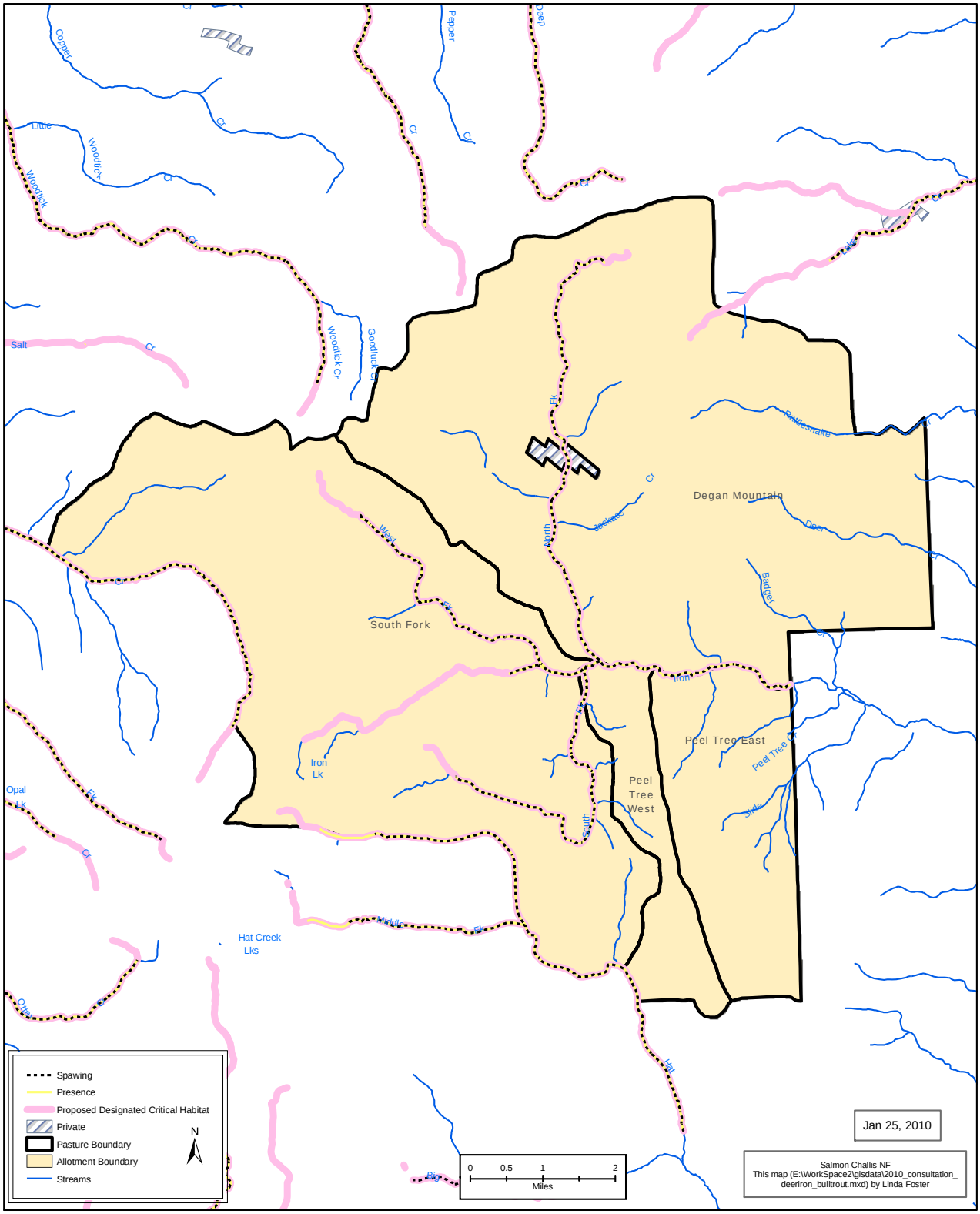


FIGURE 6 - BULL TROUT DISTRIBUTION, SPAWNING HABITAT AND PROPOSED CRITICAL HABITAT WITHIN THE DEER-IRON ALLOTMENT ACTION AREA



6 ENVIRONMENTAL BASELINE DESCRIPTION

The action area is within portions of the Iron Creek-Salmon River (HUC 1706020302), Hat Creek-Salmon River (HUC 1706020301), Twelvemile Creek-Salmon River (HUC 1706020303) and Upper Panther Creek (HUC 1706020309) watersheds. Baseline Matrices of Diagnostic Pathways and Indicators for these four watersheds 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.

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.

The Deer-Iron allotment encompasses eight streams which support populations of, and/or designated or proposed critical habitat for listed fish species. These include Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek, Hat Creek, North Fork Hat Creek, Moyer Creek and Lake Creek. All other streams within areas that will be grazed do not contain listed fish or support designated or proposed critical habitat. However, livestock grazing in these areas may indirectly affect listed fish and designated or proposed critical habitat in other streams within the allotment.

6.1.1 CHINOOK SALMON

Chinook salmon have historically used the lower private-land reaches of Iron Creek for spawning and rearing (Chuck Warren, Idaho Department of Fish and Game (IDFG), personal communication). Landowner agreements have facilitated measures to improve streamflow connectivity and passage opportunities in the stream in recent years (Wendy Koons, Upper Salmon Basin Watershed Project, personal communication), and Idaho Department of Fish and Game (IDFG) personnel observed adult Chinook salmon from the Pahsimeroi Hatchery run entering Iron Creek and spawning within these private land reaches in 2009 after having been trucked back downriver from the hatchery for re-release to the seasonal sport fishery. (Chuck Warren, IDFG, personal communication). Both historic and recent utilization of Iron Creek by Chinook salmon appears to be limited, however, to the lower three miles of the stream below a higher gradient reach near the upper extent of private lands, and despite the Forest's identification of critical habitat within the Deer-Iron Allotment action area, no spawning or rearing is known to occur on National Forest System lands (Chuck Warren, IDFG, personal communication; Tom Curet, IDFG, personal communication). Recent cooperative agreements with private landowners in have improved stream connectivity and opportunities for greater Chinook salmon utilization of the Iron Creek drainage. If, in future years, Chinook salmon utilization of the Iron Creek drainage is found to extend to Forest lands within the Deer-Iron Allotment, the Salmon-Challis National Forest will reinitiate consultation for this species.

Chinook salmon also historically occupied the lower reaches of Hat Creek (Chuck Warren, IDFG, personal communication) and may still periodically utilize these areas for spawning. However a waterfall approximately 2.2 miles above the mouth presents a complete barrier to upstream fish migrations (Salmon-Challis National Forest, 2007; Paddy Murphy, IDFG, personal communication), precluding Chinook salmon utilization of upstream Hat Creek waters, including those areas of the stream within the Deer-Iron Allotment action area.

Moyer Creek is a historically important Chinook salmon stream within the Panther Creek drainage, and adult Chinook still periodically utilize the stream for both spawning and rearing. Historic habitat for Chinook salmon in this stream is identified to a point approximately two miles above the streams South Fork (Salmon-Challis National Forest, 2005) and does not encompass headwater areas within the Deer-Iron Allotment. Population monitoring operations in this reach of the stream additionally found Chinook

salmon to be absent. It is therefore considered that Moyer Creek Chinook salmon do not occupy areas encompassed by the Deer-Iron Allotment action area.

6.1.2 STEELHEAD

Mainstem Iron Creek, along with its tributary streams North Fork Iron Creek, South Fork Iron Creek and West Fork Iron Creek support current populations of steelhead. This population is representative of the Iron Creek Local Population of the Middle Salmon River-Panther Creek Population. Relatively little is known of the status or trend of steelhead populations within the Iron Creek drainage, but is suspected that the populations may be comprised of both wild fish and hatchery influenced fish from Idaho Power Company's Pahsimeroi Hatchery. No steelhead redd count information is available for Iron Creek within the action area. Salmon-Challis National Forest fish population monitoring operations within the Iron Creek drainage identified 2009 rainbow/steelhead population estimates of 4.28 fish/100 meters^2 (173 fish/acre) in mainstem Iron Creek, 11.65 fish/100 meters^2 471 fish/acre) in North Fork Iron Creek, 8.19 fish/100 meters^2 (331 fish/acre) in South Fork Iron Creek and 4.88 fish/100 meters^2 (197 fish /acre) in West Fork Iron Creek (SCNF Fisheries Files, 2009)

Steelhead of both wild- and hatchery-influenced stocks are known to utilize the lower reaches of Hat Creek for both spawning and rearing (Chuck Warren, IDFG, personal communication). Utilization of the stream is limited by the barrier waterfalls approximately 2.2 miles above the mouth (Salmon-Challis National Forest, 2007, Paddy Murphy, IDFG, personal communication), and Hat Creek's steelhead population does not have access to upstream areas encompassed within the Deer-Iron Allotment action area.

Moyer Creek is identified as a historically important steelhead-producing stream within the Panther Creek drainage, and it is suspected that steelhead may still utilize portions of this stream for both spawning and rearing. Historic anadromous fisheries habitat in this stream is identified only to a point approximately two miles above the streams South Fork (Salmon-Challis National Forest, 2005), however, and does not encompass the stream's headwater areas within the Deer-Iron Allotment. Population monitoring operations in Moyer Creek stream reaches just downstream of the Deer-Iron Allotment action area found steelhead/rainbow to be absent. It is therefore considered that Moyer Creek steelhead populations do not occupy areas encompassed by the Deer-Iron Allotment action area.

6.1.3 BULL TROUT

Bull trout populations exist within both the Iron Creek and Hat Creek portions of the Deer Iron Allotment. Within the Iron Creek drainage, bull trout occupy both mainstem waters as well as the North, South and West forks of the stream. Within the Hat Creek drainage, bull trout are found in mainstem Hat Creek and its North Fork. Bull trout are also believed to occupy portions of upper Moyer Creek within the Deer-Iron Allotment.

The Iron Creek drainage supports a strong resident bull trout population. Salmon Challis National Forest fisheries monitoring operations identified 2009 single pass bull trout electrofishing estimates of 0.19 fish/100 meters^2 (8 fish /acre) in mainstem Iron Creek, 0.57 fish/100 meters^2 (23 fish /acre) in North Fork Iron Creek, 0.86 fish/100 meters^2 (35 fish /acre) in South Fork Iron Creek and 3.96 fish/100 meters^2 (160 fish /acre) West Fork Iron Creek (SCNF Fisheries Files, 2009). The fluvial population may be missing due to past seasonal dewatering of the lower reaches of mainstem Iron Creek on private land. Recent agreements with landowners have restored streamflow connectivity, however, and planned additional fish passage improvements may provide increased opportunities for utilization of upper stream habitats by fluvial fish (Scott Feldhausen, BLM, personal communication: Chuck Warren, Idaho Department of Fish and Game, personal communication).

Fisheries population monitoring operations at the Salmon-Challis National Forest's Bull Trout Management Indicator Species (MIS) monitoring site on mainstem Hat Creek identified multiple-pass bull trout estimates between 4 and 9 fish/fish/100 meters^2 (155-372 fish/acre) between 2005 and 2008, with numbers peaking in 2006 and showing a declining trend during the remainder of the period. Population

numbers in Hat Creek's North Fork have not been identified, but it is suspected that densities are lower than those observed in mainstem Hat Creek due to reduced habitat suitability (

While Moyer Creek supports a strong bull trout population, especially in reaches near and above its South Fork confluence (Salmon Challis National Forest, 2005), habitat capability diminishes rapidly in the headwater portions of the stream encompassed within the Deer-Iron Allotment boundary. Proposed critical habitat extends to the upper headwater reaches of mainstem Moyer Creek, however, and it is believed that the reach within the Deer-Iron Allotment action area may continue to support suitable habitat for bull trout. Population monitoring operations additionally identify bull trout presence in the stream just outside the Deer-Iron Allotment action area. It is assumed, therefore, that bull trout may occupy reaches of Moyer Creek within the Deer-Iron Allotment action area.

The Lake Creek drainage supports an isolated population of bull trout above Williams Lake, and the US Fish and Wildlife Service's proposed critical habitat for bull trout extends to headwater reaches of mainstem Lake Creek within the Deer-Iron Allotment action area. Presence Absence monitoring, however indicates that bull trout do not occupy these headwater habitats. Bull trout are therefore not considered to be present in Lake Creek portions of the Deer-Iron Allotment action area.

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 IRON CREEK DRAINAGE

The Iron Creek drainage encompasses a major portion of the Deer Iron Allotment action area. Fish habitat conditions of both mainstem and tributary reaches of Iron Creek are in good condition and meeting most PACFISH standards and Primary Constituent Element criteria. Overall physical habitat quality reflects the stable conditions of the quartzite geology. All Water Quality Elements and Pathway Indicators are functioning appropriately. Despite the presence of water diversions, connectivity is excellent throughout the drainage due to recent passage improvements on private lands in the lower reaches of the drainage. Habitat, Channel and Watershed Elements and Pathway Indicators are meeting Federal standards in most areas, except where roads along streamcourses impact the channels. The watershed supports a significant quantity of suitable spawning and rearing habitat for both resident and anadromous salmonid species, with both steelhead and bull trout continuing to spawning in the action area.

6.2.2 HAT CREEK DRAINAGE

The Deer-Iron Allotment action area encompasses portions of mainstem Hat Creek and North Fork Hat Creek. Within the action area, fish habitat conditions of mainstem Hat Creek are considered to be in good condition, and meeting most INFISH standards, Habitat Element Pathway Indicators, and Primary Constituent Element criteria. Monitoring indicates that physical habitat quality, including the elements of water quality, flow/hydrology, channel conditions and structural habitat elements is considered good. General fish habitat conditions within North Fork Hat Creek are also generally considered to in be good condition, but marginally reduced in both quantity and quality relative to mainstem Hat Creek, due to reduced streamflow.

The Hat Creek Watershed is considered to be a Priority Watershed for Chinook salmon and steelhead. However, a natural barrier falls approximately 2.2 miles above the mouth of Hat Creek limits upstream fish migration to areas below the falls ((Salmon-Challis National Forest, 2007, Paddy Murphy, IDFG, personal communication),. Given consideration of the inaccessibility of steelhead and salmon to aquatic habitats above the barrier falls, the Salmon-Challis National Forest considers the Hat Creek drainage to be a priority watershed only in the lower reaches of the drainage, and not within portions of the drainage on National Forest System lands.

6.2.4 MOYER CREEK DRAINAGE

The Deer-Iron Allotment action area includes approximately four miles of Moyer Creek's headwater reaches. Suitable habitat, though probably marginal for steelhead and bull trout, extends throughout this reach (see Figures 5 and 6). No fisheries surveys have been conducted in these areas, due to presumed marginal habitat capability. Reaches within the action area are confined within a tight canyon with virtually no access to the stream from sideslopes and very limited access along the streamcourse.

6.2.5 LAKE CREEK DRAINAGE

The action area includes approximately one-half mile of Lake Creek's uppermost headwaters. Fisheries monitoring operations in areas downstream of the action area identified these upper reaches as being fishless, and it is assumed that Lake Creek aquatic habitat within the action area is only marginally capable of supporting fish populations due to small stream size and elevated stream gradient.

6.3 MAJOR LIMITING FACTORS

Within both the Iron Creek and Hat Creek drainages, factors most likely to be limiting fisheries resources from achieving full carrying capacity are near-stream roads. Significant lengths of mainstem Iron Creek as well as its North Fork, are paralleled by roads which have impacted large woody debris loading, pool frequency and quality, off-channel habitat and floodplain connectivity at locations within the action area, while near-stream roads along mainstem and North Fork Hat Creek have produced impacts to riparian conservation areas of that stream. Roads within RHCAs comprise approximately 27 percent of the total roads within both the Iron Creek and Hat Creek watersheds. Additionally, the natural barrier falls of the lower Hat Creek drainage are a major limiting factor to full utilization of Hat Creek watershed aquatic habitats.

The Deer-Iron Allotment action area encompasses only small headwater portions of the Moyer Creek and Lake Creek drainages. Within the action area, habitat capability of these streams is limited primarily by minimal streamflows and general lack of habitat structure.

It is not believed that past grazing activities have contributed to habitat capability limitations within streams of the Deer-Iron Allotment action area (see Appendix B).

