USDA United States Department of Agriculture
Forest Service
Salmon-Challis National Forest Supervisor's Office
1206 S. Challis
Salmon, ID 83467
208 756-5100

File Code: 2670
Date: March 10, 2010

Acting Supervisor – East Idaho Field Office
U.S. Fish and Wildlife Service
4425 Burley Dr. – Suite A
Chubbuck, ID 83201

Dear Acting Supervisor:

Enclosed you will find the *Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment*. The Biological Assessment (BA) evaluates all potential effects of livestock grazing on federally listed fishes for all creeks included in the action area. This action received early coordination and a field review with the Salmon-Challis Level 1 Team. In addition, the enclosed Biological Assessment has been developed with ongoing participation and review by Level 1 Team members, and has now been deemed acceptable by them for initiation of Streamlined Consultation.

In this BA, the Salmon-Challis National Forest has analyzed and determined the effects of livestock grazing. We have analyzed the potential effects based on the best available information either published or unpublished. We are committed to working with the permittees and other partners to minimize effects where possible. As always we will continue to consult with you when appropriate regarding this permitted activity.

This Assessment's determinations of effects include "May Affect" determinations for individual fish species within the action area, as well as determinations for each species and their Critical and/or Essential Habitats. Determinations have concluded there would likely be 'Adverse Effects' to Chinook salmon, steelhead and bull trout. Determinations have concluded there would be 'Not Likely to Adversely Affect' on Chinook salmon and steelhead designated critical habitat and 'Not Likely to Adversely Affect' on bull trout proposed critical habitat.

We believe that we have complied with the requirements and at this time would like to initiate formal consultation and request conference on bull trout Proposed Designated Critical Habitat on the *Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment* with the (U.S. Fish and Wildlife Service/National Marine Fisheries Service). If you have any questions please contact Stefani Melvin at (208) 756-5290.

Sincerely,

FRANK V. GUZMAN
Forest Supervisor

Encl. Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment
cc: Stefanie Melvin, Karen E Dunlap, Robert W Rose

USDA United States Department of Agriculture | Forest Service | Salmon-Challis National Forest Supervisor's Office | 1206 S. Challis Salmon, ID 83467 208 756-5100

File Code: 2670
Date: March 10, 2010

David Mabe
State Director, Idaho State Habitat Office
National Marine Fisheries Service
10095 W. Emerald
Boise, ID 83704

Dear Dave:

Enclosed you will find the *Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment*. The Biological Assessment (BA) evaluates all potential effects of livestock grazing on federally listed fishes for all creeks included in the action area. This action received early coordination and a field review with the Salmon-Challis Level 1 Team. In addition, the enclosed Biological Assessment has been developed with ongoing participation and review by Level 1 Team members, and has now been deemed acceptable by them for initiation of Streamlined Consultation.

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Forest Supervisor

Encl. Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment
cc: Stefanie Melvin, Karen E Dunlap, Robert W Rose

Aquatic Species Biological Assessment for Camas Creek Cattle and Horse Allotment

SALMON-COBALT RANGER DISTRICT

SALMON-CHALLIS NATIONAL FOREST

LEMHI COUNTY, IDAHO

Prepared by: Robert W. Rose

Fish Biologist

Signature: Robert W Rose

Date: March 9, 2010

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1 INTRODUCTION

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

2 BACKGROUND INFORMATION

Camas Creek Allotment grazing activities are conducted within the Upper and Lower Camas Watersheds (HUCs 1706020602, 1706020603) of the Lower Middle Fork Salmon River Subbasin. Together the Upper and Lower Camas Creek watersheds encompass approximately 185,323 acres and support 174 miles of streams. The majority of streams within the watersheds are considered low to moderate gradient. Elevations range from 6,800 feet in headwaters areas to 4,400 feet at the confluence of Camas Creek with the Middle Fork of the Salmon River. Estimated stream flows at the mouth of Camas Creek range from 190 cubic feet per second (CFS) in February to over 2,000 CFS in June.

Soils in the watersheds are derived from granitics, quartzites and volcanic. Granitic soils are found in the north and northeast areas of the watersheds. Quartzite bedrock is found at the northern end of the watersheds north of Camas Creek, and soils derived from Challis Volcanics are found from the northeast portion of the watersheds and extending toward the south end.

Riparian vegetation in narrow canyons generally consists of birch, alder, and dogwood overstory. Where wider canyon bottoms occur, cottonwoods and willows characterize the overstory. Understory is typically composed of a variety of riparian-dependent forbs and grasses, with blue wild rye, Kentucky blue grass, Smilacina, and cinquefoils as the dominant species. Upland vegetation is generally characterized by mixed conifer overstory, primarily composed on Douglas-fir, ponderosa pine and Lodgepole pine, with an understory of Idaho fescue, pine grass, elk sedge, and a variety of shrubs and forbs.

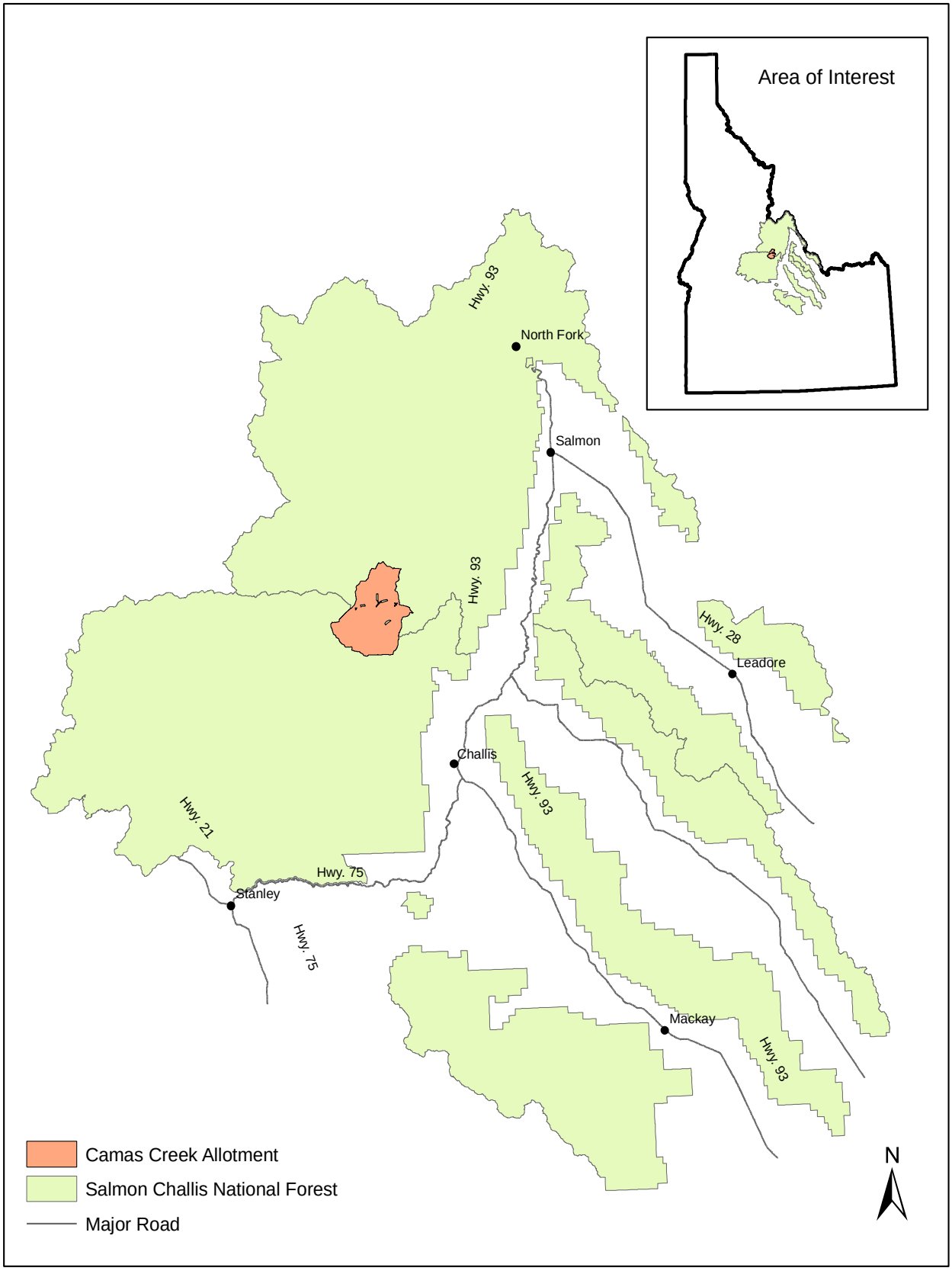
Actions or activities which have occurred or continue to occur within the Upper and Lower Camas Creek watersheds include historic mining, past timber harvest, grazing, roads, trails, earthen dams, water diversions, outfitting and guiding operations, prescribed and natural fire, and recreation. The watersheds encompass several private inholdings, including a small subdivision within the lower Rams Creek drainage.

3 PROPOSED ACTION

3.1 PROJECT AREA

The Camas Creek Allotment is located north of Challis on National Forest System lands within the Camas Creek drainage (Figure 1). The allotment contains 63,375 acres of Forest Service Land. The proposed project area is located within the Upper and Lower Camas Watersheds (HUCs 1706020602, 1706020603) of the Lower Middle Fork Salmon River Subbasin.

FIGURE 1 – CAMAS CREEK ALLOTMENT VICINITY MAP



3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The Camas Allotment is permitted for 132 cow/calf pairs (594 Head Months) from June 1 - October 15. The permit number is 10562 and expires on 12/31/2014.

3.2.2 GRAZING SYSTEM

- The Camas Creek Allotment will continue to emphasize a deferred rotation system.
- Over the last ten years, the majority of livestock is removed by the end of September.
- Range readiness (Bluebunch wheatgrass in the first boot stage) will be monitored to determine if the on-date is appropriate and adjusted as necessary. Forest staff and permittee will do the monitoring to determine the on-date.
- Annual use indicators (see section 3.2.6) will dictate when unit moves or the off date occurs with unit move dates being approximate. Permittees are responsible for moving livestock to meet annual use indicators. Annual use indicators will be monitored by Forest Service personnel.

The following rotations will be used on this allotment:

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

Year 1	Year 2
Upper Silver Creek Unit	Lower Silver Creek Unit
West Fork Unit	West Fork Unit
Camas Creek Area (Camas Creek Unit)*	Camas Creek Area (Camas Creek Unit)*
Furnace/Castle Creek (Camas Creek Unit)*	Furnace/Castle Creek (Camas Creek Unit)*
Lower Silver Creek Unit	Upper Silver Creek Unit

*The Camas Creek unit has 2 sections: the Camas Creek Area and the Furnace/Castle Area. The Camas Creek Area of the Camas Creek Unit will be incidental use of no more than 12 pairs until August 15.

Upper Silver Creek Unit:

- Chinook: Not Present
- Steelhead: Livestock will be present in the unit for up to 4 weeks during spawning and incubation once every two years.
- Bull Trout: Livestock will be present in the unit after August 15th for up to 4 weeks once every two years.
- Trailing: Trailing from Upper Silver Creek Unit across Camas Creek to West Fork Unit will occur during steelhead spawning and incubation. Late season trailing from Furnace/Castle Area across Camas Creek to Upper Silver Creek Unit will occur during Chinook and bull trout spawning and incubation. Duration of each move is approximately 1 day.

West Fork Unit:

- Chinook: Livestock will be removed from the unit by August 15th every year.
- Steelhead: Livestock will be present in the unit for up to 4 weeks during spawning and incubation.
- Bull Trout: Livestock will be removed from the unit by August 15th every year.

- Trailing: Trailing from West Fork Unit across Camas Creek to Camas Creek Unit will occur during steelhead spawning and incubation. Duration of move is approximately 1 day.

Camas Creek Unit:

Camas Creek Area

- Chinook: Livestock will be moved through the area by July 26th. Remaining incidental livestock will be moved off of the area before August 15th.
- Steelhead: Livestock will not be in the area earlier than July 7th.
- Bull Trout: Livestock will not be in the area after August 15th.
- Trailing: See West Fork Unit.

Furnace/Castle Area

- Chinook: Not present.
- Steelhead: Not present
- Bull Trout: Livestock will be in the area after August 15th for up to 4 weeks.
- Trailing: See Upper Silver Creek and Lower Silver Creek Units.

Lower Silver Creek Unit:

- Chinook: Not present.
- Steelhead: Livestock will be in the unit for up to 4 weeks during spawning and incubation once every two years.
- Bull Trout: Livestock will be in the unit after August 15th for up to 4 weeks once every two years.
- Trailing: Trailing from Lower Silver Creek Unit across Camas Creek to West Fork Unit will occur during steelhead spawning and incubation. Late season trailing from Furnace/Castle Area across Camas Creek to Lower Silver Creek Unit will occur during Chinook and bull trout spawning and incubation. Duration of each move is approximately 1 day.

Livestock enter the allotment on and/or after June 1 by truck and trailer into the Meyers Cove Corral, within the Lower Silver Creek Unit every year, some trailing may occur on Silver Creek Road (FS RD 108). The handling facility at Meyers Cove is utilized while entering the allotment. The handling facility is fenced and affords no accessibility to Camas Creek or riparian areas.

When livestock are scheduled to graze the Upper Silver Creek Unit first they are trailed from the corral location via Silver Creek Road (FS RD 108). Use of these two units is rotated every other year.

Livestock are trailed from Upper Silver/Lower Silver Creek Units to West Fork Unit.

Livestock are then trailed from the West Fork Unit to the Camas Creek Unit via FS RD 258 and FS RD 221. Up to six existing road fording locations, including one Furnace Creek ford, will be used depending on whether Hidden Valley Ranch (private land) is being used. The first two crossings are hardened. The majority of livestock are immediately moved east to the Furnace/Castle Creek Area of the Camas Creek Unit. Livestock that are not gathered initially, no more than 12 cow/calf pairs, will be moved to the Furnace/Castle Creek Area. Duration of this move is approximately one day.

In approximately 1 out of 10 years the permittee will use private land at Hidden Valley Ranch which is located South of Furnace Creek on White Goat Creek (See Figure 2). Again, livestock not gathered initially, no more than 12 cow/calf pairs, will be moved to the Furnace/Castle Creek Area by August 15th. When Hidden Valley Ranch is used the time spent in the Camas Creek Unit will be reduced by approximately two weeks.

In years when Hidden Valley Ranch is not used livestock are moved from the West Fork Unit to the Furnace/Castle Area. The duration of this move is approximately 1 day.

Livestock are then moved into either the Lower or Upper Silver Creek Unit (depending on yearly schedule) via FS Rd 258 in 1 day.

Exit off the allotment begins with livestock being trailed via FS RD 108 to the Cabin Creek trail/road near Rabbits Foot Summit. The Cabin Creek trail/road affords no access to Cabin Creek because the trail follows an upland route. The Cabin Creek trail/road connects to the Panther Creek RD (FS RD 055) about ½ a mile south of the mouth of Cabin Creek. After trailing across Panther Creek RD, livestock are trailed across Panther Creek on an established road crossing near McGowan Basin and then continue up an undeveloped road to Moyer Basin private property. Duration of move is approximately one day. Livestock will pasture at private land until the 1st week of November. Then, livestock will be trail down an undeveloped road across Panther Creek near McGowan Basin. Duration of move is approximately 1 day. Temporary corrals will be established on flat bench near McGowan Basin (T19N; R18E; Section 21; SE1/4). Livestock will be trucked from temporary corrals to permittee's private ranch.

3.2.3 CONSERVATION MEASURES

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

1. A deferred rotation grazing system will continue to be used. Early season use provides benefits to riparian vegetation. This will help meet our long term riparian resource objective for greenline successional status.
2. The on date will be varied so that livestock will be placed on the allotment at range readiness. This will reduce potential for bank alteration. This will help meet our long term riparian resource objective for bank stability.
3. Annual use indicators will dictate when livestock are moved between units or off the allotment within the terms of the term grazing permit including moves in response to fish spawning. This will help us meet our long term riparian resource objectives. Annual use indicators will be monitored by Forest Service personnel.
4. Permittees will continue to salt at least ¼ mile away from creeks. This will continue to reduce potential impacts on spawning areas and designated critical habitat.
5. Permittees will continue to distribute livestock away from streams and associated riparian areas (ride), 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.
7. Livestock enter the allotment by truck and trailer. The handling facility at Meyers Cove is utilized while entering the allotment. The handling facility is fenced and affords no accessibility to Camas Creek or riparian areas.
8. Livestock are not authorized to graze on Camas Creek near the West Fork of Camas Creek after being moved to the West Fork Unit. Livestock are not authorized to graze the West Fork of Camas Creek after August 15th each year to mitigate Chinook and bull trout spawning.
9. When Hidden Valley Ranch is used fording occurs at up to six existing road ford locations, including one Furnace Creek crossing. The first two crossings are hardened, reducing potential impacts on spawning areas. When Hidden Valley Ranch is not used crossings include two hardened and one unhardened stream ford crossings.
10. When grazing the Hidden Valley Ranch, the permittee or permittees hired rider will be required seven days a week to keep the cows off National Forest lands and on the ranch.
11. Livestock will be off Camas Creek by July 26th to protect Chinook spawning. Livestock will be kept on the sagebrush/grass ridge at the head of Pole Creek and Sawlog Creek located within the Camas Creek Unit after August 15th to protect bull trout spawning within Furnace Creek.
12. Drift fences on both Furnace and Castle Creeks keep livestock from drifting back down into Camas Creek and lower Castle Creek. This reduces impacts to spawning Chinook and bull trout within Camas Creek.
13. The permittee or permittees hired rider will move livestock that drift down to lower portions of Castle Creek and Camas Creek at least twice per week while in the Furnace/Castle Area of the

Camas Creek Unit. This will reduce impacts to spawning areas. The permittee or permittee's hired rider will move livestock that drift down to Furnace and Castle Creeks. This will reduce impacts on bull trout spawning areas.

14. The permittee will be required to salt at the head of Pole Creek and Sawlog Creek at least ¼ mile away from creeks. This will reduce impact on spawning areas within Furnace and Castle Creeks.
15. An exclosure fence was built around Camas Creek and a portion of the West Fork of Camas Creek to prevent livestock from utilizing the riparian area. Troughs on the bench near West Fork of Camas were installed to minimize livestock use on creek and to reduce impact on spawning areas.
16. Livestock cross Panther Creek at an established road ford two times while trailing to and from private land in Moyer Basin.