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:

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 streams channels due to topography or dense riparian vegetation.

Listed fish species spawn within a number of streams of the Deer-Iron 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 Deer-Iron Allotment are discussed individually below.

6.4.1.1 CHINOOK SALMON SPAWNING AND INCUBATION

Chinook salmon are not present within the Deer-Iron Allotment action area. Therefore, the proposed grazing operation's potential for to affect Chinook salmon spawning or incubation is considered discountable.

6.4.1.2 STEELHEAD SPAWNING AND INCUBATION

Mainstem Iron Creek, along with its primary tributary streams North Fork Iron Creek, South Fork Iron Creek and West Fork Iron Creek, support populations of steelhead as well as Designated Critical Habitat for Snake River Basin steelhead. It is considered that each of these streams additionally support spawning habitat for the species.

Based upon proposed grazing rotations within the allotment, and spawning and incubation periodicities identified by the Upper Salmon Basin Technical Team, potential livestock impacts to incubating steelhead redds exist within mainstem and North Fork reaches of Iron Creek in years when the Degan Mountain Pasture receives early grazing use, and within mainstem reaches of Iron Creek when the Peel Tree West Pasture receives early grazing use.

Livestock enter the Degan Mountain Unit in mid-June of alternate years ("Year 1"), and remain within the unit through and beyond the conclusion of steelhead incubation. The southern boundary of the Degan Mountain Unit borders an approximately 1.8 mile reach of mainstem Iron Creek from the lower allotment boundary to the Iron Creek forks, and the unit additionally encompasses the North Fork Iron Creek drainage.

The potential for livestock impacts on steelhead egg incubation within the Degan Mountain Unit is minimized by both the use of off-stream trailing routes onto the unit, and the extreme topography adjacent to mainstem and lower North Fork Iron Creek streamcourses. Entry routes through the BLM Twin Peaks Unit utilize upland paths well removed from the Iron Creek streamcourse, and once in the Degan Mountain Unit, livestock are unable to access the Iron Creek stream channel due to the extremely steep north slope topography throughout the length of this reach of stream. This steep topography additionally precludes access to the lower 2.1 miles of North Fork Iron Creek below Jackass Creek. There remains, however, a potential for direct livestock impact to incubating steelhead eggs along reaches of North Fork Iron Creek above the confluence of Jackass Creek, where topography flattens and livestock can potentially access upper North Fork Iron Creek's steelhead spawning habitats. While off-channel water

troughs and active livestock herding to upland areas will help minimize the likelihood of impact, potential livestock/steelhead redd interactions could occur over approximately 36 percent (1.2 miles) of North Fork Iron Creek's identified steehead spawning habitats, with potential exposure spanning a three week period from mid June through the identified end of steelhead incubation in early July.

Trailing from Degan Mountain Unit to the Peel Tree East Unit in "Year 1) traverses the South Fork Unit and includes stream crossings of North Fork Iron Creek, West Fork Iron Creek, Mainstem Iron Creek and South Fork Iron Creek. This trailing operation is conducted after the July 7 conclusion of steelhead incubation, thereby avoiding potential impact to incubating steelhead redds in these streams.

In "Year 2" of the grazing cycle, livestock initially enter the Peel Tree West Unit in mid-June via upland routes through the BLM Beaver Gulch Unit, and remain in the unit through early to mid July. The northern boundary of the Peel Tree West unit borders approximately 0.79 miles of the same mainstem Iron Creek stream reach bordered by the southern portions of the Degan Mountain Unit. Approximately 0.49 miles of South Fork Iron Creek also lie within the Peel Tree West Unit. Once in the unit, livestock are likewise unable to access the Iron Creek or South Fork Iron Creek stream channels due extremely steep south slope topography. Livestock remain within the Peel Tree West pasture through the conclusion of the identified steelhead spawning period. Movement into the South Fork Unit after July 7 avoids impacts to late steelhead incubation within South Fork Iron Creek, West Fork Iron Creek and sections of mainstem Iron Creek within the unit.

In summary, given assessment of likely incubation timeframes within the action area, grazing rotation strategies, off-channel livestock ingress trailing routes, the presence of significant topographical features which naturally preclude livestock access to stream channels, and the function of range improvements within the allotment in keeping livestock in upland areas away from stream channels, potentials for livestock impacts to steelhead incubation within the allotment would occur only over a small portion of the allotment and only during alternating years ("Year 1") of the two year grazing cycle. Application of a post-July 7 livestock movement from both the Degan Mountain Unit to the Peel Tree East Unit in "Year 1" and from the Peel Tree West Unit to the South Fork Unit in "Year 2" will avoid potential impacts to steelhead redds in South Fork, West Fork and mainstem Iron Creek stream reaches within the South Fork Unit, and mainstem Iron Creek reaches within the Peel Tree East Unit. Natural topographical features and fences will additionally preclude livestock access and potential impact to most steelhead spawning reaches when livestock are in the Degan Mountain Unit in "Year 1" of the two year grazing cycle. There remains, however, a non-discountable potential for direct impact of livestock to incubating steelhead eggs in "Year 1" over an approximately 1.2 mile reach of upper North Fork Iron Creek for a three week period from the initial mid-June livestock "on-date" through the identified July 7 conclusion of steelhead incubation.

6.4.1.3 BULL TROUT SPAWNING AND INCUBATION

Mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek, mainstem Hat Creek, North Fork Hat Creek and Moyer Creek all support bull trout populations and Proposed Critical Habitat for Columbia River bull trout. It is considered that all of these streams additionally support spawning habitat for the species.

Based upon proposed grazing rotations within the allotment, and spawning and incubation periodicities identified by the Upper Salmon Basin Technical Team, potential livestock impacts to spawning bull trout and or incubating bull trout redds exist in areas of the allotment in both years of the grazing rotation cycle. Potential impacts exist within mainstem reaches of Iron Creek in "Year 1" when the Peel Tree East Unit receives late use. Potential impacts within mainstem Iron Creek, South Fork Iron Creek, West Fork Iron Creek, Hat Creek, Middle Fork Hat Creek and Moyer Creek occur in "Year 2" of the cycle when both the South Fork and Peel Tree East Units receive late grazing use.

In "Year 1" of the two year grazing cycle, livestock enter the Degan Mountain Unit, which encompasses the North Fork Iron Creek drainage and portions of mainstem Iron Creek in mid June. Livestock are moved from the Degan Mountain Unit, through the South Fork and Peel Tree West Units, into the Peel Tree East Unit prior to the August 15 initiation of the bull trout spawning period. Livestock graze within the Peel Tree East Unit, which borders a 0.75 mile reach of mainstem Iron Creek, through the permitted off date off date of October 7. Within the Peel Tree East Unit, an upslope fenceline paralleling Iron Creek

prevents livestock from reaching the Iron Creek stream channel within a reach of moderately steep south sideslopes. Livestock are trailed out of the Peel Tree East Unit and back to private lands in lower Iron Creek in a one day move over upland routes. With adequate maintenance of the Iron Creek fenceline within the Peel Tree East Unit, potential for direct livestock impact to spawning bull trout or bull trout redds during this cycle of the grazing rotation is considered minimal.

In "Year 2" of the rotation cycle, livestock are first trailed into the Peel Tree West Unit, then moved to the South Fork Unit in early to mid July. Livestock graze within the South Fork Unit, which includes South Fork Iron Creek, West Fork Iron Creek, North Fork Hat Creek and reaches of mainstem Hat Creek and upper Moyer Creek, through the August 15 initiation of bull trout spawning activity to approximately mid-September, encompassing approximately four weeks of the identified bull trout spawning and incubation period. Bull trout spawning habitats within upper Moyer Creek, which borders northwestern portions of the unit, are inaccessible to livestock due to extremely steep south slope topography. The permittee additionally keeps livestock away from this portion of the allotment due to the danger of loss to the steep canyon slopes. A combination of fencing and steep near-stream topography precludes livestock access to both mainstem Hat Creek reaches within the unit's southern regions and portions of North Fork Hat Creek along the southern boundary. Approximately 2.1 miles of bull trout spawning habitats within the upper portions of North Fork Hat may be accessible to livestock during this period, however, and there is potential for direct impact to spawning bull trout or incubating bull trout eggs in this reach of the stream. Approximately 4.5 miles of South Fork Iron Creek, 4.0 miles of West Fork Iron Creek, and 1.1 miles of mainstem Iron Creek bull trout spawning habitats are additionally accessible to livestock within the South Fork Unit during this four week period. Consideration of water temperature regimes of the Iron Creek forks suggest that initiation of bull trout spawning in South Fork Iron Creek may occur at a later period than in West Fork Iron Creek or mainstem Iron Creek, and at some time later than the general August 15 date identified for the area by the Upper Salmon Basin Watershed Technical Team (see Appendix C).

The actual exposure time of potential livestock impact to bull trout redds in mainstem Iron Creek, the South and West Forks of Iron Creek and the North Fork of Hat Creek would be expected to be significantly less than the four week period of livestock presence in the South Fork Unit during the bull trout spawning period, however due to movement of livestock across the unit, and relatively little time spent in any given area.

Livestock are moved from the South Fork Unit to the Peel Tree East Unit in approximately mid-September, where they remain for an approximately four week period until the permitted off date of October 7. Trailing operations from the South Fork to Peel Tree East Units is conducted during a one day period and moves quickly through portions of the Peel Tree West Unit. With adequate maintenance of the Iron Creek fenceline, potential for direct livestock impact to spawning bull trout or bull trout redds during this period is considered minimal.

In summary, the potential for livestock impacts to spawning bull trout and/or bull trout egg incubation within the Deer Iron Allotment is minimized by extreme topography which precludes livestock access to the Moyer Creek stream channel, removal of livestock from the North Fork Iron Creek drainage prior to April 15, and fences which preclude livestock access to portions of mainstem Iron Creek, mainstem Hat Creek and portions of North Fork Hat Creek. Potential for livestock impacts to bull trout or bull trout egg incubation within either the Moyer Creek or North Fork Iron Creek drainages is considered discountable. While allotment fences minimize potential for livestock access to Iron Creek reaches within the Peel Tree East Unit, Hat Creek and North Fork Hat Creek, there remains a non-discountable potential for direct livestock impacts to bull trout and/or incubating bull trout eggs within mainstem Iron Creek, South Fork Iron Creek, West Fork Iron Creek, mainstem Hat Creek and North Fork Hat Creek. Within the Peel Tree East Unit, there is a minimal but non-discountable potential for livestock impact to spawning bull trout and/or incubating bull trout eggs in a 0.75 mile fenced reach of mainstem Iron Creek over a seven week period during "Year 1" grazing, and over a four week period during "Year 2" of the grazing cycle. Within the South Fork Unit, there is a non-discountable potential for impacts to spawning bull trout or redds within approximately 4.5 miles of South Fork Iron Creek, 4.0 miles of West Fork Iron Creek, 1.1 miles of mainstem Iron Creek within the South Fork Unit, and approximately 2.1 miles of North Fork Hat Creek over a four week period in alternate years, occurring during "Year 2" of the grazing rotation cycle. A minimal, but still non-discountable potential for impacts to spawning bull trout or incubating eggs exists within an additional 1.2 miles of spawning habitats within fenced sections of North Fork Hat Creek and 1.9

miles of fenced sections of mainstem Hat Creek during alternate years ("Year 2") of the two year grazing rotation cycle.

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 in streams of the Deer-Iron Allotment. Water temperature monitoring was conducted at sites within the allotment action area in Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek, Hat Creek and Deer Creek during 2008 or 2009, with all sites meeting both PACFISH spawning and rearing criteria throughout a late- June to late-October survey period (Appendix C). Water temperatures were also monitored at sites downstream of the allotment action area in Lake Creek and Moyer Creek 2009, with these streams additionally meeting all PACFISH water temperature standards. Mean summer water temperatures at the eight sites ranged between 7.6 and 9.3 degrees C, with all streams displaying mean temperatures below the 10 degree C 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).

Within the Deer Creek Allotment action area, stream sediment levels have been monitored on mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek and mainstem Hat Creek. Functionality criteria for instream sediment reflect goal levels identified in the Salmon National Forest Plan, as modified by geologic setting. A sediment goal of 20 percent or less fines by depth is identified for streams in quartize geology, while 25 percent or less goal is identified for streams within volcanic, granitic or sedimentary geologies Streams of the Iron Creek drainage are within a primarily quartzite based geology, while streams within the Hat Creek drainage lie within a mix of volcanic and quartzite geologies.

Within the Iron Creek drainage, Forest monitoring indicates that mainstem Iron Creek and West Fork Iron Creek are meeting sediment goal levels, with 2009 values measured at 16.8 and 17.2 percent fines, respectively. Long term sediment trends in both streams have been generally stable over time, with measurements below 20 percent fines in most years of record. Sediment levels within the North Fork and South Fork of Iron Creek are both slightly exceeding the quartzite sediment goal level of 20 percent fines, measuring 21.6 and 21.9 percent fines, respectively. The long term trend of North Fork Iron Creek has been generally somewhat variable, but values have generally centered around the 20 percent goal level. South Fork Iron Creek has displayed an improving trend in sediment conditions over time, after the monitoring site was temporarily impacted by beaver dam inundation in the mid 1990's.

Within the Hat Creek drainage, mainstem Hat Creek appears to be meeting the goal level for volcanic geology. While no 2009 monitoring was conducted, the most recent (2003) reading indicated 23.7 percent fines. Sediment trend on this stream has been somewhat variable over time, but the stream has met goal levels in most years of record

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).

Within the Deer-Iron Allotment action area, channel geometry has been monitored on mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek and mainstem Hat Creek.

PACFISH identifies a stream channel width:depth ratio RMO of 10, while natural ranges of width:depth ratios over a variety of geologic and morphological conditions have been identified in a Natural Condition database, by Overton et al, (1995). The Salmon-Challis National Forest has utilized both criteria to assess morphologic condition of Forest stream channels.

Within the Iron Creek drainage, mainstem Iron Creek and West Fork Iron Creek are classed primarily as "B" type channels (Rosgen, 1994), while the North and South Forks of Iron Creek are classed as "C" type channels. Based upon most recent 2002 to 2003 measurements, the PACFISH width;depth RMO of 10 is met on the South Fork Iron Creek (8.8) and West Fork Iron Creek (7.6), but is exceeded on mainstem Iron Creek (16.9) and its North Fork (17.0). With only one exception, however (Iron Creek, 1996, w;d 25.6) all surveyed Iron Creek drainage streams have exhibited width;depth ratios below the Natural Condition Database's mean values of 24 for quartzite based "B" channels or 28 for quartzite-based "C" channels throughout their respective monitoring (see Appendix C)

Within the Hat Creek drainage, mainstem Hat Creek slightly exceeded the PACFISH width;depth RMO, measuring 11.4 during the 2003 reading. All measurements over its period of record, however, have fallen below the mean value of 16 identified in the Natural Condition Database for "A" channel streams in volcanic geology. (see Appendix C).

For the reasons described in this section, it is our determination that current width:depth conditions in the action area are functioning appropriately.

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).

Within the Deer Iron Allotment action area, streambank conditions have been monitored on mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek and mainstem Hat Creek.

All monitored streams within the Iron Creek drainage are meeting the general PACFISH RMO of 80 or greater streambank stability. Mainstem Iron Creek, and its North, South and West Forks are currently exceeding 90 percent stability and most streams are approaching 100 pecent stability. Past monitoring has indicated consistent attainment of the streambank RMO within the drainage (see Appendix C). Multiple indicator monitoring data additionally identify high streambank stabilities in South Fork Iron Creek and West Fork Iron Creek, and indicate improving trends in these streams. A diminished bank stability reading on North Fork Iron Creek in 2009, however, is considered, based upon discussion with range personnel, to have been reflective of MIM protocol classification of undercut banks at the monitoring site as unstable, which is in contrast with assessment of such spruce root dominated sites under the assessment protocols utilized by SCNF hydrology personnel. By contrast, assessment of the same reach of North Fork Iron Creek by Forest Hydrology survey crews identified a 2009 streambank stability of 99 percent.