3.2.4 CHANGES FROM EXISTING MANAGEMENT

- The annual use indicator for Furnace Creek (M228) has been changed from 4 inch to 6 inch greenline stubble and browse use of 30% on willows and 20% on alder was added to aid in moving greenline to late successional status[1].
- The annual use indicator on the Upper Silver Creek (M230) has been changed from 6 inch to 4 inch greenline stubble and browse use of 50% was added. Changes were made based on the site being at potential natural community (PNC) for the last three readings.
- An annual use indicator for Castle Creek (M227) for browse use of 50% on willows and 30% on alder was added.
- All units will have an annual use indicator for bank alteration.

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

1 Successional status is the present state of vegetation on an area in relation to the potential natural community(ies) that could occur on that area. Potential Natural Community (PNC) is the biotic community that would become established if all successional sequences were completed without human interference, under the present environmental conditions. (Winward 2000)
While PNC is not described for the riparian communities on this allotment a procedure has been established to broadly rate riparian area successional status, greenline community successional stage and their relative bank stability. (Winward 2000).

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).
- 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: The purpose of annual use indicators are to ensure grazing effects do not limit attaining the riparian resource objectives. Livestock grazing on key herbaceous species, in key areas other than the greenline, will be limited to 50% use by weight, during the grazing season.

Other annual use indicators follow:

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

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.

TABLE 2 – ANNUAL USE INDICATORS

Key Area Location # / Unit Name / Creek Name	Monitoring Attribute*	Use Indicator	Key Species	Trigger
M228 / Camas Unit / Furnace Creek	Browse Use	30% 20%	Willow Alder	25% 15%
	Greenline stubble**	6 in.	Hydric spp	7 in.
	Bank Alteration	≤ 20%	n/a	15%
M226 / Camas Unit / Camas Creek	Greenline stubble**	6 in.	Hydric spp	7 in.
	Bank Alteration	≤ 15%	n/a	10 %
M227 / Camas Unit / Castle Creek	Browse Use*	50% 30%	Willow Alder	45% 25%
	Greenline stubble**	4 in.	Hydric spp	5 in.
	Bank Alteration	≤ 20%	n/a	15%
M229 / Lower Silver Unit / Lower Silver Creek* **	Greenline stubble	6 in.	Carex spp	7 in.
	Bank Alteration	≤ 20%	n/a	15%
M230 / Upper Silver Unit / Upper Silver Creek	Browse Use	50%	Willow	45%
	Greenline stubble**	4 in.	Hydric spp	5 in.
	Bank Alteration	20%	n/a	15%
M242 / West Fork Camas Unit / West Fork Camas Creek	Greenline stubble	4 in.	Carex spp	5 in.
	Bank Alteration	15%	n/a	10%

**If it is determined that there are no bull trout in Lower Silver Creek, greenline stubble annual use indicator will be 4 in.

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 shown on Figure 7 and will be maintained in accordance with the term grazing permit.

Potential Future Improvement: Fence on allotment boundary (south of Furnace Creek): Fence will improve utilization of south end of allotment. Improved utilization would decrease impacts to creeks.

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 from unit to unit and year. The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be monitored within each unit at the end of the grazing season to ensure that the standards have been met.

Effectiveness Monitoring: The condition of resource objectives will be evaluated in the following manner. Within the Camas Creek Lower and Upper Silver and West Fork 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.

3.4 INTERDEPENDENT ACTIONS

Interdependent actions are actions that have “no independent utility apart from the action under consideration” (50 CFR§402.02). The Forest has not identified any interdependent actions associated with the proposed action. There are activities that occur within the action area and may be associated with the proposed action. For example, livestock grazing on private lands within the rotation of the proposed action. However, we believe that these activities would continue to occur in a manner similar to the way they are currently occurring whether or not livestock graze on the Camas Creek Allotment. Therefore, these activities will not be considered as interdependent actions.

3.5 INTERRELATED ACTIONS

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

3.6 ADAPTIVE MANAGEMENT

The adaptive management strategy described below and depicted in Appendix G 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.

4 ESA ACTION AREA DESCRIPTION

The ESA action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR§402.02). This is the area where the action

and any interdependent and interrelated actions will result in direct or indirect affects to listed species or designated critical habitat. Our analysis indicates that the proposed action has the potential to generate direct or indirect affects to aquatic species and aquatic habitats in 1) the Camas Creek drainage from the Salmon-Challis National Forest boundary at the north edge of Hidden Valley Ranch downstream to the lower Camas Creek Allotment boundary downstream of the confluence of Duck Creek with mainstem Camas Creek, including tributary streams, and 2) an upland corridor along Cabin Creek drainage between upper Silver Creek and Panther Creek, crossing Panther Creek on Forest lands within T19N.R18E S21 and continuing along an upland route east of Panther Creek to Moyer Basin private lands within the South Fork Moyer Creek drainage (Figure 2).

Priority Watersheds in the action area are identified in Figure 3. The Upper and Lower Silver Creek Units are not within a priority watershed. The West Fork and Camas Creek Units are within a priority watershed. Management direction for priority watershed is identified in section 3.2.5.

FIGURE 2 – ACTION AREA

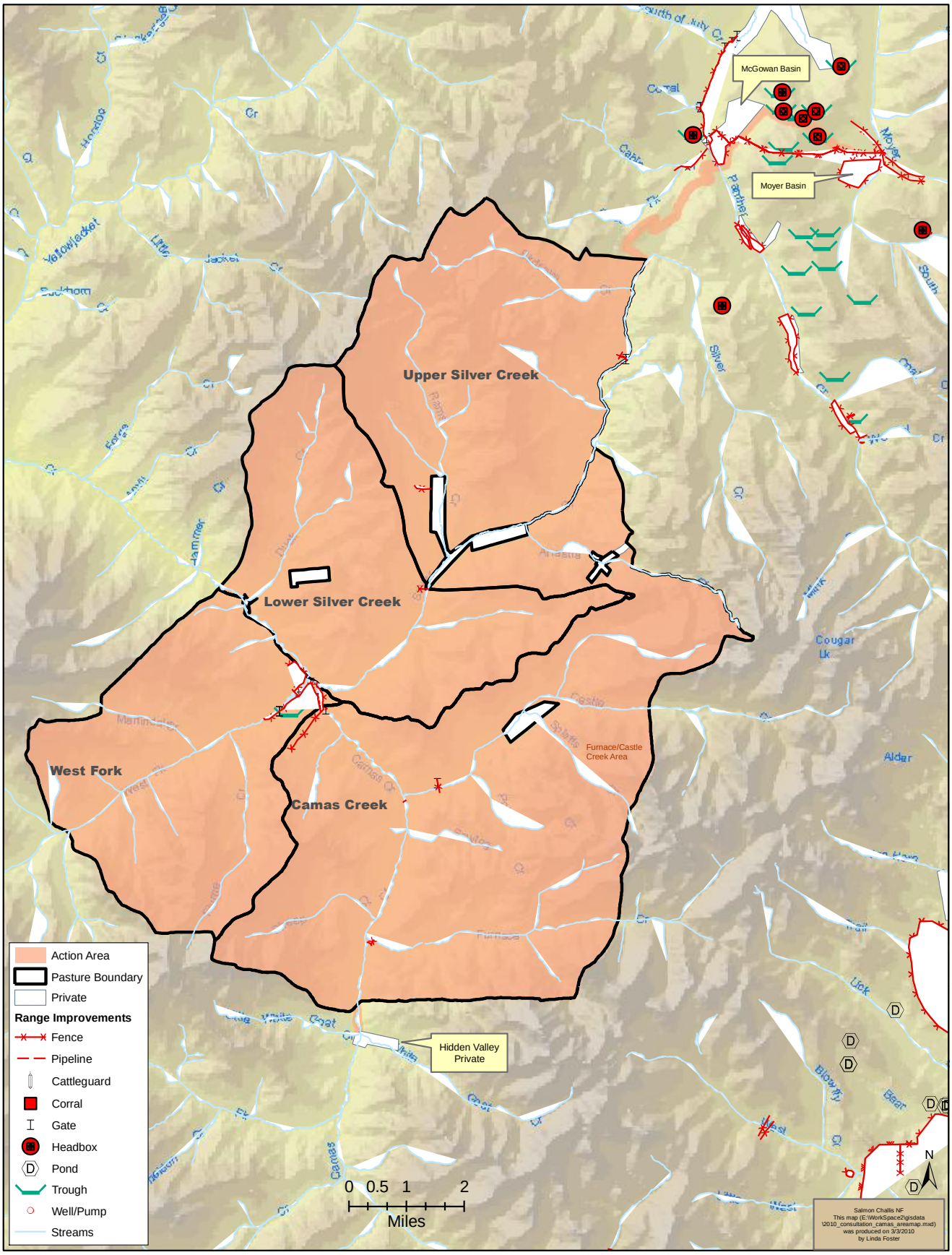
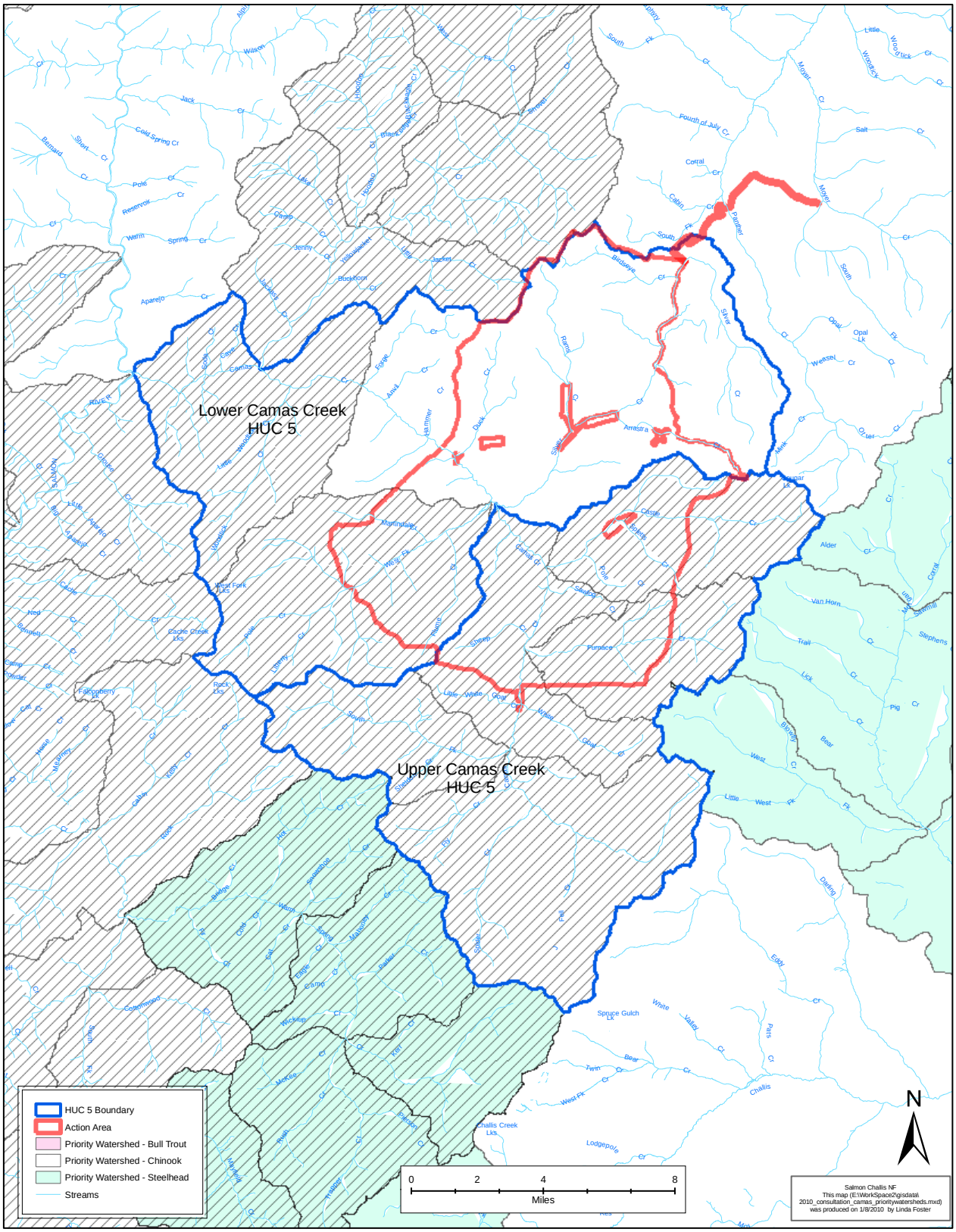


FIGURE 3 – CAMAS CREEK HUCS AND PRIORITY WATERSHEDS



5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

The current semi-annual Species List issued by the U.S. Fish and Wildlife Service (List #14420-2010-SL-0089, issued Dec. 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 three of these species occur within the action area. These species are Chinook salmon (Figure 3), steelhead (Figure 4), and bull trout (Figure 5). Sockeye salmon do not occur within either the action area or the larger Middle Fork Salmon River drainage (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 Camas Creek, West Fork Camas Creek, Silver Creek, Castle Creek Martindale Creek, Furnace Creek, and Panther Creek as action area streams supporting critical habitat for Chinook salmon (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 Camas Creek, Furnace Creek, Castle Creek, Silver Creek, Duck Creek, West Fork Camas Creek, Martindale Creek, Flume Creek, Panther Creek, Cabin Creek and South Fork Moyer Creek (Figure 5).

5.2.4 COLUMBIA RIVER BULL TROUT

Critical habitat for bull trout has recently been proposed (January 2010, 75 FR 2270) for designation on Salmon-Challis Nation Forest lands (Figure 6) and the Forest desires to assess the potential impact to the Primary Constituent Elements (PCEs) of that proposed 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

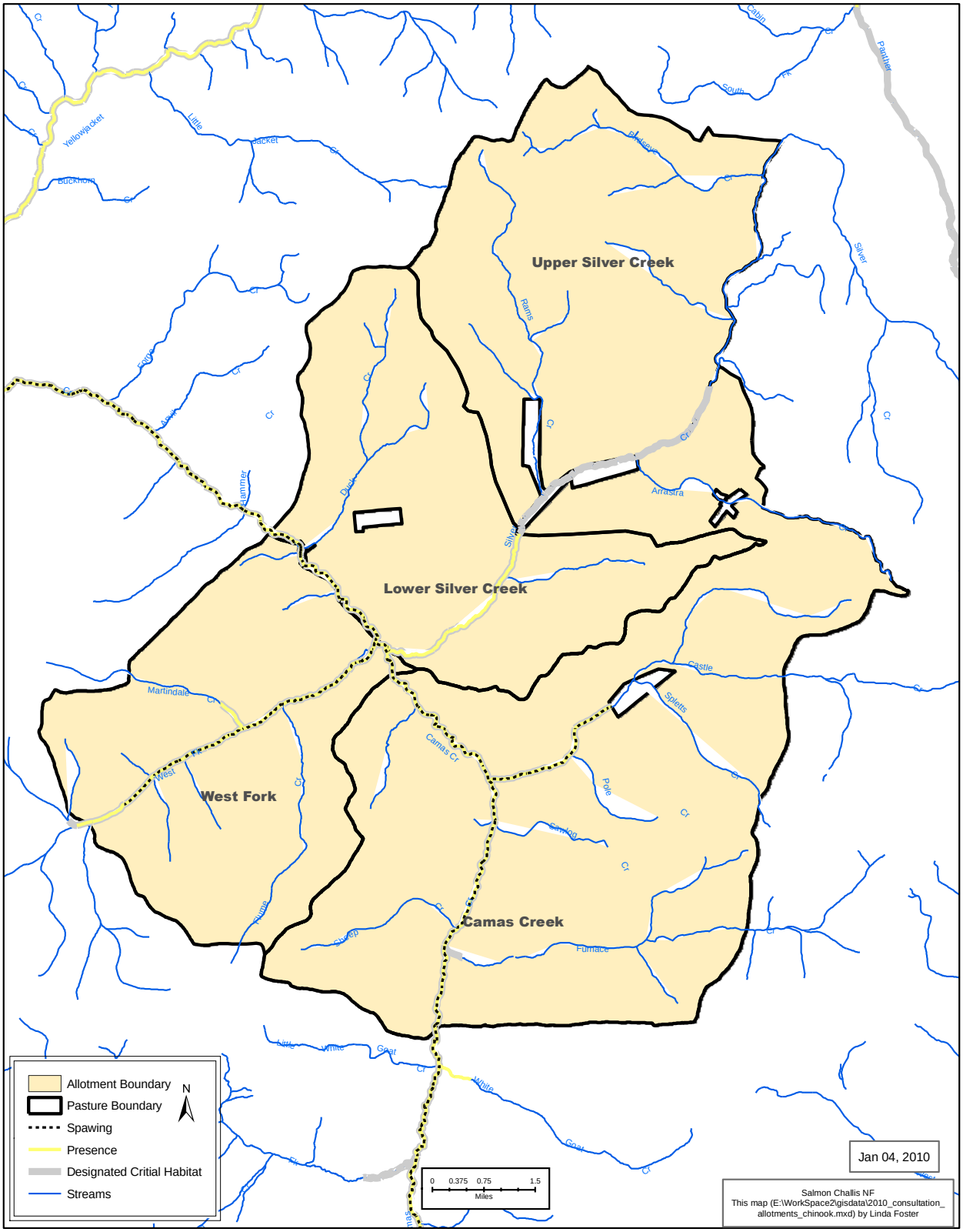


FIGURE 5 – STEELHEAD

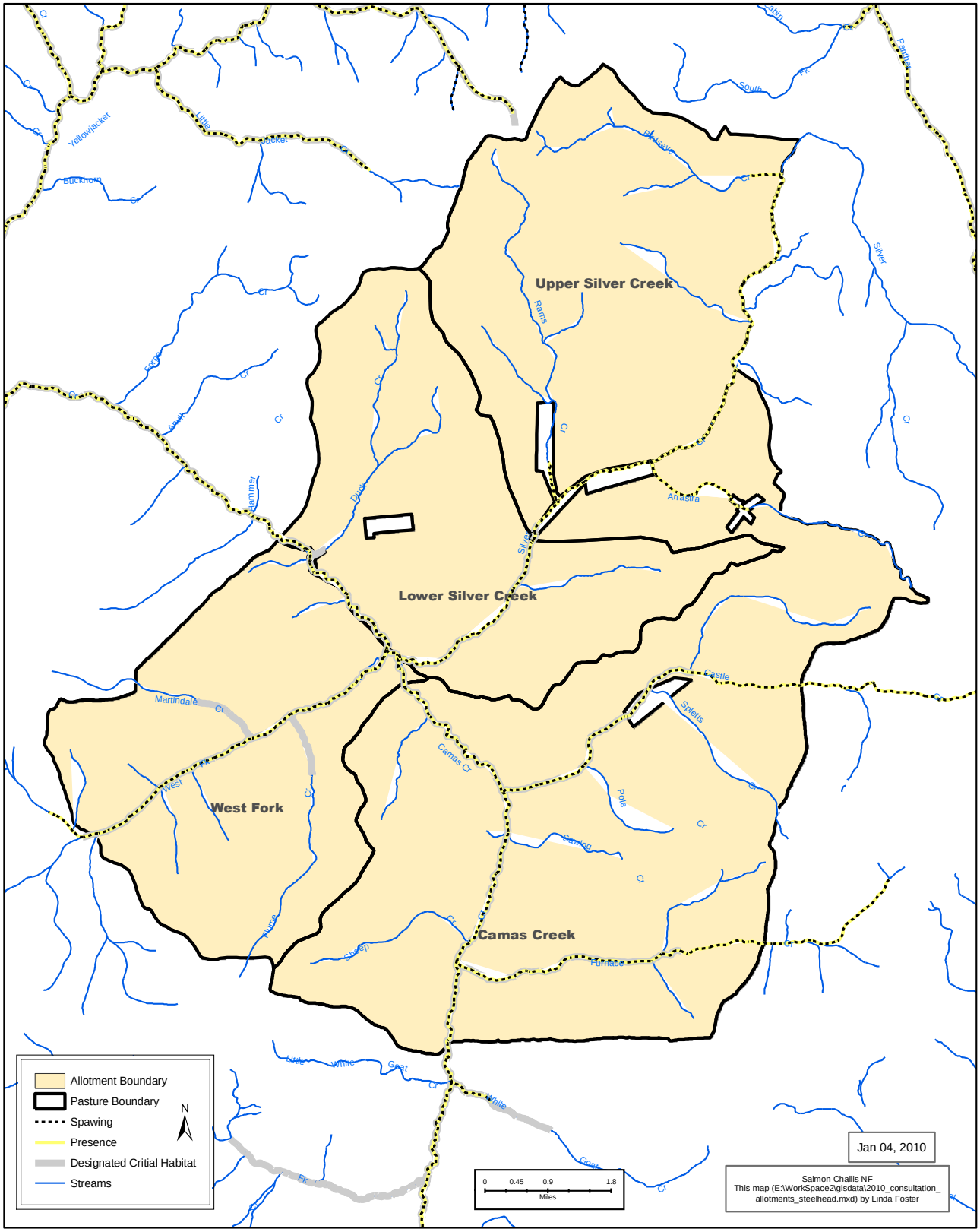
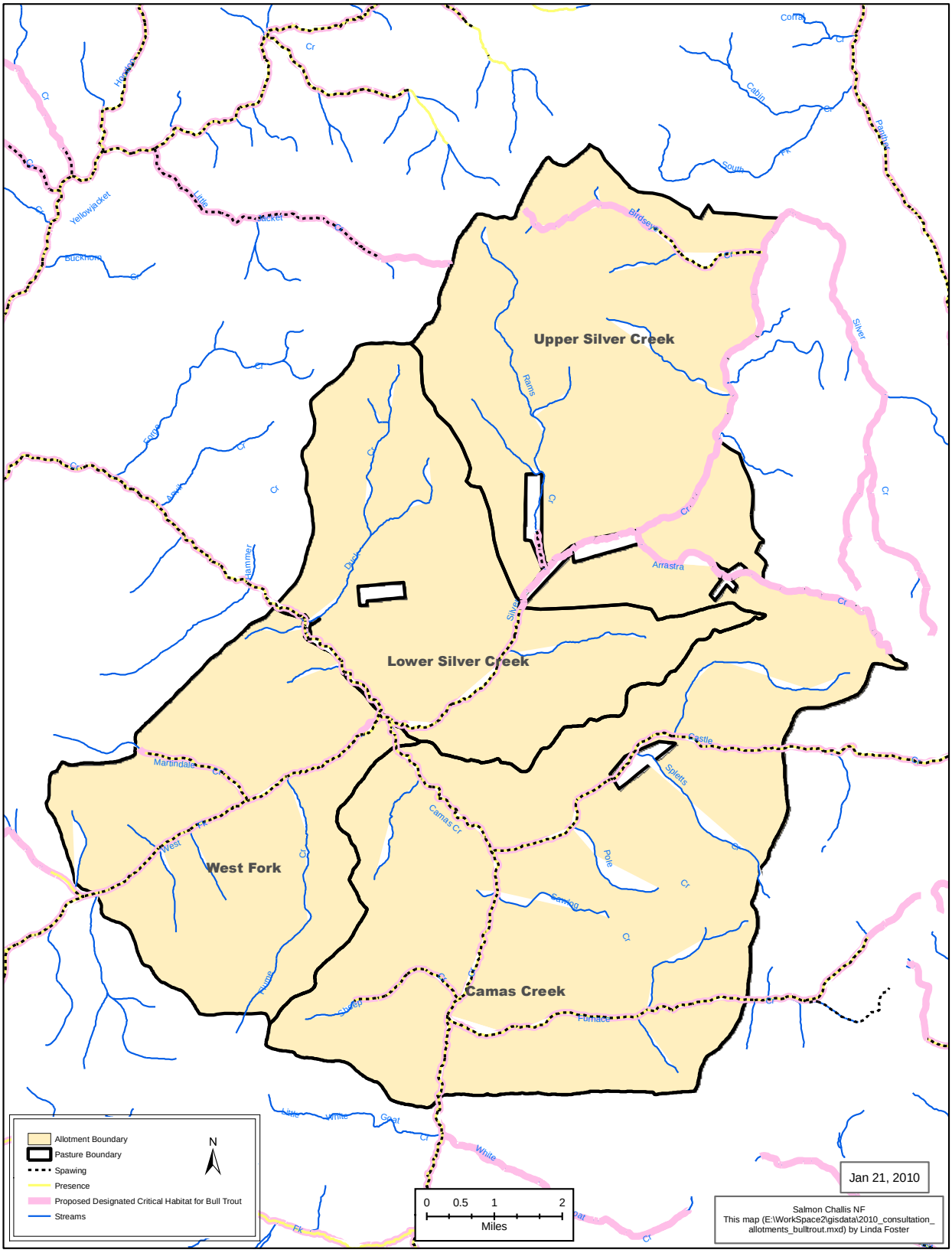


FIGURE 6 – BULL TROUT



6 ENVIRONMENTAL BASELINE DESCRIPTION

The action area is within the Upper Camas Creek, Lower Camas Creek and Upper Panther Creek HUC5 watersheds (HUCs 1706020602, 1706020603, 1706020309). Baseline Matrices of Diagnostic Pathways and Indicators for these 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 Camas Creek Allotment action area encompasses sixteen streams which support populations of, and/ or habitat for, listed fish species. Within the allotment boundaries these include mainstem Camas Creek, Furnace Creek, Sheep Creek, Castle Creek, Duck Creek, West Fork Camas Creek and its tributary streams Martindale Creek, Flume Creek and Pole Creek and Silver Creek and its tributary streams Birdseye Creek, Arrastra Creek, and Rams Creek. Additionally, the final trailing route from the allotment encompasses portions of Cabin Creek, Panther Creek and South Fork Moyer Creek. All other streams within areas that will be grazed do not contain listed fish or support designated critical habitat. However, livestock grazing in these areas may indirectly affect listed fish and designated critical habitat in other streams within the allotment.