The Hat Creek drainage is identified as a Priority Watershed for Chinook salmon and steelhead. Utilization of the drainage by these fish is limited, however, by impassable natural falls approximately 2.2 miles above the confluence of mainstem Hat Creek with the Salmon River. These falls have been documented as the upstream limit of upstream fish migration during Bureau of Land Management surveys of steelhead spawning (Jude Trapani, personal communication), and Idaho Department of Fish and Game acknowledges the falls as a total barrier (Chuck Warren, Idaho Department of Fish and Game, personal communication, Scott Feldhausen, Bureau of Land Management, personal communication).

Based upon this acknowledgement, the Salmon-Challis National Forest considers the Priority Watershed classification of the Hat Creek drainage to encompass only portions of the drainage accessible to fish migrating from the Salmon River, with areas above the falls considered non-inclusive. Given a non-Priority Watershed designation, the applicable PACFISH RMO for streambank stability for those portions of the Hat Creek drainage within the Deer-Iron Allotment action area is considered to be 80 percent.

Limited monitoring data for mainstem Hat Creek indicate that the stream met the streambank stability RMO during its most recent survey in 2003, with a measured stability of 84 percent. Long term data indicate variable conditions of bank stability in this stream.

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).

Riparian monitoring sites were established and subsequent monitoring has occurred on the Deer- Iron Allotment since the early 90's. Since that time grazing management has evolved based upon management in reference to listed fish species which occur within the allotment. Greenline Ecological Status (GES) typically is the element considered in assessment and interpretation of ecological status and trend.

Generally, of the three sites monitored since the early 1990s, two sites, M215 on North Fork Iron Creek and M243 on West Fork Iron Creek, are in upward trend or at Late Seral/ PNC. The riparian monitoring site on South Fork Iron Creek (M238) is at Early Seral status. All three sites have display a static recent trend.

The GES of South Fork Iron Creek (M238) is static at Early Seral stage. The monitoring site is dominated by mesic grasses with Douglas Maple as the dominate shrub with some conifer encroachment. The observed early seral status can be attributed to the mesic grass dominance. The best monitoring attribute to manage this site is bank alteration with an endpoint indicator not to exceed 15 percent. The monitoring attribute of greenline stubble with an endpoint indicator no less than six inches will also be used at this site. These new endpoint indicators are more restrictive to aid in moving GES upward.

The GES of West Fork Iron Creek (M243) is static at Late Seral stage. The monitoring site is dominated by willows and is very rocky. Livestock access is limited to small open areas. The best monitoring attribute to manage this site is bank alteration with an endpoint indicator not to exceed 20 percent. The monitoring attribute of greenline stubble with an endpoint indicator no less than four inches will also be used.

The GES of North Fork Iron Creek (M215) is static at PNC. This monitoring site is dominated by spruce overstory with a shrub understory. The best monitoring attribute to manage the site is bank alteration with an endpoint indicator not to exceed 20 percent. The low bank stability of 61 percent observed at this site in 2005 could be attributed to bank undercutting in areas dominated by small shrubs. Bank stability data collected in the same area by hydrology field crews using a protocol which did not categorize undercut banks.as unstable identified 100 percent stability in 2005. Continued monitoring will focus on bank alteration to determine if livestock are impacting bank stability. The monitoring attribute of greenline stubble will also be used with an endpoint indicator no less than fou inches will also be used at this site.

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 (Bengeyfield, 2006).

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

7 ANALYSIS OF EFFECTS

This section contains the effects analysis. The effects of the proposed action are described below and summarized in Table 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 flsh and their aquatic and riparian habitats. These include:

- Strategic Rotation: Pasture 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.

The Forest has integrated five of these six measures into its grazing strategy for the Deer-Iron Allotment to reduce the potential for adverse effects to listed fish and aquatic and riparian habitats within the action area. Fences within the Peel Tree East and South Fork pastures exclude livestock from significant spawning reaches of Iron Creek and Hat Creek. Salting is employed in the allotment to keep livestock off stream areas, and troughs in all pastures provide off-stream watering opportunities. Riders additionally keep livestock in upland areas and off stream channels and riparian areas. Utilization standards have been identified and revised for the various pastures of the allotment to promote attainment of riparian objectives.

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.

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 streams channels due to topography or dense riparian vegetation.

Listed fish species spawn within a number of streams of the Deer-Iron 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 Deer-Iron Allotment are discussed individually below.

7.1.1.1 CHINOOK SALMON

Chinook salmon are not present within the Deer-Iron Allotment action area. Therefore, the proposed grazing operation's potential for to affect Chinook salmon spawning or incubation is considered discountable.

7.1.1.2 STEELHEAD

Mainstem Iron Creek, along with its primary tributary streams North Fork Iron Creek, South Fork Iron Creek and West Fork Iron Creek, support populations of steelhead as well as Designated Critical Habitat for Snake River Basin steelhead. It is considered that all of these streams additionally support spawning habitat for the species.

Based upon proposed grazing rotations within the allotment, and spawning and incubation periodicities identified by the Upper Salmon Basin Technical Team, potential livestock impacts to incubating steelhead redds exist within mainstem and North Fork reaches of Iron Creek in years when the Degan Mountain Pasture receives early grazing use, and within mainstem reaches of Iron Creek when the Peel Tree West Pasture receives early grazing use.

Livestock enter the Degan Mountain Unit on June 16 of alternate years ("Year 1"), and remain within the unit through and beyond the conclusion of steelhead incubation. The southern boundary of the Degan Mountain Unit borders an approximately 1.8 mile reach of mainstem Iron Creek from the lower allotment boundary to the Iron Creek forks, and the unit additionally encompasses the North Fork Iron Creek drainage.

The potential for livestock impacts on steelhead egg incubation within the Degan Mountain Unit is minimized by both the use of off-stream trailing routes onto the unit, and the extreme topography adjacent to mainstem and lower North Fork Iron Creek streamcourses. Entry routes through the BLM Twin Peaks Unit utilize upland paths well removed from the Iron Creek streamcourse, and once in the Degan Mountain Unit, livestock are unable to access the Iron Creek stream channel due to the extremely steep north slope topography throughout the length of this reach of stream. This steep topography additionally precludes access to the lower 2.1 miles of North Fork Iron Creek below Jackass Creek. There remains, however, a potential for direct livestock impact to incubating steelhead eggs along reaches of North Fork Iron Creek above the confluence of Jackass Creek topography flattens and livestock can potentially access upper North Fork Iron Creek's steelhead spawning habitats. While off channel water troughs and active livestock herding to upland areas will help minimize the likelihood of impact, potential livestock/steelhead redd interactions could occur over approximately 36 percent (1.2 miles) of North Fork Iron Creek's identified steehead spawning habitats, with potential exposure spanning the period from mid June through the identified end of steelhead incubation in early July.

Trailing from Degan Mountain Unit to the Peel Tree East Unit in "Year 1) traverses the South Fork Unit and includes stream crossings of North Fork Iron Creek, West Fork Iron Creek, Mainstem Iron Creek and South Fork Iron Creek. This trailing operation is conducted after the July 7 conclusion of steelhead incubation, thereby avoiding potential impact to incubating steelhead redds in these streams.

Livestock initially enter the Peel Tree West Unit in mid June of alternate years ("Year 2"),via upland routes through the BLM Beaver Gulch Unit and remain in the unit through early to mid July. The northern boundary of the Peel Tree West unit borders approximately 0.79 miles of the same mainstem Iron Creek stream reach bordered by the Degan Mountain Unit, as well as 0.49 miles of South Fork Iron Creek Like "Year 1" grazing, entry into the Peel Tree West unit during "Year 2" grazing is via upland paths removed from the Iron Creek streamcourse, and once in the unit, livestock are likewise unable to access the Iron Creek or South Fork Iron Creek stream channels due extremely steep south slope topography. Livestock move from the Peel Tree West Unit to the South Fork Unit in early to mid July. In most years, livestock are moved into the South Fork Unit after the identified July 7 date of latest potential steelhead incubation. As it is possible, that that movement triggers could be approached and met prior to this date, there is potential for earlier livestock movement into the South Fork Unit during the final week of potential steelhead incubation in some years. In years when this early movement occurs, potential for impact to steelhead redds within South Fork Iron Creek, West Fork Iron Creek and a portion of mainstem Iron Creek could occur if steelhead incubation had not concluded in these streams. Timeframes of potential impact would be limited to a one week period and potential for actual impact during this period can be further minimized through active initial trailing to upland areas away from the South Fork, West Fork and mainstem Iron Creek spawning habitats, which are localized in the eastern portion of the unit.

In summary, given assessment of likely incubation timeframes within the action area, grazing rotation strategies, off-channel livestock ingress trailing routes, the presence of significant topographical features which naturally preclude livestock access to stream channels, and the function of range improvements within the allotment in keeping livestock in upland areas away from stream channels, potentials for livestock impacts to steelhead incubation within the allotment are generally considered unlikely despite the possibility of livestock presence in units containing steelhead production habitats during the late stages of steelhead incubation. It is concluded that there exists a non-discountable potential for direct impact of livestock to incubating steelhead eggs within South Fork Iron Creek, West Fork Iron Creek, and portions of mainstem Iron Creek and North Fork Iron Creeks. Potential for impacts to steelhead incubation within the allotment would typically occur only on alternate years,(during "Year 1" of the two year grazing rotation cycle) when livestock are moved from the Peel Tree West Unit into the South Fork Unit after July 7 during Year 2 of the cycle, and would be limited to approximately 1.2 miles of the upper reaches of the North Fork of Iron Creek. In years when movement into the South Fork Unit is triggered prior to July 7, potential impacts could additionally occur over a one week period within 1.3 miles of South

Fork Iron Creek, 0.8 miles of West Fork Iron Creek and 0.99 miles of mainstem Iron Creek within the South Fork Unit, with these potential impacts occurring during “Year 2” of the rotation cycle.

7.1.1.3 BULL TROUT

Mainstem Iron Creek, North Fork Iron Creek, South Fork Iron Creek, West Fork Iron Creek, mainstem Hat Creek, North Fork Hat Creek and Moyer Creek all support bull trout populations and Proposed Critical Habitat for Columbia River bull trout. It is considered that all of these streams additionally support spawning habitat for the species.

Based upon proposed grazing rotations within the allotment, and spawning and incubation periodicities identified by the Upper Salmon Basin Technical Team, potential livestock impacts to spawning bull trout and or incubating bull trout redds exist in areas of the allotment in both years of the grazing rotation cycle. Potential impacts exist within mainstem reaches of Iron Creek in “Year 1” when the Peel Tree East Unit receives late use. Potential impacts within mainstem Iron Creek, South Fork Iron Creek, West Fork Iron Creek, Hat Creek, Middle Fork Hat Creek and Moyer Creek occur in “Year 2” of the cycle when both the South Fork and Peel Tree East Units receive late grazing use.

Livestock enter the Degan Mountain Unit, which encompasses the North Fork Iron Creek drainage and portions of mainstem Iron Creek, on June 16 of alternate years (“Year 1”). Livestock are moved from the Degan Mountain Unit, through the South Fork and Peel Tree West Units, into the Peel Tree East Unit prior to August 15.

Livestock graze the Peel Tree East Unit, which borders a 0.75 mile reach of mainstem Iron Creek, through the permitted off date off date of October 7. Within the Peel Tree East Unit, an upslope fenceline paralleling Iron Creek prevents livestock from reaching the Iron Creek stream channel within a reach of moderately steep south sideslopes. Livestock are trailed out of the Peel Tree East Unit and back to private lands in lower Iron Creek in a one day move over upland routes. With adequate maintenance of the Iron Creek fenceline within the Peel Tree East Unit, potential for direct livestock impact to spawning bull trout or bull trout redds during this cycle of the grazing rotation is considered minimal.

In “Year 2” of the rotation cycle, livestock are first trailed into the Peel Tree West Unit, then moved to the South Fork Unit in early to mid July. Livestock graze within the South Fork Unit, which includes South Fork Iron Creek, West Fork Iron Creek, North Fork Hat Creek and reaches of mainstem Hat Creek and upper Moyer Creek, through the August 15 initiation of bull trout spawning activity to approximately mid-September, encompassing approximately four weeks of the identified bull trout spawning and incubation period. Bull trout spawning habitats within upper Moyer Creek, which borders northwestern portions of the unit, are inaccessible to livestock due to extremely steep south slope topography. The permittee additionally keeps livestock away from this portion of the allotment due to the danger of loss to the canyon slopes. A combination of fencing and steep near stream topography precludes livestock access to both mainstem Hat Creek reaches within the unit’s southern regions and portions of North Fork Hat Creek along the southern boundary. Approximately 2.1 miles of bull trout spawning habitats within the Upper portions of North Fork Hat may be accessible to livestock during this period however, and there is potential for direct impact to spawning bull trout or incubating bull trout eggs in this reach of the stream. Approximately 4.5 miles of South Fork Iron Creek 4.0 miles of West Fork Iron Creek, and 1.1 miles of mainstem Iron Creek bull trout spawning habitats are additionally accessible to livestock within the South Fork Unit during the four week period. Consideration of water temperature regimes of the Iron Creek forks suggest that initiation of bull trout spawning in South Fork Iron Creek may occur at a later period than in West Fork Iron Creek or mainstem Iron Creek, and at some time later than the general August 15 date identified for the area by the Upper Salmon Basin Watershed Technical Team (see Appendix C).

The actual exposure time of potential livestock impact to bull trout redds in mainstem Iron Creek, the South and West Forks of Iron Creek and the North Fork of Hat Creek would be expected to be significantly less than the four week period of livestock presence during the bull trout spawning period, however due to movement of livestock across the unit, and relatively little time spent in any given area.

Livestock are moved from the South Fork Unit to the Peel Tree East Unit in approximately mid-September, where they remain for an approximately four week period until the permitted off date of October 7. Trailing operations from the South Fork to Peel Tree East Units is conducted during a one day

period and moves quickly through portions of the Peel Tree West Unit. With adequate maintenance of the Iron Creek fenceline, potential for direct livestock impact to spawning bull trout or bull trout redds during this period is considered minimal.

In summary, the potential for livestock impacts to spawning bull trout and/or bull trout egg incubation within the Deer Iron Allotment is minimized by extreme topography which precludes livestock access to the Moyer Creek stream channel, removal of livestock from the North Fork Iron Creek drainage on April 15, and fences which preclude livestock access to portions of mainstem Iron Creek, mainstem Hat Creek and portions of North Fork Hat Creek. Potential for livestock impacts to bull trout or bull trout egg incubation within either the Moyer Creek or North Fork Iron Creek drainages is considered discountable. While allotment fences minimize potential for livestock access to reaches of Iron Creek within the Peel Tree East Unit, Hat Creek and North Fork Hat Creek, there remains, however, a non-discountable potential for direct livestock impacts to bull trout and/or incubating bull trout eggs within mainstem Iron Creek, South Fork Iron Creek, West Fork Iron Creek, mainstem Hat Creek and North Fork Hat Creek. Within the Peel Tree East Unit, there is a minimal but non-discountable potential for livestock impact to spawning bull trout and/or incubating bull trout eggs in a 0.75 mile fenced reach of mainstem Iron Creek over a seven week period during “Year 1” grazing, and over a three week period during “Year 2” of the grazing cycle. Within the South Fork Unit, there is a non-discountable potential for impacts to spawning bull trout or redds within approximately 4.5 miles of South Fork Iron Creek, 4.0 miles of West Fork Iron Creek, 1.1 miles of mainstem Iron Creek within the South Fork Unit, and approximately 2.1 miles of North Fork Hat Creek over a four week period in alternate years, occurring during “Year 2” of the grazing rotation cycle. A minimal, but still non-discountable potential for impacts to spawning bull trout or incubating eggs exists within an additional 1.2 miles of spawning habitats within fenced sections of North Fork Hat Creek and 1.9 miles of fenced sections of mainstem Hat Creek during alternate years (“Year 2”) of the two year grazing rotation cycle.

7.1.2 WATER TEMPERATURE

Stream temperatures can have important effects on fish distribution and abundance.. Livestock grazing can impact aquatic and riparian habiats 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.