6.1.1 CHINOOK SALMON

Chinook salmon are present in mainstem Camas Creek, and within its tributary streams West Fork Camas Creek, Silver Creek and Castle Creek. Populations within the Camas Creek drainage belong to the Camas Creek Subpopulation of the Middle Fork Salmon River Population. Chinook salmon within Panther Creek portions of the action area belong to the Panther Creek Subpopulation of the Upper Salmon River Population. The National Oceanic and Atmospheric Administration's Fisheries Technical Recovery Team (NOAA TRT) has rated the genetic integrity of Camas Creek Chinook salmon as very high. This population is essentially free from hatchery influence (Thurow, 2000). This genetically pure wild population of Chinook was historically very strong, and has evolved over thousands of years to select individuals capable of making the 800 mile journey to Camas Creek. This population is important to the overall ESU because it possesses genetic traits that increase the entire Evolutionarily Significant Unit's (ESU's) likelihood of survival in the wild. Index counts of Chinook salmon redds have been conducted annually in the drainage by the Rocky Mountain Research Station and /or Idaho Department of Fish and Game. Redd count data is identified in Section 6.4.1.1 and Appendix F of this document. Overall trend counts in Camas Creek for Chinook salmon indicate that this population is on a fluctuating downward trend

Chinook salmon are also present within Panther Creek in areas downstream of the identified action area trailing route. Historic distribution of Chinook salmon in Panther Creek was considered to extend to the Porphyry Creek area (Idaho Fish and Game Department, publication date unknown), approximately three miles downstream of the Camas allotment trailing route crossing to private lands. Chinook salmon were considered extirpated from the Panther Creek drainage by the 1960's due to pollution from the Blackbird Creek mine, but small numbers of salmon have been observed spawning in the stream as far upstream as Moyer Creek in recent years. Idaho Department of Fish and Game aerial redd counts of the stream identified between one and 18 redds during surveys between 2001 and 2009 (Appendix F).

6.1.2 STEELHEAD

Mainstem Camas Creek, along with tributary streams Castle Creek, Furnace Creek, Silver Creek, Birdseye Creek, Duck Creek, West Fork Camas Creek, Martindale Creek, Arrastra Creek and Rams Creek support populations of steelhead. Utilization of Rams Creek by steelhead is limited to the lower reaches of the stream below a private earthen dam. *Onchorhynchus mykiss* above this barrier dam are considered to be a resident rainbow trout population. Despite supporting designated critical habitat steelhead presence is not currently identified within either Flume Creek or Duck Creek.

Steelhead populations within the Camas Creek drainage belong to the Camas Creek Subpopulation of the Middle Fork Salmon River Population. Steelhead within Panther Creek portions of the action area belong to the Panther Creek Subpopulation of the Upper Salmon River Population. Camas Creek steelhead are essentially free of hatchery influence. NOAA Fisheries has rated Camas Creek as a high priority watershed, scoring 17 out of a possible 18 on the steelhead population prioritization scale. The drainage supports one of only five populations within the ESU that are important strongholds of genetically unique steelhead.

Relatively little is known of the status or trend of steelhead populations within the Camas Creek drainage. It is assumed that subpopulation characteristics and general population trend within the drainage are similar to those described for Chinook salmon. The Idaho Department of Fish and Game conducted steelhead redd counts within index transects of Camas Creek and West Fork Camas Creek between 1987 and 1998, which indicated a fluctuating downward trend over the period. Steelhead redd count data is identified in Section 6.4.1.2 and Appendix F of this document.

Panther Creek additionally supports populations of steelhead, with current distributions extending into the upper portions of drainage near the Opal Creek confluence and encompassing the area of the stream intersected by the Camas Creek Allotment trailing route. Steelhead use in Cabin Creek and South Fork Moyer use is considered to be limited to juvenile rearing in the lower reaches as these streams are considered too small to support adult spawners (Salmon-Challis National Forest, 2005a).

6.1.3 BULL TROUT

Bull trout populations within grazing areas of the Camas Creek Allotment belong to the Camas and Silver Creek Local Populations of the Middle Fork Salmon River Core Area. Within the Camas Creek drainage, Salmon-Challis National Forest and Idaho Department of Fish and Game surveys identify bull trout within mainstem Camas Creek and in tributary streams Castle Creek, Furnace Creek, West Fork Camas Creek Martindale Creek, Birdseye Creek and Rams Creek. Rams Creek populations are limited to the lower reach of that stream below an earthen dam on private inholdings (Salmon-Challis National Forest, 2007). While the Salmon-Challis National Forest has identified both Silver Creek and Arrastra Creek as supporting potential critical habitat for bull trout, and the US Fish and Wildlife Service includes these streams in its critical habitat proposal, presence/absence surveys by both the Idaho Department of Fish and Game and the Salmon-Challis National Forest have not identified any bull trout presence within the Upper Silver Creek Unit area of the stream. SCNF electroshocking operations identified a single bull within the Lower Silver Creek Unit, but it is considered that bull trout use is limited to the lowermost reach of the unit area near the confluence of the stream with mainstem Camas Creek. An observed mean water temperature of 13.8 degrees Centigrade in lower Silver Creek between July 1 and September 30, 2009 suggests that bull trout would not be expected to be present in these lower reaches of the stream (Gamett, 2002). The Forest plans additional monitoring of the Creek drainage within both Upper and Lower Silver Creek Units to better identify presence of bull trout in this stream. Until more conclusive information on presence in this stream is identified, however, analysis will consider potential presence of bull trout within the Lower Silver Creek Unit.

The resident populations within the action area are considered strong. No bull trout spawning information is available for this watershed. Salmon-Challis National Forest fisheries monitoring operations identified 2009 single pass bull trout electrofishing estimates of 0.413 fish per 100 meters^2 in lower Castle Creek, 0.222 fish per 100 meters^2 in lower Furnace Creek, 0.433 fish per 100 meters^2 in lower Silver Creek, 0.431 fish per 100 meters^2 in Birdseye Creek (SCNF Fisheries Files). Fluvial forms are known to utilize mainstem Camas Creek and Castle Creek, and are believed to utilize West Fork Camas Creek. The

migratory form appears to be increasing in numbers (Salmon-Challis National Forest, 2005a). Migratory corridors and rearing habitat are considered to be in good to excellent condition for the species with the exception of a passage barrier in lower Rams Creek, and the subpopulation exists in close proximity to other spawning and rearing groups (ibid). There are no reasons that the local population should not be able to recover from short-term disturbance, and risk of extinction of the subpopulation is low. Overall, populations are considered to be Functioning Appropriately, but numbers within the Silver Creek drainage may be reduced due to elevated water temperatures in that stream (see Effects discussion for further details).

Bull trout populations are also present in Panther Creek stream reaches in the vicinity of the Camas Creek Allotment trailing route, as well as in South Fork Moyer Creek. These fish belong to the Panther Creek (Iron Lake) Local Population of the Middle Salmon-Panther Core Area. Population densities in this reach of Panther Creek are considered depressed relative to headwater and tributary areas (Salmon-Challis National Forest, 2005b). Extent of use by fluvial fish is unknown. No bull trout spawning information is available for this watershed. Salmon-Challis National Forest fisheries monitoring operations identified 2009 single pass bull trout electrofishing estimates of 0.575 fish per 100 meters^2 in Panther Creek in the vicinity of Moyer Creek., and 0.201 fish per 100 meters^2 in Panther Creek near Opal Creek.

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 CAMAS CREEK

Fish habitat conditions of mainstem reaches of Camas Creek are in generally good condition. Overall physical habitat quality, including the elements of water quality, flow/hydrology, channel conditions and structural habitat elements is considered good, and connectivity is excellent, with no mainstem passage barriers under any flow levels. The watershed supports significant quantity of suitable spawning habitat for both anadromous and resident salmonid species, and Chinook salmon and other salmonids continue to spawn in action area reaches. Camas Creek was overgrazed in past decades and some impacts of past land clearing and farming activities in the Meyers Cove area in the early 1900s are still evident in altered channel equilibrium and decreased historic cottonwood components (May and Rose, 1984). High runoff flows have periodically resulted in decreased streambank stabilities and elevated sediment levels. Currently, a significant portion of mainstem Camas Creek within the action are is within a grazing exclosure which was constructed in the late 1980s, and some recovery of willow is occurring within these areas.

6.2.2 CAMAS CREEK TRIBUTARIES

Fish habitat conditions of Camas Creek tributary streams are also generally in good condition relative to quantity and quality of habitat elements, although residual impacts of historic mining activities outside the action area are still evident in Silver and Duck Creeks. Water temperature regimes are elevated in Silver Creek due to combined effects of past mining activities in the upper drainage and numerous small shallow beaver dams along the course of the stream. Private land inholdings and outfitter and guided activities are located within the Riparian Habitat Conservation Areas (RHCAs) of some tributary streams. Camas Creek tributaries have generally displayed upward trends in streambank and sediment conditions in recent years. Connectivity between upper and lower reaches of Silver Creek has been improved in recent years through breaching of a private land earthen dam in the lower reaches of the stream, although a barrier dam still remains on private lands in the lower reaches of the Silver Creek tributary Rams Creek.

6.3 MAJOR LIMITING FACTORS

Factors most likely to be limiting Camas Creek fisheries resources from achieving full carrying capacity are stream sediment and water temperature. Sediment levels have been impacted both by high mainstem and tributary flow events and by dynamics of beaver activity within the Silver Creek drainage. Mainstem Camas Creek continues to display some vulnerability to impacts from excessive runoff events, particularly in areas historically impacted by agricultural activities in the Meyers Cove area. While rearing habitat is relatively undisturbed and in good condition, elevated sediment levels within some mainstem Camas Creek and Silver Creek spawning reaches may currently be limiting egg-to-fry emergence success. Elevated water temperatures in the Silver Creek drainage appear to be related to cumulative heating through the extensive array of small beaver dams present in the drainage. Water temperature regimes in Silver Creek may be precluding Chinook salmon spawning in that stream, and may be delaying initiation of bull trout spawning.

Historic grazing activities may have contributed to habitat capability limitations within the Camas Creek Allotment area. It is believed, however, that improvements in grazing strategies implemented on the allotment within recent years have minimized any continuing contribution of impact to observed limiting habitat parameters within the watersheds.