Water temperature conditions within all allotment streams supporting habitat for listed fish species are functioning appropriately for rearing, spawning, and incubation. Summer water temperatures have been monitored at one mainstem Lake Creek site from June 24th through October, 2009. The mean temperature was 9.2 degrees centigrade, well below the maximum for successful habitation by bull trout (Gamett 2002). Therefore the overall, observed water temperature regimes within the Deer-Iron Allotment are within PACFISH water temperature criteria. Monitoring data do not suggest any significant contribution of temperature impacts as a result of recent livestock grazing. Monitoring data indicate that riparian conditions are generally in static to upward trend, and width:depth ratios are within the natural range of variability. Conservation measures designed primarily to avoid livestock exposure to spawning areas, including livestock movement strategies, fencing, salting and use of riders to keep livestock away from critical stream reaches, will additionally serve to reduce potential livestock impact on water temperatures by minimizing riparian vegetation use and livestock impact to streambanks within allotment streams. Resting of the Degan Mountain, South Fork, and Peel Tree West Units every other year of the rotation cycle will reduce levels of livestock exposure to streams within these pastures, and fencing within the Peel Tree East Unit will prevent livestock assess to Iron Creek habitats within that annually grazed pasture.

Livestock will also graze along several tributary streams that are not occupied by listed fish but that flow into streams with listed fish. These streams are relatively small, generally less than 1.0 m in width, and any potential impacts to stream temperatures in these streams resulting from grazing likely could not be meaningfully measured, detected, or evaluated.

In the absence of observed impacts to these influencing habitat parameters, it is concluded that future livestock grazing within the Deer-Iron Allotment is not expected to have a measureable effect on water

temperatures or water temperature regimes within streams of the action area. Because of the expected effectiveness of the project design and associated conservation measures in reducing cattle presence near streams, we believe any livestock related impacts to water temperature would be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale.

Proposed monitoring will be effective in identifying future trends of water temperature regimes within the action area, as well as 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. 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.

Livestock activity within the Deer Iron Allotment is not currently considered to be a significant factor influencing sediment levels. Stream sediment conditions across the allotment are currently at or only slightly above goal levels, with static to improving trends observed in recent years and no negative trends observed during long term monitoring. Conservation Measures associated with the proposed grazing action are considered to be effective in minimizing potential generation of sediment to stream channels of the Deer-Iron Allotment action area, and stream sediment conditions are expected to be maintained under the proposed grazing action. Measures including use of range riders to keep livestock in upland areas salting, fencing, and rapid movement of livestock through trailing areas all 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. Natural topographic features additionally preclude livestock access to significant near-stream areas of the allotment.

There will be potential stream crossings of mainstem Iron Creek and its North, South and West Forks in association with unit to unit trailing or natural livestock migration patterns. During the “Year 1” grazing rotation cycle, there will be crossings of North Fork Iron Creek, West Fork Iron Creek, mainstem Iron Creek and South Fork Iron Creek in association with trailing from the Degan Mountain Unit to the Peel Tree East Unit. During the ”Year 2” grazing rotation cycle, there will be crossings of South Fork Iron Creek, and potential crossings of mainstem Iron Creek and West Fork Iron Creek in association with grazing migration patterns within the South Fork Unit While exposure times at stream crossings during trailing operations are minimized by active livestock driving, there will be some generation of turbidity in association with transient streambed disturbances. Turbidities associated with 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 of existing or future salmonid redds,

Supplemental monitoring data from within the action area, including streambank stability and width:depth data, do not indicate or suggest exacerbation of sediment levels due to cattle grazing within the drainage. All monitored streams are exceeding 80 percent streambank stability, currently display width:depth ratios within the ranges of variability for their geologic and geomorphologic classifications.

Any impacts on stream sediment from grazing activities under the proposed action are considered to be insignificant, and are not expected to generate any measureable increases in sediment levels. We recognize there could be localized impacts to both streambanks and stream sediment levels when livestock occasionally step on streambanks and introduce minor qualities 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 sediment focus indicator within action area streams.

Ongoing sediment monitoring will be employed to continue to identify trends of stream substrate conditions within the Deer-Iron 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. 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.

Streams of the Deer-Iron Allotment are considered to be functioning appropriately with respect to width:depth ratios. While several streams within the action are slightly exceeding the PACFISH width:depth RMO of 10, all streams have remained below mean width:depth ratios identified for their respective channel types, as identified within the Natural Condition Database, over a substantial monitoring period. Grazing activities have not produced any observable changes in width;depth ratios of action area streams, and streambank stabilities throughout the allotment have consistently met and surpassed PACFISH RMO levels. Considering both observed width: depth ratios and supplemental streambank stability data and trend, 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 Deer-Iron Allotment which can be meaningfully measured, detected or evaluated. We recognize there could be potential localized impacts to channel geometry through both streambank and stream sediment impacts when livestock occasionally step on streambanks. 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.

Strategies and Conservation Measures of the proposed action, while designed primarily avoid livestock presence within stream channels during critical spawning periods, additionally serve to minimize potential livestock impacts to channel morphology of action area streams. Use of range riders to keep livestock in upland areas salting, fencing, and rapid movement of livestock through trailing areas all contribute to minimizing near-stream livestock activity which could result in impacts to channel morphology of action area streams through direct streambank impact or reduction of stabilizing riparian vegetation, and help insure that grazing operations under the proposed action will maintain width:depth conditions within the allotment.

Proposed ongoing MIM monitoring will be effective in identifying both the occurrence and causal mechanisms of any significant changes in width:depth rations 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 by direct alteration of the bank or by modifying riparian vegetation (Platts and Nelson, 1989)

All streams of the Deer Iron Allotment are functioning appropriately with respect to streambank stability. All monitored streams are meeting the PACFISH RMO of 80 percent or higher bank stability, and many

streams are displaying bank stabilities approaching 100 percent. Long term monitoring has identified consistent attainment of the bank stability RMO across the allotment boundaries.

The proposed action identifies Conservation Measures associated with grazing actions which, while designed primarily avoid livestock presence within stream channels during critical spawning periods, additionally serve to minimize potential livestock impacts to streambanks of action area streams. Measures including use of range riders to keep livestock in upland areas salting, fencing, and rapid movement of livestock through trailing areas all contribute to minimizing near-stream livestock activity which could result in direct impacts to streambank stability.

Given consideration of streambank stability condition and trends and the effectiveness of the identified conservation measures in preventing or minimizing livestock access to allotment stream channels, it is concluded that direct and indirect effects of the proposed livestock grazing actions on streambank conditions within streams of the Deer-Iron Allotment are insignificant, and not expected to have any meaningfully measureable or discernable influence on streambank stability levels within the action area. We recognize there could be localized streambank impacts when livestock congregate near stream channels. 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 expected to maintain the condition of the streambank focus indicator.

Future field data collections will continue to identify trends of streambank conditions within the Deer-Iron Creek Allotment. Monitoring operations will additionally employ annual assessment of streambank alteration to identify effectiveness of livestock movement triggers. These monitoring operations 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.

Current livestock grazing activities within the action area are not considered to be negatively impacting riparian conditions. A significant portion of the allotment's streams are excluded from livestock access by fencing , steep sideslope topography or a combination of the two. Overall riparian conditions within the Deer-Iron Allotment are moderate to good with most MIM monitoring sites identifying Late Seral to PNC status. Conditions within South Fork Iron Creek are in early seral stage, however, it is believed that this classification may be a function of the unsuitability of the monitoring site rather than reflective of actual livestock impact. The proposed action, nonetheless, identifies modifications of end of year indicators designed to improve conditions in the South Fork Iron Creek. Data for all other associated focus indicators, including water temperature, streambank stability and width:depth ratios suggest healthy condition of riparian areas across the allotment.

Given consideration of overall condition of riparian condition and trends and the effectiveness of the identified conservation measures in preventing or minimizing livestock access to allotment stream channels, it is expected that the direct and indirect effects of the proposed actions on riparian conservation areas are not able to be meaningfully measured, detected or evaluated, and are therefore insignificant. We recognize 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. The proposed action is expected to maintain the condition of the riparian focus indicator, and improve conditions within the South Fork Unit over time.

Future field data collections will continue to identify trends of riparian vegetation conditions within the Deer-Iron Creek 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.

The Deer-Iron Allotment action area includes one private land inholding within the North Fork Iron Creek drainage. Mining and mineral exploration activities have occurred within these lands in past years. However, there are no known proposed activities identified on this currently inactive mining parcel.

7.3 SUMMARY OF EFFECTS

The effects analysis identifies a non-discountable potential for direct impact of livestock on spawning steelhead and bull trout and their incubating eggs. These potential impacts could directly affect the Growth and Survival Indicator of the Subpopulation Characteristics Pathway, which could produce related indirect effects to the Subpopulation Size and Persistence and Genetic Integrity Indicators. Potential for direct impact of livestock on spawning Chinook salmon or incubating eggs is considered discountable due to the low probability of Chinook salmon use of habitats within the action area at this time. Impacts of proposed grazing activities to aquatic and riparian habitat focus indicators, including water temperature, sediment, width;depth ratio, streambank condition and riparian habitat conservation areas are all identified as insignificant or discountable, The proposed action would maintain these indicators at their current levels of functionality.

Table 4 summarizes effects of proposed Deer-Iron 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 DEER-IRON ALLOTMENT GRAZING ACTIVITIES

Pathway	Indicators	Functionality Of Baseline 1/	Response Column A Will the proposed action or any interrelated or interdependent actions likely generate any direct or indirect effects to this indicator?			Response Column B Are these effects expected to exceed beneficial, insignificant, or discountable?		
			CH	SH	BT	CH	SH	BT
Subpopulation Characteristics	Subpopulation Size	FA/FA/FA/FA	YES	YES	YES	NO	YES	YES
	Growth and Survival (including incubation survival)	FA/FA/FA/FA	YES	YES	YES	NO	YES	YES

	Life History Diversity and Isolation	FR/FR/FR/FR	NO	NO	NO			
	Persistence and Genetic Integrity	FR/FR/FA/FA	YES	YES	YES	NO	YES	YES
Water Quality	Temperature	FA/FA/FA/FA	YES	YES	YES	NO	NO	NO
	Sediment	FA/FR/FA/FA	YES	YES	YES	NO	NO	NO
	Chemical Characteristics	FR/FR/FA/FA	NO	NO	NO			
Habitat Access	Physical Barriers	FA/FA/FR/FR	NO	NO	NO			
Habitat Elements	Substrate Embed.	N/A	N/A	N/A	N/A			
	LWD	FR/FA/FA/FR	NO	NO	NO			
	Pool Frequency and Quality	FR/FA/FA/FA	NO	NO	NO			
	Off-channel Habitat	FR/FA/FR/FR	NO	NO	NO			
	Refugia	FA/FA/FR/FA	NO	NO	NO			
Channel Condition and Dynamics	Width:Depth Ratio	FA/FA/FA/FA	YES	YES	YES	NO	NO	NO
	Streambank Condition	FA/FA/FA/FA	YES	YES	YES	NO	NO	NO
	Floodplain Connectivity	FR/FA/FR/FA	NO	NO	NO			
Flow/Hydrology	Change in Peak/Base Flows	FA/FR/FR/FR	NO	NO	NO			
	Increase in Drainage Networks	FR/FR/FR/FR	NO	NO	NO			
Watershed Conditions	Road Density and Location	FR/FR/FR/FR	NO	NO	NO			
	Disturbance History	FR/FA/FA/FA	NO	NO	NO			
	Riparian Conservation Areas	FR/FR/FA/FR	YES	YES	YES	NO	NO	NO
	Disturbance Regime	FA/FA/FA/FA	NO	NO	NO			

Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FA/FA/FA/FA	NO	NO	NO			

1/ Iron Cr Watershed / Hat Cr Watershed / Twelvemile Watershed / Upper Panther Cr Watershed

Non-highlighted elements refer to overall conditions within the four watersheds as identified in Matrix Tables Appendix B

Highlighted elements refer to functionality conditions within action area portions of the four watersheds as identified for Focus Indicators

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 currently support Chinook salmon, and there is a low likelihood of current or near-future chinook salmon utilization of habitats within the action area. Therefore, the proposed action results in a “NOT LIKELY TO ADVERSELY AFFECT” determination for Chinook salmon. Designated Critical Habitat for Chinook salmon exists within the action area, however, and the effects analysis concluded that the proposed action may have some effects on designated Chinook salmon critical habitat. However, these effects are expected to be insignificant or discountable. Therefore, the proposed action results in a “NOT LIKELY TO ADVERSELY AFFECT” determination for designated Chinook salmon critical habitat.

8.2 SNAKE RIVER STEELHEAD

The effects analysis concluded that the proposed action may have direct effects on incubating steelhead redds within the action area which are not considered insignificant or discountable. Although proposed conservation measures limit the adverse effects of grazing activities, there exists a remaining potential for direct trampling of steelhead redds within action area streams. Therefore, the proposed action results in a “MAY AFFECT, LIKELY TO ADVERSELY AFFECT” determination for steelhead.

The action area contains designated critical habitat for steelhead, and the effects analysis concluded that the proposed action may have some effects on designated steelhead critical habitat. However, these effects are expected to be insignificant or discountable. In addition, all vegetation pathway indicators, PCEs, and the grazing focus indicators are being met with current livestock management practices. Therefore, the proposed action results in a “NOT LIKELY TO ADVERSELY AFFECT” determination for designated steelhead critical habitat.

8.3 COLUMBIA RIVER BULL TROUT

The effects analysis concluded that the proposed action may have direct effects to bull trout or bull trout redds within the action area which are not considered insignificant or discountable. Although proposed conservation measures limit the adverse effects of grazing activities, there exists a remaining potential for direct trampling of bull trout redds within action area streams. Therefore, the proposed action results in a “MAY AFFECT, LIKELY TO ADVERSELY AFFECT” determination for bull trout.

The action area contains proposed critical habitat for bull trout and, and the effects analysis concluded that the proposed action may have some effects proposed bull trout critical habitat. However, these effects are expected to be insignificant or discountable. In addition, all vegetation pathway indicators, PCEs, and the grazing focus indicators are being met with current livestock management practices. Therefore, the proposed action results in a “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 NOT ADVERSELY AFFECT” Chinook salmon Essential Fish Habitat.

TABLE 5 – EFFECTS DETERMINATION SUMMARY FOR DEER-IRON ALLOTMENT GRAZING ACTIVITIES

	Chinook Salmon		Steelhead		Bull Trout	
	Species	Designated Critical Habitat	Species	Designated Critical Habitat	Species	Proposed Critical Habitat
Determination[1]	Not Likely to Adversely Affect	Not Likely to Adversely Affect	Likely to Adversely Affect	Not Likely to Adversely Affect	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
REFERENCES

References

Belsky, J., A. Matzke, and S. Uselman. 1997. Survey of livestock influences on stream and riparian ecosystems in the western United States. Oregon Natural Desert Association. 38 p.

Bjornn, T.C. and Reiser, D.W. 1991. Habitat Requirements of Salmonids in Streams IN Meehan, W.R. ed Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, American Fisheries Society. Bethesda, Maryland..

Bjornn, T.C., C.A. Perry and L.M. Garmann, 1998 Deposition of fine sediments in substrates and their effects on survival of trout embyos. Idaho Cooperative Fish and Wildlife Research Unit Technical Report 98-1. University of Idaho. February 1998

Burton, T.A., S.J. Smith and E.R. Crowley. 2008. Monitoring Stream Channels and Riparian Vegetation Multiple Indicators. Interagency Technical Bulletin Version 5.0. USDA Forest Service, USDI Bureau of Land Management. April,2008.

Clary, W. P. and B. F. Webster. 1989. Managing grazing of riparian areas in the Intermountain Region. General Technical Report INT-263, U.S. Dept. of Agriculture, USFS, Intermountain Research Station, Ogden, Utah. 11 p.

Curet, T., 2010. Personal communication between Robert Rose, Salmon-Challis National Forest fishery biologist and Tom Curet, Salmon Region Office, Idaho Department of Fish and Game, regarding current Chinook salmon use of the lower Iron Creek drainage.

Ehrhart, R.C. and P.L. Hansen. 1997. Effective cattle management in riparian zones: a field survey and literature review. USDI, Bureau of Land Management, Montana State Office. November.

Feldhausen, S., 2010. Personal communication between Robert Rose, Salmon-Challis National Forest fishery biologist and Scott Feldhausen, Salmon Field Office, Bureau of Land Management, regarding barrier falls within the Hat Creek drainage, and steelhead use of the Hat Creek drainage.