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

6.4 GRAZING FOCUS INDICATORS

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

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

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

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

6.4.1 SPAWNING AND INCUBATION:

6.4.1.1 CHINOOK SALMON SPAWNING AND INCUBATION

Adult Chinook salmon migrate into the Middle Fork Salmon River and into Camas Creek from April

through July. Spawning periodicity data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general initiation date for Chinook salmon spawning activity in the Camas Creek drainage of August 15. Chinook salmon spawning surveys by Russ Thurow of the Forest Service Rocky Mountain Research Station however, have identified initiation of Chinook salmon spawning in mainstem Camas Creek reaches above the Hidden Valley Ranch area of the drainage as early as July 24 (Thurow, 2000). Incubation of eggs can occur through the end of April (Upper Salmon Basin Watershed Project Technical Team, 2005).

Within the Camas Creek Allotment, chinook salmon spawning habitat has been identified in a 9.71 mile reach of mainstem Camas Creek (nominal stream width 35 feet), a 4.68 mile reach of West Fork Camas Creek (nominal stream width 15 feet) and in the lower 2.35 miles of Castle Creek (nominal stream width 10 feet) (Thurow, 2000; SCNF, 2009) (see Figure 4, Appendix C, and Chinook Salmon Critical Habitat, Appendix D). These lengths reflect continuous mapping reaches and are likely a significant overestimation of actual spawnable area within the allotment stream due to the discontinuous occurrence of suitable combination of water depth, water velocity and stream substrate composition within the stream profile. Within these totals, approximately 0.76 miles of mainstem Camas Creek and 0.49 miles of West Fork Camas Creek spawning habitats are additionally encompassed within the Meyers Cove exclosure fence and are excluded from livestock access. Fences in lower Furnace and Castle Creeks additionally limit livestock re-entry to upper mainstem reaches of Camas Creek once cattle are moved into upland areas in these drainages.

Annual surveys of Chinook salmon spawning activity in a six mile index reach from Hammer Creek, (approximately one-half mile below the lower Camas Creek Allotment boundary) to Castle Creek have been conducted by the US Forest Service Rocky Mountain Research Station, or Idaho Fish and Game (IDFG). Surveys conducted between 2001 and 2009 identified between seven and 94 redds, with larger numbers observed in the early 2000s and lower numbers observed during the mid and late 2000s (Appendix F). Approximately 75 percent of the Chinook salmon spawning in Camas Creek is believed to occur within this index reach (IDFG, Publication date unknown).

Current extent of Chinook salmon spawning use within the Castle Creek drainage is largely unknown, but based upon observations of long time residents of the drainage use is considered to be infrequent, limited to areas below the Castle Creek Ranch (Shane McAffee, personal communication), and probably commensurate with relative mainstem Camas Creek run size in any given year. Current use of Silver Creek for Chinook salmon spawning is also unknown. The stream often displays water temperature regimes well beyond those considered suitable for Chinook salmon spawning, and it is considered unlikely that adults are currently utilizing the spawning habitats available in this stream.

Chinook salmon spawning within the Panther Creek drainage is considered to occur between August 21 and September 30 with incubation extending through April 30 (Upper Salmon River Watershed Project Technical Team, 2005). All current and historic Chinook salmon spawning has occured well downstream of the Camas Creek trailing route.

6.4.1.2 STEELHEAD SPAWNING AND INCUBATION

Data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general spawning periodicity for steelhead in the Camas Creek drainage ranging from the third week of March through the second week of June, with egg incubation through the second week of July. Observations by Russ Thurow in other Middle Fork drainages however, suggest that steelhead incubation in the Middle Fork Salmon River drainage can potentially extend as late as the third week of August, if and when cool seasonal conditions were to result in late season spawning followed by low stream temperature regimes which prolonged incubation periods (Russ Thurow, personal communication).

Steelhead spawn in both mainstem Camas Creek and its tributaries. Based upon consideration of observed species distribution and habitat conditions within the action area it is believed that steelhead utilize 9.71 miles of mainstem Camas Creek, along with 5.31 miles of West Fork Camas Creek, 4.76 miles of Castle Creek, 4.79 miles of Furnace Creek, 5.98 miles of Silver Creek, 1.53 miles of Arrastra

Creek and 0.46 miles of Birdseye Creek for spawning (Figure 5 and Appendix C). These lengths reflect continuous mapping reaches and are likely significant overestimates of actual spawnable area within the allotment streams due to the discontinuous occurrence of suitable combination of water depth, water velocity and stream substrate composition within the stream profile. Approximately 0.76 miles of mainstem Camas Creek and 0.49 miles of West Fork Camas Creek spawning habitats are protected from livestock use by the Meyers Cove exclosure fence. The lowermost mile of Castle Creek is additionally fenced from access during livestock grazing periods in the Camas Creek Unit.

Available spawning areas for steelhead in Rams Creek are limited to the lowermost private land reaches below the impassible Rams Creek dam. It is considered unlikely that either Duck Creek or Martindale support steelhead spawning due to their small size.

Information on steelhead spawning within the Camas Creek Allotment action area is largely lacking, although the Idaho Department of Fish and Game (IDFG) conducted redd counts on mainstem Camas Creek and West Fork Camas Creek between 1987 and 1998. Annual counts in an unidentified reach of Camas Creek ranged between 0 and 55 redds, with no redds observed in four of the 10 survey years. A single IDFG survey of West Fork Camas Creek in 1990 identified six redds over a reach of unidentified length (Appendix F). IDFG has identified that these data have limitations, as spring surveys provide an unreliable estimate of actual spawner abundance due to changing water conditions and potential variability of reach lengths between survey years.

Steelhead spawning within the Panther Creek drainage is considered to occur between March 15 and June 15, with incubation extending through July 15 (Upper Salmon River Watershed Project Technical Team, 2005). The Camas Creek Allotment trailing route across Panther Creek lies within stream reaches utilized for steelhead spawning.

6.4.1.3 BULL TROUT SPAWNING AND INCUBATION

Mainstem Camas Creek, Castle Creek, Furnace Creek, Sheep Creek, Birdseye Creek, West Fork Camas Creek, Martindale Creek and lower Silver Creek support populations of bull trout. It is considered that each of these streams additionally support bull trout spawning. Within the Camas Creek Allotment, Figure 6 and Appendix C identify 9.71 miles of bull trout spawning habitat within mainstem Camas Creek 4.76 miles within Castle Creek, 4.79 miles within Furnace Creek, 1.89 miles within Sheep Creek, 1.98 miles within Birdseye Creek, 5.31 miles within West Fork Camas Creek, and 1.79 miles within Martindale Creek. (see Figure 4, Appendices C, and Chinook Salmon Critical Habitat, Appendix D). While extent of bull trout use of the Lower Silver Creek Unit is currently unknown, mapping identifies 3.04 miles of suitable spawning habitat for this species within the unit (Figure 6 and Appendix C*).* These lengths reflect continuous mapping reaches, and are likely a significant overestimation of actual quantity of bull trout spawning habitat within the allotment due to the discontinuous occurrence of suitable combination of water depth, water velocity and stream substrate composition within the stream profile. Due to the larger general substrate size, spawning habitats within mainstem Camas Creek are probably more suitable for larger fluvial bull trout than smaller fish of the resident populations.

Data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general spawning periodicity for bull trout in the Camas Creek drainage ranging from mid August to mid October. Observed water temperature regimes of Silver Creek suggest that water temperatures in this stream do not typically drop below 48 degrees F until mid to late September (see supplemental Water Temperature Summary Table, Appendix C, Table 9). Incubation of eggs can occur into late April (Upper Salmon Basin Watershed Project Technical Team, 2005).

Silver Creek is the only stream within the Camas Creek Allotment which bull trout spawning surveys have been conducted. While a 1999 survey of likely spawning areas within the upper reaches of the stream near Rabbits Foot Summit identified completed, but unoccupied redds, supplemental presence/absence snorkeling information was able only to document the presence of brook trout in the reach, and the survey was unable to conclusively link the observed redds with bull trout

Bull trout spawning within the Panther Creek drainage is considered to occur between August 15 and November 7, with incubation extending through April 21 (Upper Salmon River Watershed Project

Technical Team, 2005). The Camas Creek Allotment trailing route across Panther Creek lies within stream reaches utilized for bull trout spawning.

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 conditions in the Upper and Lower Camas Creek Watersheds are considered to be Functioning at Risk for spawning and incubation relative to these criteria. Water temperature is considered one of the two identified limiting factors influencing fish habitat quality within the Camas Creek Allotment action area.

Water temperatures were monitored on mainstem Camas Creek, West Fork Camas Creek, Castle Creek, Furnace Creek, Silver Creek, Birdseye Creek and Arrastra Creek during 2009 (Appendix C, Table 8). Seasonal water temperature regimes have additionally been monitored at two mainstem Camas Creek sites, as well as two Silver Creek sites, between 1999 and 2005 (Appendix C, Table 9).