Gamett, B, L. 2002 The relationship between water temperature and bull trout distribution and abuncance. Utah State University. Logan, Utah. 2002.

Gregory, J.S. and B.L. Gamett. 2009. Cattle trampling of simulated bull trout redds. North American Journal of Fisheries Management 29:361.

Idaho Department of Fish and Game, 2005 Iron Creek Fisheries Report. Prepared by Chuck Warren and John Thabes for the U.S. Department of Energy, Bonneville Power Administration, Fish and Wildlife Program. Project Number 1994-015-00 May, 2005.

Idaho Fish and Game Department, (publication date unknown) Inventory of Idaho streams containing anadromous fish, including recommendations for improving production of salmon and steelhead. Part 1. Snake, Salmon, Weiser, Payette and Boise River Drainages.

Kauffman, J. B. and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications - a review. Journal of Range Management 37(5):430-438.

Koons, W., 2010. Personal communication between Robert Rose, Salmon-Challis National Forest fishery biologist and Wendy Koons, Upper Salmon Basin Watershed Project, regarding cooperative landowner measures to improve fish passage opportunities within the lower Iron Creek drainage.

Lee, D. C., J. R. Sedell, B. R. Rieman, R. F. Thurow, J. E. Williams, [and others]. 1997. In: Quigley, T.M.; S.J. Arbelbide, An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: vol. 3, ch. 4. Gen. Tech. Rep. PNW-GTR-405. Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 1058–1496.

McInnis, M.L. and J. McIver. 2001. Influence of off-stream supplements on streambanks of riparian pastures. Journal of Range Management 54(4). 4p.

Menke, J. (ed.). 1977. Symposium on livestock interactions with wildlife, fish and the environment. Sparks, Nevada. USDA Forest Service Pacific Southwest Forest andRange Experiment Station. Berkeley, California.

Murphy, P., 2010. Personal communication between Robert Rose, Salmon-Challis National Forest fishery biologist and Paddy Murphy, Salmon Region Office, Idaho Department of Fish and Game, regarding barrier falls within the Hat Creek drainage.

Overton, C.K., J.D McIntyre, R. Armstrong, S.L. Whitwell, and K.A. Duncan, 1995. User's Guide to Fish Habitat:: Descriptions that Represent Natural Conditions in the Salmon River Basin, Idaho. USDA Forest Service Intermountain Research Station General Technical Report INT-GTR-322. August 1995.

Platts. W.S. 1991. Livestock Grazing. IN Meehan, W.R. ed Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, American Fisheries Society. Bethesda, Maryland..

Platts, W.S and R.L. Nelson, 1989. Stream Canopy and its relation to salmonid biomass in the Intermountain West. North American Journal of Fisheries Management 9:446-457

Bjornn, T.C. and Reiser, D.W. 1991. Habitat Requirements of Salmonids in Streams IN Meehan, W.R. ed Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, American Fisheries Society. Bethesda, Maryland.

Rosgen, D.L., 1994. A classification of natural rivers. In: Catena. An interdisciplinary journal of soil science, hydrology, geomorphology focusing on geoecology and landscape evolution. Vol 22. No 3. June 1994.

Salmon-Challis National Forest, 2005. Biological Assessment for Proposed and Ongoing Activities within the Panther Creek Drainage. Salmon-Cobalt Ranger District, Salmon-Challis National Forest, March 15, 2005

Salmon-Challis National Forest, 2007. Middle Salmon River Watershed Diversions Biological Assessment. Salmon-Cobalt, Challis and North Fork Ranger Districts. Salmon-Challis National Forest. December 26, 2007.

Salmon-Challis National Forest, 2009. Hydrology Department Monitoring Files, 1992-2009.

Upper Salmon Basin Watershed Project Technical Team, 2005. Upper Salmon River Recommended Instream Work Windows and Fish Periodicity. For River Reaches and Tributaries Above the Middle Fork Salmon River Including the Middle Fork Salmon River Drainage. Revised November 30, 2005.

U.S. Fish and Wildlife Service. 2009. 90 Day Species List 14420-2010-SL-0089, issued December 30, 2009.

U.S. Office of the Federal Register. 1991. 56FR58619 - Endangered and Threatened Species; Endangered status for Snake River sockeye salmon. [See Fed Reg. November 20, 1991 (Vol.56, Number 225)]. Effective December 20, 1991.

U.S. Office of the Federal Register. 1992. 57FR14653 - Endangered and Threatened Species; Threatened status for Snake River spring and summer Chinook salmon. [See Fed Reg. April 22, 1992 (Vol.57, Number 78)]. Effective May 22, 1992.

U.S. Office of the Federal Register. 1993. 58FR68543 –Sockeye Salmon and Chinook Salmon Critical Habitat designation) [See Fed Reg. December 28, 1993 (Vol.58, Number 247)]. Effective January 27, 1994.

U.S. Office of the Federal Register. 1997. 62FR43937 - Endangered and Threatened Species; Threatened status for Snake River steelhead. [See 62 Fed Reg. August 18, 1997 (Vol.62, Number 159)]. Effective October 17, 1997.

U.S. Office of the Federal Register. 1998. 63FR31647 - Endangered and Threatened Species; Threatened status for bull trout. [See Fed Reg. June 10, 1998 (Vol.63, Number 111)]. Effective July 10, 1998.

U.S. Office of the Federal Register. 1999. 58FR68543 – Designated Critical Habitat: Revision of Critical Habitat for Snake River Spring/Summer Chinook Salmon) [See Fed Reg. October 25, 1999 (Vol.64, Number 205)]. Effective November 24, 1999.

U.S. Office of the Federal Register. 2002. 67FR2343 - Magnuson-Stevens Act Provisions; Essential Fish Habitat (EFH) [See Fed Reg. January 17, 2002 (Vol.67, Number 12)]. Effective February 19, 2002.

U.S. Office of the Federal Register. 2005. 70FR52630 – Endangered and Threatened Species; Designation of Critical Habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho [See Fed Reg. September 2, 2005 (Vol.70, Number 170)]. Effective January 2, 2006.

U.S. Office of the Federal Register. 2005. 70FR56212 –Bull Trout Critical Habitat designation) [See Fed Reg. September 26, 2005 (Vol.70, Number 185)]. Effective October 26, 2005.

U.S. Office of the Federal Register. 2006. 71FR834 - Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. [See Fed Reg. January 5, 2006 (Vol.71, Number 3)]. Effective February 6, 2006.

U.S. Office of the Federal Register. 2010. 75FR2269 Endangered and Threatened Wildlife and Plants; Revised designation of Critical Habitat for Bull Trout in the Coterminous United States. Proposed Rule. [See Fed Reg. January 14, 2010 (Vol.75, Number 9)]. Effective February 14, 201

Warren, C., 2010. Personal communication between Robert Rose, Salmon-Challis National Forest fishery biologist and Chuck Warren, Salmon Region Office, Idaho Department of Fish and Game, regarding barrier falls within the Hat Creek drainage, and historic and current use of the lower Iron Creek drainage by Chinook Salmon.

Winward, A.H. 1995. Monitoring the Vegetation Resources in Riparian Areas. USDA Forest Service. Rocky Mountain Research Station. General Technical Report GTR-47 April, 2000.

APPENDIX B
WATERSHED BASELINES WITH
MATRICES OF DIAGNOSTIC PATHWAYS AND INDICATORS

IRON CREEK – SALMON RIVER WATERSHED BASELINE

Agency:	**HU Code and Name: 1706020302 Iron Creek-Salmon River**
Unit: Salmon-Cobalt Ranger District	**Spacial Scale of Matrix:** One 5th HUC
Fish Species Present: Chinook Salmon, Steelhead, Bull Trout	**Designated Critical Habitat Present:** Chinook Salmon, Steelhead, Bull trout (Proposed)
Anadromous Species Population: Salmon River	**Anadromous Species Subpopulation:**
Bull Trout Core Area: Salmon River	**Local Population:**
Management Actions: Ongoing	**Updated:** 12-29-09

Subpopulation Characteristics (bull trout only)		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Subpopulation Size	FA	PJ; Iron Creek has a strong resident population, existence of a fluvial population is questionable due to the seasonal dewatering of the lower reaches of Iron Creek.
Growth and Survival	FA	PJ; Iron Creek has a strong resident population.
Life History Diversity and Isolation	FR	Fluvial population may be missing due to dewatering for irrigation purposes on private lands in lower watershed.
Persistence and Genetic Integrity	FR	There are no brook trout; lack of migratory ability has nothing to do with federal actions.
Water Quality		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Temperature (7day average. Maximum, ^{o}C)	FA	Meets standards on federal lands, unknown on private lands

Sediment	FA	Meets standards on federal lands, data available
Chemical Contaminants/Nutrients	FR	Salmon River - Sedimentation/Siltation
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	FA	Recent private land irrigation modifications have improved flow regimes in the lower portions of mainstem Iron Creek.
Habitat Elements		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Substrate Embeddedness	FR	Meets standards on federal lands; data available.
Large Woody Debris	FR FR	Bull trout - Meets standards for most of stream, but not where impacted by road up valley bottom and historic firewood gathering (<1 mile total stream length). Steelhead – Is Functional at Risk; meets in some areas, not in others. Impacted by road up valley bottom and historic firewood gathering.
Large Pools or Pool Frequency and Quality	FR	Tied to LWD losses in past and road impacts; meets for vast majority of the watershed.
Off-Channel Habitat	FR	Somewhat diminished due to roads modifying floodplain access and reduced LWD.
Refugia	FA	PJ - supported by evidence of strong, healthy population and variety of age classes.
Channel Condition & Dynamics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Average Wetted Width/Maximum Depth Ratio	FA	Meets standards as supported by R1/R4 data
Streambank Condition	FA	Meets standards as supported by R1/R4 data

Floodplain Connectivity	FR	Road up valley bottom has impacted floodplain in some areas (<½ mile). The watershed has approximately 64.1 miles of roads within an RHCA, which is 27.2% of the roads within the watershed.
Flow/Hydrology		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Change in Peak/Base Flows	FA	Recent private land irrigation modifications have improved flow regimes in the lower portions of mainstem Iron Creek.
Increase in Drainage Network	FR	PJ; due to limited disturbance and roading.
Watershed Condition		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Road Density and Location	FR	Road density is 2.0 mi/mi^2. The watershed has approximately 64.1 miles of roads within an RHCA, which is 27.2% of the roads within the watershed.
Disturbance History	FR	Overall ECA is 5.1%.
Riparian Conservation Areas	FR	PJ - riparian functionality appears good except where modified by road and lack of potential for woody debris due to road and historic firewood gathering.
Disturbance Regime	FA	Very stable system.
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	FA	Iron Creek is a very stable system with good riparian and aquatic habitats, supporting natural processes and a healthy resident bull trout population; The road up the stream bottom has impacted woody debris and channel characteristics, but this is limited to a small portion of the watershed. Habitat survey and temperature data are available to support most of the conclusions reached in this evaluation. Professional judgment calls are based on the on-the-ground knowledge of several biologists. Due to topography, the naturally armored stream channels and shrubby nature of the riparian areas in this subwatershed, livestock grazing has not impacted the riparian resources. Current management will maintain this high quality habitat that should sustain healthy bull trout populations.

HAT CREEK – SALMON RIVER WATERSHED BASELINE

Agency: USDA Forest Service, Salmon-Challis National Forest	**HU Code and Name:** 1706020301 Hat Creek-Salmon River
Unit: Salmon-Cobalt and Challis Ranger Districts	**Spatial Scale of Matrix:** One 5th HUC
Fish Species Present: Chinook Salmon, Steelhead, Bull Trout	**Designated Critical Habitat Present:** Chinook Salmon, Steelhead
Anadromous Species Population: Salmon River	**Anadromous Species Subpopulation:**
Bull Trout Core Area: Salmon River	**Local Population:**
Management Actions: Ongoing	**Last Updated:** 12-29-09

Subpopulation Characteristics	**(Bull trout only**	
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Subpopulation Size	FA	
Growth and Survival	FA	
Life History Diversity and Isolation	FR	
Persistence and Genetic Integrity	FR	
Water Quality		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Temperature (7day average. Maximum, ^{o}C)	FA	Hobos =63 F (17 C) Measured on lower key area meadow. Spring spawning temperatures unknown
Sediment	FR	Upper key area on willow site measured 43.6% fines (surface estimate) from R1/R4

Chemical Contaminants/Nutrients	FR	Cow Creek - Combined Biota/Habitat Bioassessments Mud Creek - Combined Biota/Habitat Bioassessments North Fork Cow Creek - Combined Biota/Habitat Bioassessments Salmon River - Combined Biota/Habitat Bioassessments
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	FA	Diversions present on Big Hat, tributary to Salmon River.
Habitat Elements		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Substrate Embeddedness	FR	Considered at FR with cobble/gravel dominate at 27.5 % from R1/R4 measured on Upper key area-630 feet.
Large Woody Debris	FA	At PF with 151/mile-R1/R4 but with limited inventory length along 630 foot Upper key area. Fall trailing may be affecting regeneration.
Large Pools or Pool Frequency and Quality	FA	At PF with 151/mile-R1/R4-measured along 630 foot Upper key area.
Off-Channel Habitat	FA	PJ; believe habitat conditions are adequate with active beaver dams and overflow channels.
Refugia	FA	Same as above.
Channel Condition & Dynamics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Average Wetted Width/Maximum Depth Ratio	FA	At PF with 3.9 on scour pools-R1/R4 measured along 630' of upper key area
Streambank Condition	FR	FR with 64.9% bank stability R1/R4 measured along 630' of lower key area
Floodplain Connectivity	FA	PJ; creeks rated at PFC; transport streams on moderate gradients limits floodplain. The watershed has approximately 53.4 miles of roads within an RHCA, which is 27.5% of the total roads within the watershed.

Flow/Hydrology		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Change in Peak/Base Flows	FR	Diversions present but not related to action.
Increase in Drainage Network	FR	Not related to action.
Watershed Condition		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Road Density and Location	FR	Road density is 1.4 mi/mi^2. The watershed has approximately 53.4 miles of roads within an RHCA, which is 27.5% of the total roads within the watershed.
Disturbance History	FA	Overall ECA is 0%.
Riparian Conservation Areas	FR	PJ; creeks rated at-risk, fair to good habitat conditions, potential for improvement.
Disturbance Regime	FA	
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	FA	

TWELVEMILE CREEK – SALMON RIVER WATERSHED BASELINE

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	**Designated Critical Habitat Present:** Chinook Salmon, Steelhead
Anadromous Species Population: Salmon River	**Anadromous Species Subpopulation:**

Bull Trout Core Area: Salmon River	**Local Population:**
Management Actions: Ongoing	**Updated:** 12-29-09

Subpopulation Characteristics (bull trout only)		
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, ^{o}C)	FA	Meets standards on federal lands, data available
Sediment	FA	Meets standards on federal lands, data available
Chemical Contaminants/Nutrients	FA	No 303(d) listed streams in watershed
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 standards, data available
Streambank Condition	FA	Meets standards on federal lands, data available
Floodplain Connectivity	FR	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	FR	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	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. Twelvemile Creek is very stable with good riparian and aquatic habitats, supporting natural processes and a healthy resident bull trout population. Current management will maintain this excellent habitat and provide the necessary habitat parameters to sustain healthy bull trout populations.

UPPER PANTHER CREEK WATERSHED BASELINE

Agency: USDA Forest Service, Salmon-Challis National Forest	**HU Code and Name:** 1706020309 Upper Panther Creek
Unit: Salmon-Cobalt Ranger District	**Spacial Scale of Matrix:** One 5th HUC
Fish Species Present: Chinook Salmon, Steelhead, Bull Trout	**Designated Critical** Habitat Present: Chinook Salmon, Steelhead, Bull trout (Proposed)
Anadromous Species Population: Salmon River	**Anadromous Species Subpopulation:**
Bull Trout Core Area:	**Local Population:**
Management Actions: Ongoing	**Last Updated:** 12-29-09

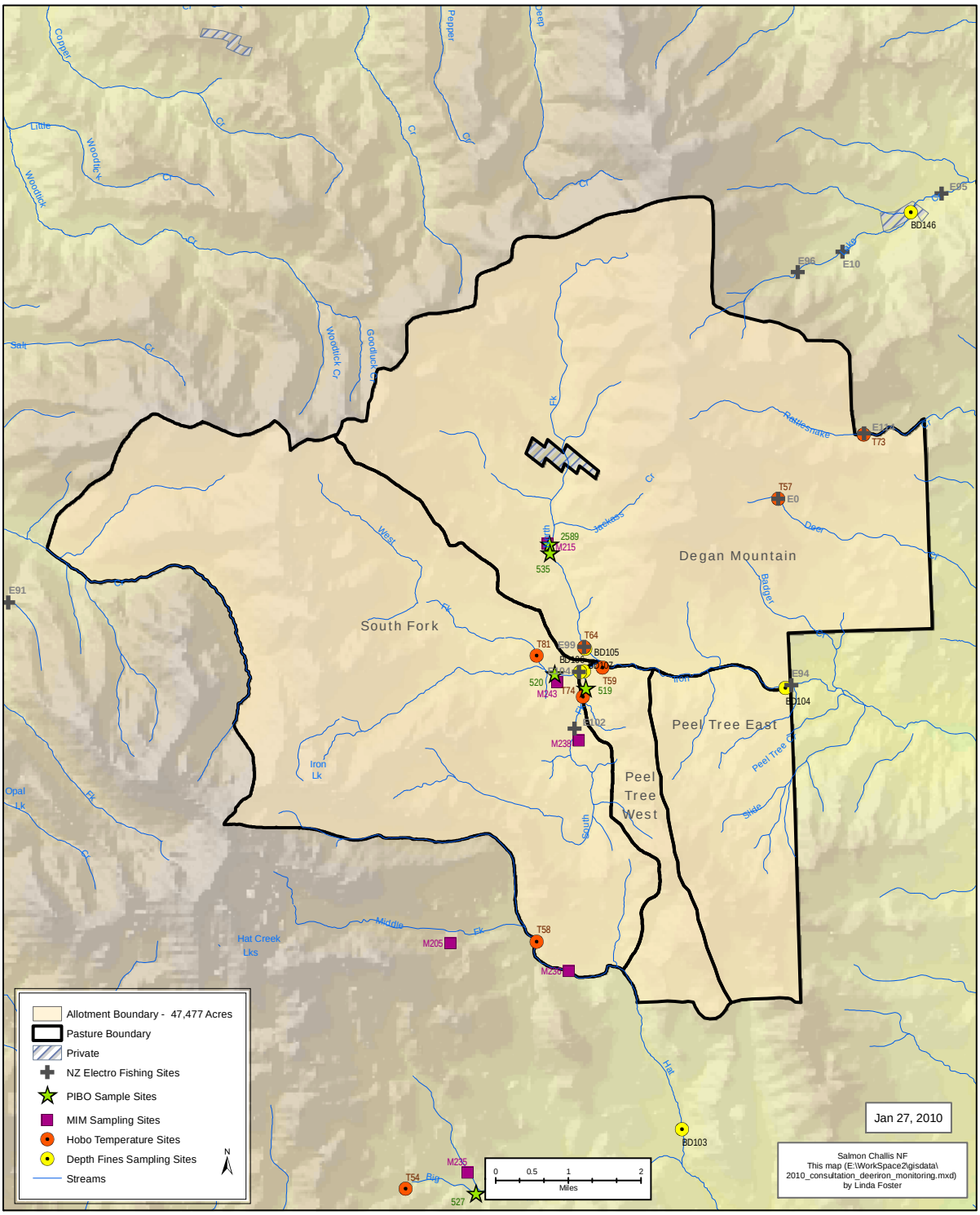
Subpopulation Characteristics (Bull trout only)		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Subpopulation Size	**FA**	Moyer Creek bull trout populations are relatively strong, especially above the South Fork due to low brook trout numbers. Historic salmon and steelhead habitat exists in Moyer Creek up to the South Fork. Small numbers of Chinook have spawned in Panther Creek as far upstream as Moyer Creek in recent years
Growth and Survival	**FA**	Local bull trout population appears to be stable with all age classes represented. Extent of fluvial bull trout component is unknown. Populations should have the resilience to withstand short term disturbances.
Life History Diversity and Isolation	**FR**	Fluvial bull trout from the Salmon River appear to be depressed. There is a small population of 300-400 mm bull trout that inhabit Panther Creek above Big Deer Creek. Upper Panther tributaries are well connected.
Persistence and Genetic Integrity	**FA**	Connectivity remains high among local bull trout populations. Brook trout predominate in lower reaches of watershed, bull trout predominate in upper reaches. Chinook spawning in mainstem Panther Creek appears to be increasing in recent years
Water Quality		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Temperature (7day average. Maximum, ^{o}C)	**FA**	Most tributaries and headwater reaches are Functioning Appropriately except during climatically warm years
Sediment	**FA**	Most monitoring locations within the watershed reflect Appropriately Functioning conditions.
Chemical Contaminants/Nutrients	**FA**	There are no 303(d) listed streams within the watershed
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	**FA**	There are no man made barriers to fish migration in the watershed.
Habitat Elements		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Substrate Embeddedness	**FA**	Refer to Sediment

Large Woody Debris	**FR**	Because of the small size of streams within the watershed, little LWD is transported downstream from forested reaches. LWD is scarcer in meadow reaches compared to forested areas.
Large Pools or Pool Frequency and Quality	**FA**	Available pool habitat is generally good with adequate cover and minimal filling of pools with fine sediment, except in beaver dam reaches of Musgrove Creek.
Off-Channel Habitat	**FR**	All subwatersheds have valley bottom roads which affect both quality and quantity of side-channel and backwater habitat
Refugia	**FA**	Stream habitats throughout the watershed are capable of supporting strong populations. Habitats are protected, well distributed and connected. Although some reaches are not functioning appropriately for water temperature, fish of all age classes have access to cooler water.
Channel Condition & Dynamics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Average Wetted Width/Maximum Depth Ratio	**FA**	All surveyed stream reaches meet the Natural Condition Database for width/depth ratio
Streambank Condition	**FR**	Most surveyed reaches exceed 80% bank stability
Floodplain Connectivity	**FA**	Except for short segments of Porpyhry Creek and main Panther Creek where roads encroach on the stream, streams have full access to their floodplains.
Flow/Hydrology		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Change in Peak/Base Flows	**FR**	Diversions are present in the watershed but changes in peak base flows do not appear to be significant.
Increase in Drainage Network	**FR**	There have been no increases in active channel lengths due to human-caused disturbances.
Watershed Condition		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Road Density and Location	**FR**	Overall Road density is 1.27 mi/mi^2. Density within the Moyer Creek drainage is 0.45 mi/mi^2

Disturbance History	**FA**	Overall ECA is 11.8%. Risk of Cumulative Watershed Effects is Low.
Riparian Conservation Areas	**FR**	Riparian conditions along main Panther Creek have improved. Reduced grazing pressure on mainstem Panther has shifted pressure to a few tributaries, including Fourth of July Cr, lower Porphyry Cr, Sawmill Gulch and McGowan Gulch..
Disturbance Regime	**FA**	Throughout most of the watershed, natural processes are stable. Scour events, debris torrents, and rain-on-snow events seldom occur. In the unburned portion of the watershed, environmental disturbances are short-lived, hydrograph is predictable.
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	**FA**	Overall, habitat quality in the Upper Panther Creek Watershed is adequate to support strong populations of all resident and anadromous species and all life history forms. . There are isolated areas of impacts associated with cattle grazing, stream channeling on private land, road construction, irrigation diversions, etc. throughout the watershed, but such areas are small relative to the entire Upper Panther Creek Watershed. Displacement and/or hybridization of westslope cutthroat trout and bull trout by non-native species is a real area of concern in this watershed. (Professional Judgm

APPENDIX C
MONITORING DATA AND SUMMARIES

APPENDIX C FIGURE 1 - MONITORING LOCATIONS WITHIN THE DEER-IRON ALLOTMENT ACTION AREA



APPENDIX C TABLE 1 - FISH INFORMATION

Stream	Site ID	Sample Date	Sampling Method	Species Present		
				Chinook	Steelhead/Rainbow	Bull Trout
Iron Cr	E94	09/01/09	E-shock		X	X
NF Iron Cr	E99	09/01/09	E-shock		X	X
SF Iron Cr	E102	09/01/09	E-shock		X	X
WF Iron Cr	E104	09/01/09	E-shock		X	X
Hat Cr	FS Bndry	08/14/08	E-shock			X
NF Hat Cr	XXX		E-shock			X
Rattlesnake Cr	E114	08/31/09	E-shock			
Deer Cr	E0	09/21/09	E-shock			
Moyer Cr	-		PJ			X
Unn Moyer Trib	-		PJ			

APPENDIX C TABLE 2 – CHINOOK SALMON CRITICAL HABITAT

Chinook DCH	
Unit/Stream	Sum of LENGTH
Degan Mountain Unit	1.83
Iron Creek	1.83
Peel Tree East Unit	0.75
Iron Creek	0.75
Peel Tree West Unit	0.79
Iron Creek	0.79
South Fork Unit	0.50
Iron Creek	0.50
Grand Total	3.87

APPENDIX C TABLE 3 - STEELHEAD DISTRIBUTION, SPAWNING HABITAT, AND DESIGNATED CRITICAL HABITAT

Steelhead Present		Steelhead Spawning		Steelhead DCH	
Unit/Stream	Sum of LENGTH	Unit Stream	Sum of LENGTH	Unit/Stream	Sum of LENGTH
Degan Mountain Unit	5.13	Degan Mountain Unit	5.13	Degan Mountain Unit	1.83
Iron Creek	1.83	Iron Creek	1.83	Iron Creek	1.83
North Fork Iron Creek	3.30	North Fork Iron Creek	3.30	Peel Tree East Unit	0.75
Peel Tree East Unit	0.75	Peel Tree East Unit	0.75	Iron Creek	0.75
Iron Creek	0.75	Iron Creek	0.75	Peel Tree West Unit	0.79
Peel Tree West Unit	1.27	Peel Tree West Unit	1.27	Iron Creek	0.79
Iron Creek	0.79	Iron Creek	0.79	South Fork Unit	0.69
South Fork Iron Creek	0.49	South Fork Iron Creek	0.49	Iron Creek	0.50
South Fork Unit	7.78	South Fork Unit	7.78	Moyer Creek	0.19
Iron Creek	0.99	Iron Creek	0.99	Grand Total	4.07
Moyer Creek	4.70	Moyer Creek	4.70		
South Fork Iron Creek	1.31	South Fork Iron Creek	1.31		
West Fork Iron Creek	0.78	West Fork Iron Creek	0.78		
Grand Total	14.94	Grand Total	14.94		

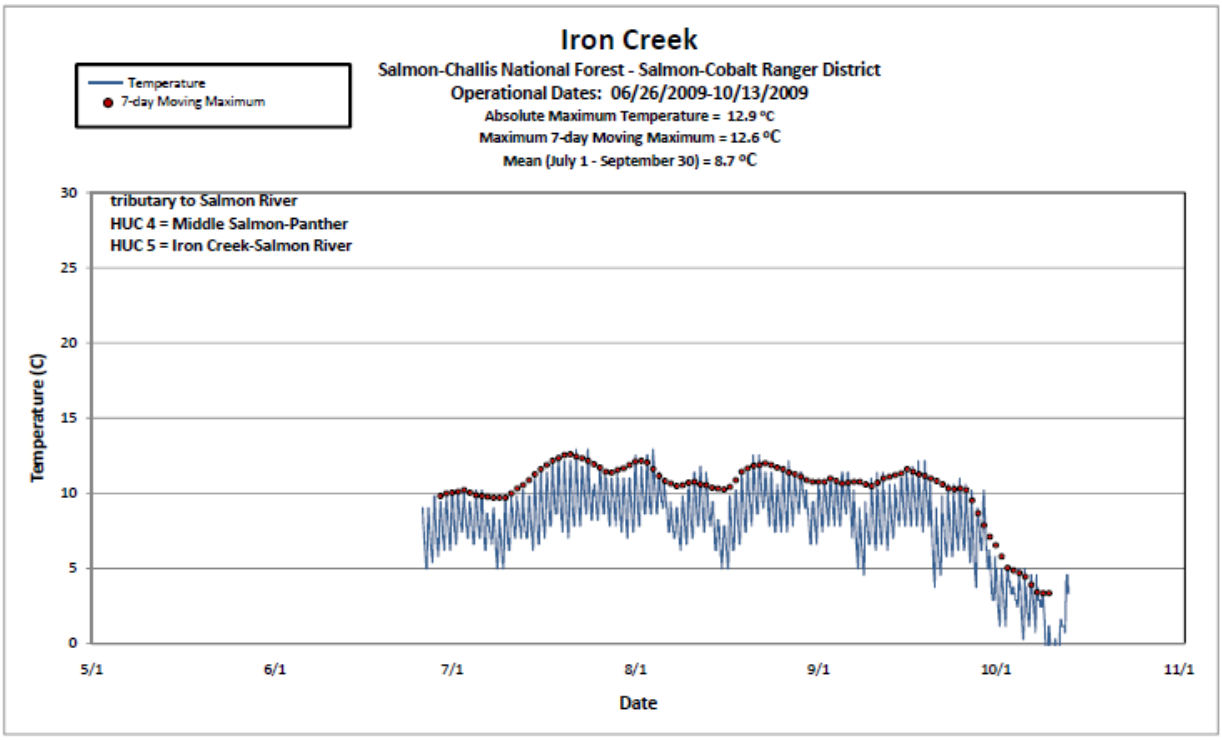
APPENDIX C TABLE 4 BULL TROUT DISTRIBUTION, SPAWNING HABITAT AND PROPOSED CRITICAL HABITAT

Bull Trout Present		Bull Trout Spawning		Bull Trout Potential DCH	
Unit/Stream	Sum of LENGTH	Unit	Sum of LENGTH	Unit/Stream	Sum of LENGTH
Degan Mountain Unit	8.26	Degan Mountain Unit	8.26	Degan Mountain Unit	9.33
Iron Creek	1.83	Iron Creek	1.83	Iron Creek	1.83
North Fork Iron Creek	6.43	North Fork Iron Creek	6.43	Lake Creek	0.66
Peel Tree East Unit	0.75	Peel Tree East Unit	0.75	North Fork Iron Creek	6.84
Iron Creek	0.75	Iron Creek	0.75	Peel Tree East Unit	0.75
Peel Tree West Unit	1.80	Peel Tree West Unit	1.80	Iron Creek	0.75
Hat Creek	0.53	Iron Creek	0.79	Peel Tree West Unit	1.80
Iron Creek	0.79	Hat Creek	0.53	Hat Creek	0.53
South Fork Iron Creek	0.49	South Fork Iron Creek	0.49	Iron Creek	0.79
South Fork Unit	20.17	South Fork Unit	20.17	South Fork Iron Creek	0.49
Hat Creek	1.89	Iron Creek	1.07	South Fork Unit	25.78
Iron Creek	1.07	Moyer Creek	4.90	Hat Creek	1.89
Moyer Creek	4.90	North Fork Hat Creek	3.88	Iron Creek	4.50
North Fork Hat Creek	3.88	Hat Creek	1.89	Moyer Creek	4.86
South Fork Iron Creek	4.47	South Fork Iron Creek	4.47	North Fork Hat Creek	4.56
West Fork Iron Creek	3.97	West Fork Iron Creek	3.97	South Fork Iron Creek	4.47
Grand Total	30.98	Grand Total	30.98	West Fork Iron Creek	4.90
				(blank)	0.61
				Grand Total	37.66

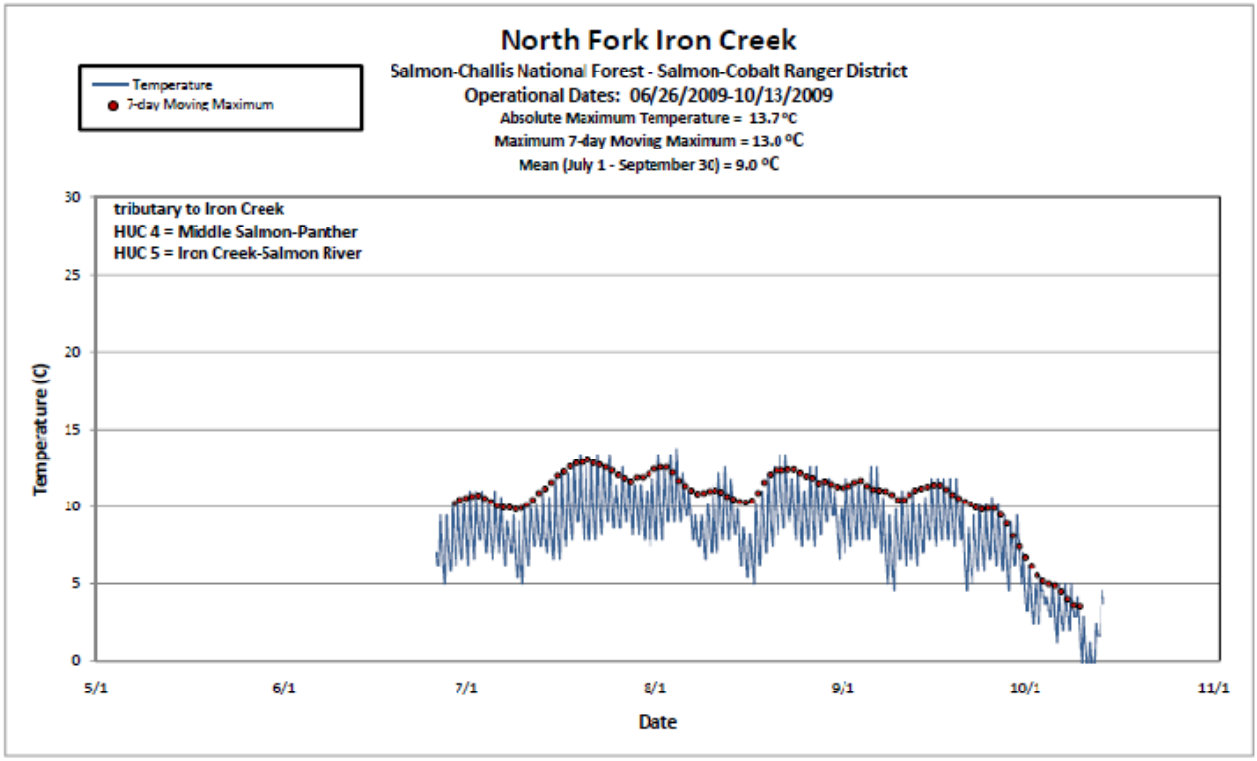
APPENDIX C TABLE 5 WATER TEMPERATURE

Pasture	Site ID	Monitoring Period	Maximum Daily Temperature	Maximum of 7 day Moving Maximum	Mean Temperature 7/1 to 9/30
Degan Mountain	T59 Iron	6/26 – 10/13	12.9	12.6	8.7
	T64 NF Iron	6/26– 10/13	13.7	13.0	9.0
	T57 Deer	6/30– 9/20	10.6	10.0	I/D
South Fork	T74 SF Iron	6/26– 10/13	15.2	14.5	9.3
	T81 WF Iron	6/26– 10/13	11.4	10.6	7.8
	T58 Hat	05/01-10/31	11.4	10.8	7.6
Peel Tree West	T59 Iron	6/26 – 10/13	12.9	12.6	8.7
	T74 SF Iron	6/26– 10/13	15.2	14.5	9.3

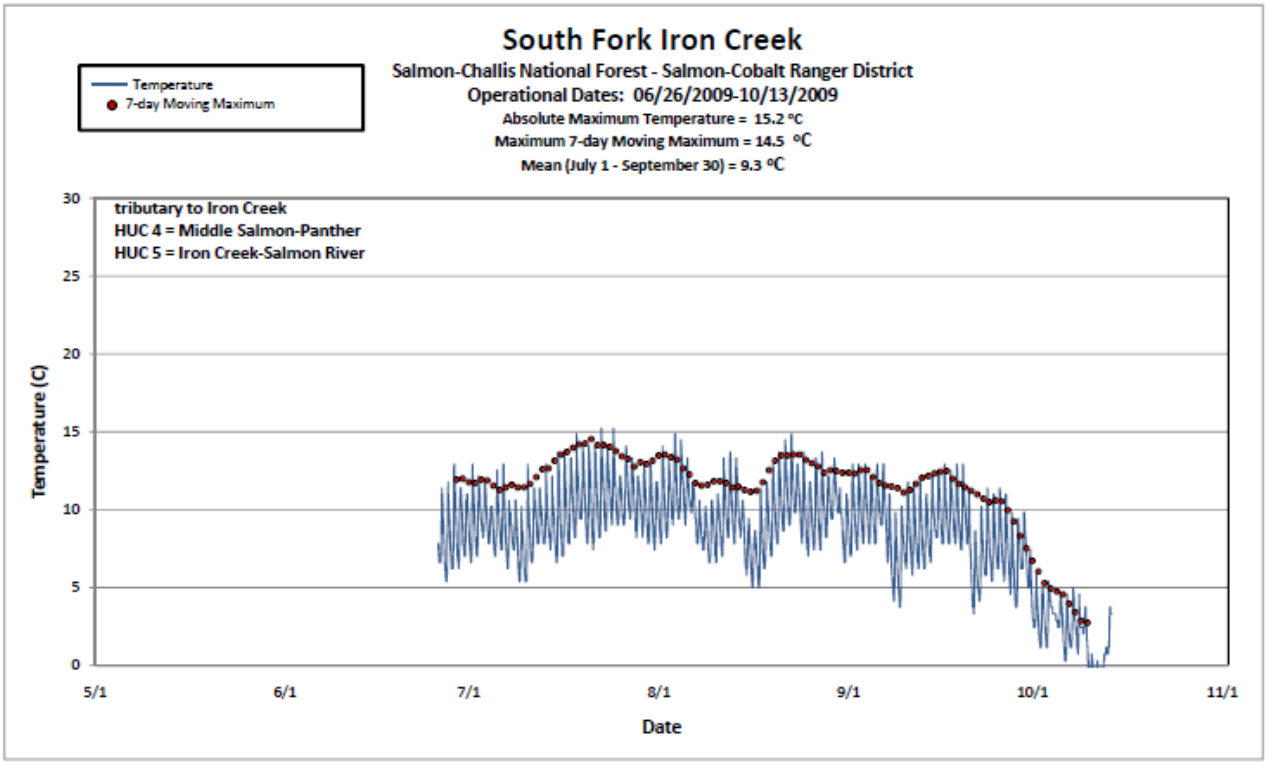
APPENDIX C FIGURE 2 - IRON CREEK WATER TEMPERATURES 2009



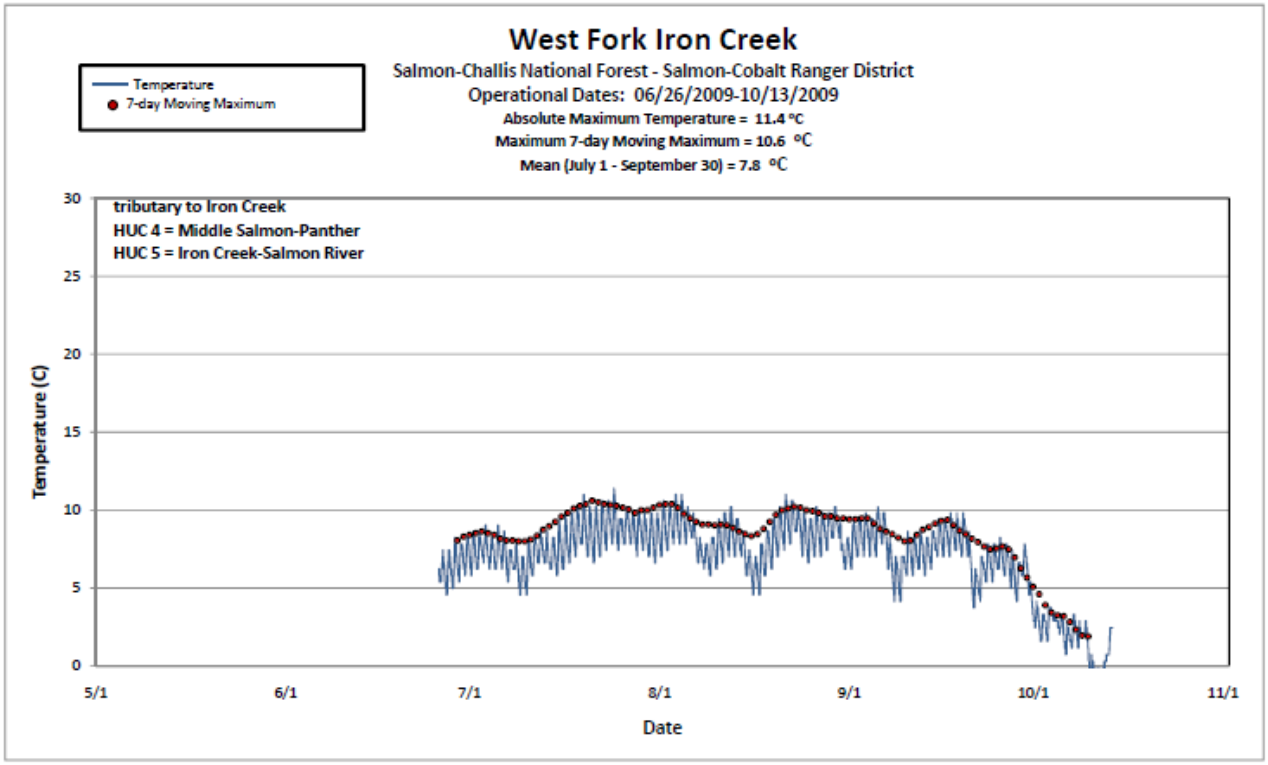
APPENDIX C FIGURE 3 - NORTH FORK IRON CREEK WATER TEMPERATURES 2009



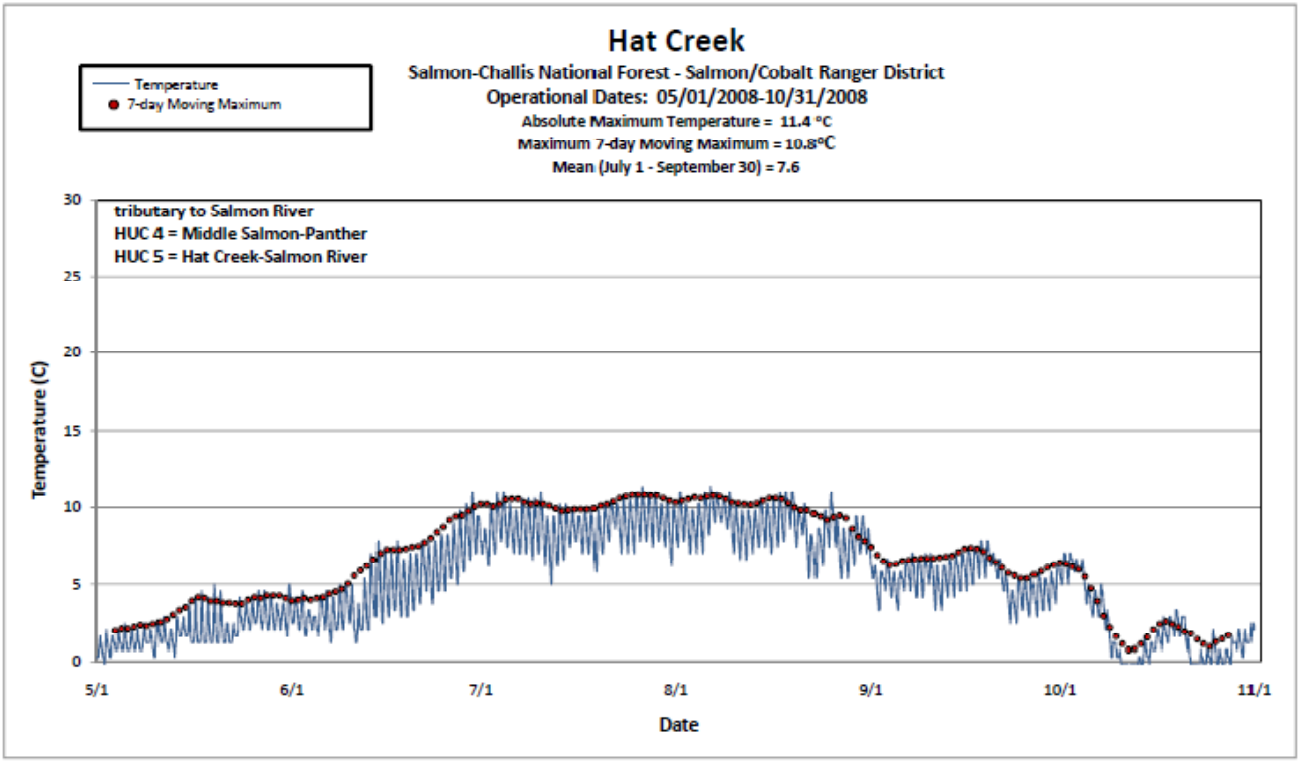
APPENDIX C FIGURE 4 - SOUTH FORK IRON CREEK WATER TEMPERATURES 2009



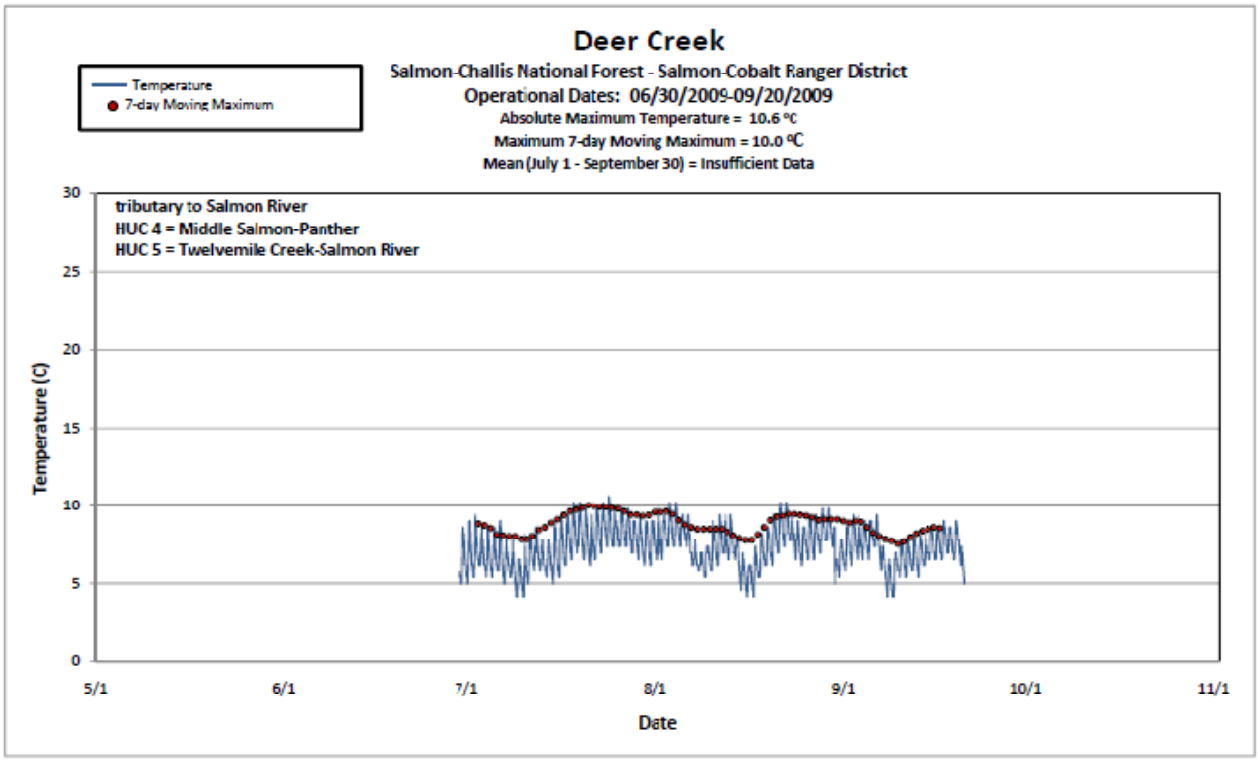
APPENDIX C FIGURE 5 - WEST FORK IRON CREEK WATER TEMPERATURES 2009



APPENDIX C FIGURE 6 – HAT CREEK WATER TEMPERATURES 2008



APPENDIX C FIGURE 7- DEER CREEK WATER TEMPERATURES 2009



APPENDIX C TABLE 6 SEDIMENT - MEAN PERCENT FINES <.25 AT DEPTH

Pasture	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Degan Mountain	BD104 Iron1	22.9	17.2	18.7	16.8	15.8	6.4	16.2	21.7	15.6	17.6	15.9						16.8
	BD105 NF Iron	24.4	19.7	19.2	19.0	21.9	9.6	22.4	23.8	17.9	21.8			7.7				21.6
South Fork	BD106 SF Iron	40.0	27.2		42.8	32.8	25.3	22.2		24.0		27.5						21.9
	BD107 WF Iron	11.5	10.7		18.1	21.7	16.0	16.7	19.5	14.9	11.2			6.3				17.2
	BD103 Hat	16.7	21.8					15.1	27.6			23.7						
Peel Tree	BD104 Iron	22.9	17.2	18.7	16.8	15.8	6.4	16.2	21.7	15.6	17.6	15.9						16.8
	BD106 SF Iron	40.0	27.2		42.8	32.8	25.3	22.2		24.0		27.5						21.9

APPENDIX C TABLE 7 CHANNEL GEOMETRY – WIDTH : DEPTH RATIO

Pasture	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Degan Mountain	BD104 Iron1			11.9	25.6	8.8	9.1	8.0	17.4	19.5	17.3	16.9						
	BD105 NF Iron			12.2	16.1	9.6	13.6	13.7	14.6	13.6	17.0							
South Fork	BD106 SF Iron				11.7	7.8	9.2	7.6				8.8						
	BD107 WF Iron				12.3	7.4	11.3	14.8	13.1	14.2	7.6							
	BD103 Hat							7.7	8.6			11.4						
Peel Tree	BD104 Iron			11.9	25.6	8.8	9.1	8.0	17.4	19.5	17.3	16.9						
	BD106 SF Iron				11.7	7.8	9.2	7.6				8.8						

APPENDIX C TABLE 8 STREAMBANK CONDITION – PERCENT STABLE BANKS

Pasture	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Degan Mountain	BD104 Iron1		99.0	99.0	89.5	79.0	90.5	86.0	83.0	100	96.0	97.5						100
	BD105 NF Iron		94.0	100	94.5	92.0	98.0	86.5	92.0	93.0	96.5			100				99.0
South Fork	BD106 SF Iron	79.0	96.0		80.5	97.0	99.5			95.5		99.5						97.0
	BD107 WF Iron		100		93.5	87.0	96.5	96.0	95.5	98.0	99.5			100				90.0
	BD103 Hat		95					53	51			84						
Peel Tree	BD104 Iron		99.0	99.0	89.5	79.0	90.5	86.0	83.0	100	96.0	97.5						100
	BD106 SF Iron	79.0	96.0		80.5	97.0	99.5			95.5		99.5						97.0

APPENDIX C TABLE 10 MULTIPLE INDICATORS MONITORING (MIM) DATA

Pasture	Site ID	Year	Width:Depth Ratio	Bank Stability (%)	Woody Species Regeneration**		Greenline Ecological Status (GES)*	Trend in GES
					Seedling/Young (#/%)	Mature/Dead (#/%)		
South Fork	M238 SF Iron	1996	n/a	n/a	7/12	50/88	33/Early Seral	Base
		2000	n/a	64	16/33	33/67	35/Early Seral	Static
		2005	n/a	97	8/8	100/92	40/Early Seral	Static
	M243 WF Iron	1993	n/a	91	194/59	135/41	62/Late Seral	Base
		2000	n/a	91	82/44	103/56	67/Late Seral	Static
		2009	12.08	100	14/17	69/83	79/Late Seral	Static
Degan Mountain	M215 NF Iron	1993	n/a	90	321/76	101/24	69/Late Seral	Base
		2000	n/a	65	159/63	92/37	94/PNC	Up
		2005	n/a	65	52/22	188/78	86/PNC	Static

*0-15 Very Early Seral; 16-40 Early Seral; 41-60 Mid Seral; 61-85 Late Seral; 86+ PNC

**Starting in 2006, woody species regeneration was collected using different methods. Data should not be compared between the years.

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 SCNFs 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 that 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.

Literature Cited

Cooney, T. and D. Holzer. 2006. Appendix C: Interior Columbia basin stream type chinook salmon and steelhead populations: habitat intrinsic potential analysis. Preliminary Review Draft. NWFSC

Kahler, T. H. and T.P. Quinn. 1998. Juvenile and resident salmonid movement and passage through culverts. Washington State Department of Transportation Research Project T9903, Task 96. Transportation Building, Olympia, WA.

Maslin, P. E., W. R. McKinney and T. L. Moore. 1996a. Intermittent streams as rearing habitat for Sacramento River chinook salmon. http://www.csuchico.edu/~pmaslin/rsrch/Salmon/Abstrt.html

Maslin, P. E., W. R. McKinney and T. L. Moore. 1996b. Intermittent streams as rearing habitat for Sacramento River chinook salmon. 1996 Update. http://www.csuchico.edu/~pmaslin/rsrch/Salmon96/Abstrct.html

Maslin, P.E., J. Kindopp and M. Lennox. 1997. Intermittent streams as rearing habitat for Sacramento River chinook salmon. 1997 Update. http://www.csuchico.edu/~pmaslin/rsrch/Salmon97/Abstrct.html

Maslin, P.E., J. Kindopp and M. Lennox. 1998. Intermittent streams as rearing habitat for Sacramento River chinook salmon. 1998 Update. http://www.csuchico.edu/~pmaslin/rsrch/Salmon98/Abstrct.html

Maslin, P.E., J. Kindopp, M. Lennox, and C. Storm. 1997. Intermittent streams as rearing habitat for Sacramento River chinook salmon. 1997 Update. http://www.csuchico.edu/~pmaslin/rsrch/Salmon99/Abstrct.html

Murray, C.B. and M.L. Rosenau. 1989. Rearing of juvenile chinook in nonnatal tributaries of the lower Fraser River, British Columbia. Trans. Amer. Fish. Soc. 118(3): 284-289.

Scrivener, J.C., T.G. Brown, and B.C. Andersen. 1994. Juvenile chinook salmon (*Oncorhynchus tshawytscha*) utilization of Hawks Creek, a small nonnatal tributary of the upper Fraser River. Can. J. Fish. Aquat. Sci. 51: 1139-1146.

Torgersen, C.E., Price, D.M., Li, H.W. and McIntoch, B.A. 1999. Multiscale thermal refugia and stream habitat associations of Chinook salmon in northeastern Oregon. Ecological Applications 9: 301-319.

Yukon River Council. Chinook salmon (ONCORHYNCHUS TSHAWYTSCHA). http://yukonriverpanel.com/salmon/about/yukon-river-salmon/chinook/

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

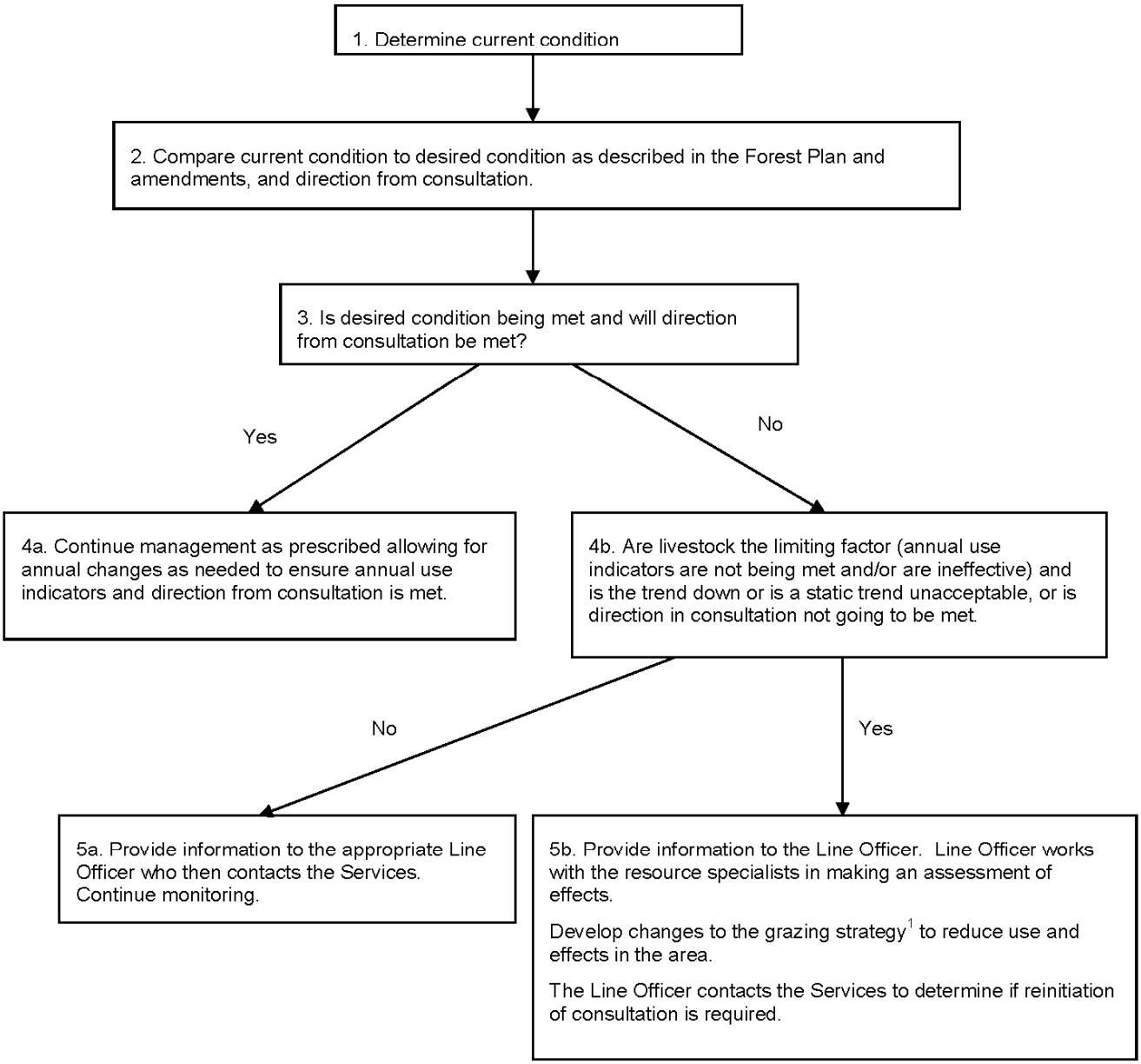
Primary Constituent Elements for Proposed Bull Trout Critical Habitat and Associated Habitat Indicators

PCE #	PCE Description	Associated Habitat Indicators
1.	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	floodplain connectivity, change in peak/base flows, increase in drainage network, **riparian conservation areas**, chemical contamination/nutrients
2.	Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	life history diversity and isolation, persistence and genetic integrity, **temperature**, chemical contamination/nutrients, physical barriers, **average wetted width/maximum depth ratio in scour pools in a reach**, change in peak/base flows, refugia
3.	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	growth and survival, life history diversity and isolation, **riparian conservation areas**, floodplain connectivity (importance of aquatic habitat condition indirectly covered by previous seven PCEs)
4.	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	large woody debris, pool frequency and quality, large pools, off channel habitat, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, **streambank condition**, floodplain connectivity, **riparian conservation areas**
5.	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	**temperature**, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, streambank **condition**, change in peak/base flows, **riparian conservation areas**, floodplain connectivity
6.	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines	**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 pea k/base flows, increase in drainage network, disturbance history*, disturbance regime (* Information relative to disturbance history is often found in the baseline narrative)
8.	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	**sediment**, chemical contamination/nutrients, change in peak/base flows
9.	Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.	persistence and genetic integrity, physical*barriers* (* Information relative to disturbance history is often found in the baseline narrative)

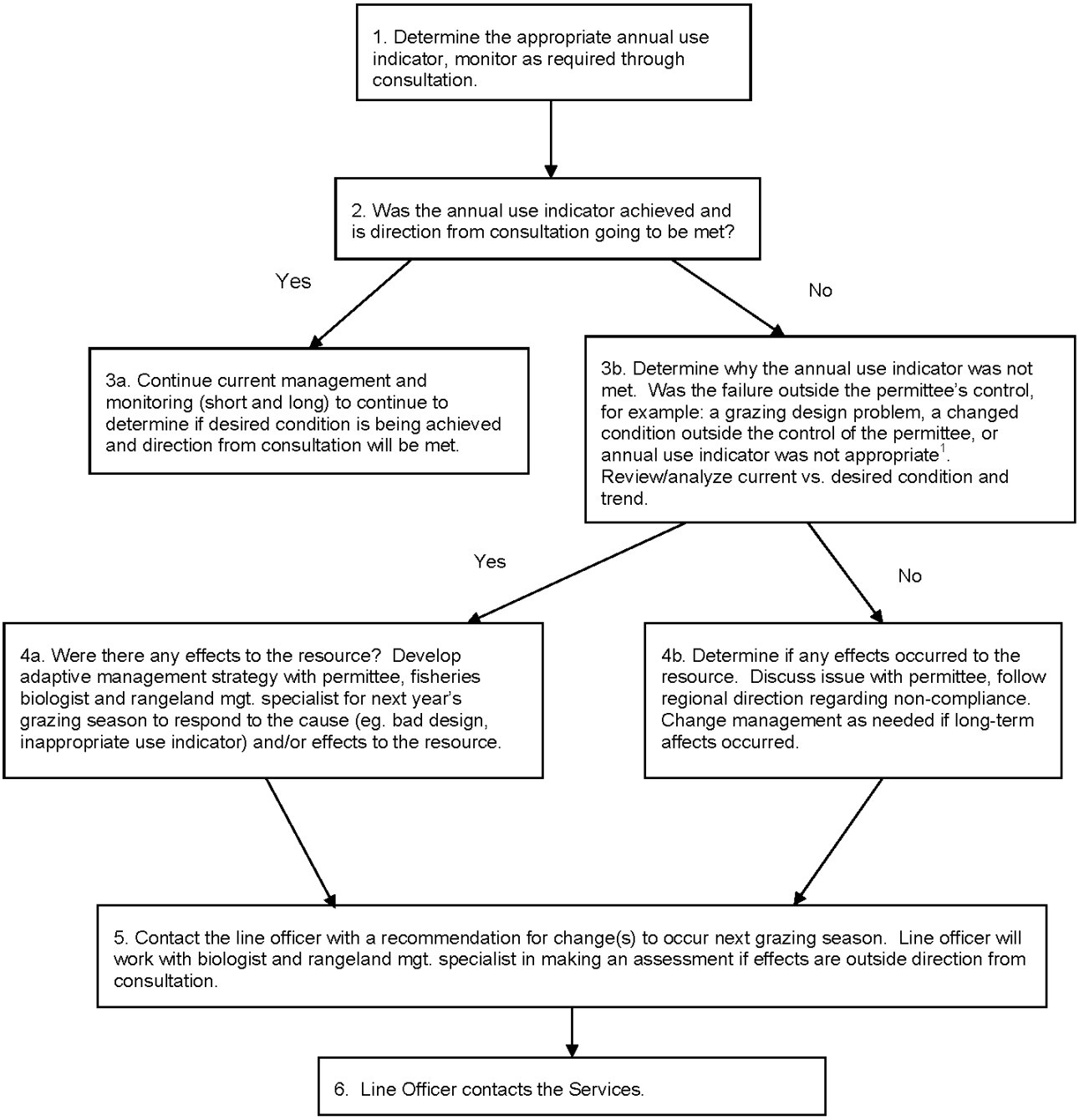
APPENDIX F
ADAPTIVE MANAGEMENT DIAGRAMS

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



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

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



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