Overall, observed water temperature regimes within the Camas Creek Allotment have generally fallen within PACFISH water temperature criteria, but individual streams and stream reaches have periodically displayed periods of elevated temperatures beyond optimum ranges for both spawning and rearing (Appendix C). Elevated temperature regimes are most notable in Silver Creek, and, to a lesser extent, mainstem Camas Creek. Mainstem Camas Creek monitoring indicates that water temperatures typically exceeded PACFISH rearing criteria by several degrees C, and regularly exceed spawning criteria by as much as five degrees C for extended periods between July and September. Slightly higher seasonal maximum temperatures have been observed in downstream reaches of the Camas Creek Allotment relative to locations in the Meyers Cove area. Silver Creek water temperatures have regularly exceeded both PACFISH rearing and spawning temperature criteria for extended periods during summer months. Elevated summer water regimes observed in Silver Creek are believed to be due primarily to the combination of numerous small beaver dams in the lower reaches of the stream and the additional warming influences of small shallow private land reservoirs on both mainstem Silver Creek and its tributary Rams Creek. Past mining activities in the upper reaches of Silver Creek may continue to be influencing temperature regimes throughout the mid and lower reaches of the stream.

The remaining major tributary streams within the allotment, including West Fork Camas Creek, Furnace Creek, Castle Creek, Birdseye Creek and Arrastra Creek, while generally meeting salmonid rearing temperature criteria, may additionally display brief exceedences of spawning temperature criteria. Each of these streams, however, appear to be providing overall cooling influences to their respective receiving waters in mainstem Camas Creek and Silver Creek during summer months. The warming influence Silver Creek on mainstem Camas Creek waters is somewhat mitigated by the introduction of cooler West Fork Camas Creek waters a short distance downstream.

Water temperature monitoring within the Panther Creek drainage indicate that temperature regimes in areas near the final livestock trailing routes are well within both PACFISH rearing and spawning criteria. Water temperatures in this area of Panther Creek did not exceed 14 degrees C, and displayed a mean temperature of 8.8 degrees between July 1 and September 30.

6.4.3 SEDIMENT

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

Stream sediment conditions are considered to be Functioning at Risk in both the Upper and Lower Camas Subwatersheds, based upon exceedences of the 25 percent fine sediment criteria for non-quartzite based geologies. Substrate sediment is considered one of the two identified limiting factors influencing fish habitat quality within the Camas Creek Allotment action area. Sediment levels have been monitored at numerous sites within the Camas Creek Allotment since 1994 (Appendix C, Table 10). Monitoring sites are located on mainstem Camas Creek, West Fork Camas Creek, Silver Creek and Castle Creek. Mainstem Camas Creek sites, along with the West Fork Camas Creek site, are located to monitor sediment conditions within the Meyers Cove exclosure. Sites on Silver Creek and Castle Creek monitor tributary sediment conditions outside of the exclosure area.

Monitoring data from sites within the Meyers Cove exclosure reveal the strong influence of high runoff flows on sediment transport and deposition within areas of the allotment. The Meyers Cove area reflects a major depositional reach within the allotment boundary, with steam gradient decreasing and valley width increasing significantly from the steeper, more confined upstream reaches of the stream between White Goat Creek and Silver Creek. Monitoring results at mainstem sites within the Meyers Cove area indicate that 72 percent of all substrate measurements between 1994 and 2009 have exceeded 25 percent fines, while 36 percent of these observations have exceeded 30 percent fines. During any given survey year, lowest levels of fines in mainstem Camas Creek have been observed in the upper portion of the Meyers Cove area, with observed levels increasing downstream. Camas Creek sediment levels above the confluence of Silver Creek have met the Forest sediment functionality goal level of less than 25 percent fines (volcanic geologies) during fifty-five percent of all surveys, while mainstem sites below Silver Creek have met this level during thirty-three percent of all observations, and sites below West Fork Camas Creek have met these levels only six percent of the time. Limited data since 2004 suggest moderate improvement in overall mainstem substrate conditions, with only one of five recent surveys finding fines in excess of 30 percent, and two surveys indicating fines below the Forest goal level of less than 25 percent fines.

Monitoring data on Castle Creek and West Fork Camas Creek indicate that both of these streams are effectively flushing sediments to mainstem Camas Creek. Monitoring operations on West Fork Camas Creek have revealed substrate fines to be at or below 25 percent during most surveys. Trend has shown overall improvement in recent years, with all readings since 2003 falling under 25 percent fines. Castle Creek has consistently met Forest sediment goal levels in throughout its monitoring period.

Elevated levels of fines have been observed in Silver Creek throughout its monitoring period of record. Sixty percent of lower Silver Creek surveys and sixty-seven percent of upper Silver Creek surveys have revealed levels of fine sediments in excess of 30 percent. Forest sediment monitoring operations have shown these values to be typical of streams with extensive beaver complexes (Robert Rose, personal observation). While the individual dams serve to trap and hold large volumes of sediment, some level of “leakage” of stored fine sediments is generally released from the dams throughout the year only to be redeposited in the free-flowing reaches between the dams. This leakage tends to result in elevated levels or fines throughout both dammed and free-flowing areas of the beaver complexes, not just within the storage areas behind the dams.. While individual yearly observations have been somewhat variable, general long term trend at the lower Silver Creek site appears to be generally static at the elevated levels. While the monitoring period of record is shorter at the upper Silver Creek survey site, observed levels of fines were generally similar to those observed in lower Silver Creek whenever both upper and lower sites were both surveyed.

Sediment monitoring operations within the Panther Creek drainage indicate that substrate fines near the Silver Creek Road junction have consistently remained within Forest goal levels for volcanic geology over an extended period of record. Levels of fines at depth have ranged from 7.1 to 25.5 percent, with 64 percent of readings falling below 20 percent fines.

6.4.4 WIDTH: DEPTH RATIO

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

Stream width:depth ratios are considered to be Functioning Appropriately within the Upper Camas

Creek Subwatershed and Functioning at Risk within the Lower Camas Creek Subwatershed. Channel morphology monitoring within the Camas Creek Allotment has been conducted at sediment monitoring locations and MIM sites on C channel reaches of mainstem Camas Creek, West Fork Camas Creek, Furnace Creek, Castle Creek and lower Silver Creek (Appendix C, Tables 11 and 13).

Width:depth ratios at all MIM sites fell within one standard deviation of the Natural Condition Database range for C channel (Rosgen 1994) streams in volcanic geology (Overton et al, 1995). Width:depth ratios measured at sediment monitoring sites on Silver Creek, Castle Creek and West Fork Camas Creek between 1995 and 2006 additionally all fell within one standard deviation of the Natural Condition Database range for C channel volcanic streams. Observed width:depth ratios outside this range were observed only during two of seven surveys of mainstem Camas Creek below the confluence of West Fork Camas Creek. These observations were recorded in 1998 and 1999, and most likely reflect channel impacts associated with excessive 1997 runoff flows (USGS, 1997). Width: depth ratios improved at this location after 2000, however, and are again at levels within the Natural Condition Database range.

Width:depth ratios measured at the Forest's Panther Creek sediment monitoring site near the Silver Creek Road junction have also fallen well within one standard deviation of Natural Condition Database values identified for volcanic geology (Overton et al, 1995), with all measurements taken over a nine year period falling below the database's modal value.

6.4.5 STREAMBANK CONDITION

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

Streambank conditions are considered to be Functioning at Risk within both the Upper and Lower Camas Subwatersheds. The Camas Creek drainage is considered to be a PACFISH priority watershed, with an identified Riparian Management Objective (RMO) of 90 percent or greater bank stability. Full attainment of the 90 percent stability RMO is occurring only during approximately 25 percent of all measurements of record in the drainage, however.

Streambank conditions within the Camas Creek Allotment have been monitored in association with sediment monitoring operations since 1994 (Appendix C, Table 12). Monitoring sites are located on mainstem Camas Creek, West Fork Camas Creek, Silver Creek and Castle Creek. Mainstem Camas Creek sites, along with the West Fork Camas Creek site, are located primarily to monitor streambank conditions within the Meyers Cove exclosure. Sites on Silver Creek and Castle Creek monitor tributary conditions outside of the exclosure area. Streambank stability data has additionally been collected at MIM sites on Camas Creek, West Fork Camas Creek, Silver Creek, Castle Creek and Furnace Creek.

Monitoring data from sites within the Meyers Cove exclosure reveal the strong influence of high runoff flows on streambank stability within the Camas Creek drainage. Monitoring operations in exclosure areas, which are excluded from general cattle grazing, have revealed significant impacts to streambank stability in response to the extremely high mainstem and tributary flows of the 1997 runoff. Prior to 1997, sixty-four percent of streambank stability measurements within the exclosure exceeded 80 percent stable banks with 27 percent attaining the PACFISH BO Priority Watershed Riparian Management Objective (RMO) of 90 percent streambank stability. Runoff flows in 1997 produced significant reductions in streambank stability at all monitoring sites within the exclosure which persisted through 2004, when three of five sites once again exceeded 80 percent stability and one site attained the 90 percent streambank stability RMO. Trends at the four monitoring sites within the exclosure area since 2005 suggest that conditions are once again improving, with seventy one percent of measurements meeting or exceeding 80 percent, and one site attaining the priority watershed RMO of 90 percent or greater stability Only the mainstem Camas Creek MIM site failed to show a some level of recovery of streambank stabilities impacted by the late 1990's runoff event. Streambank alteration data and photos associated with this 2007 MIM survey, however, suggest that the observed bank stability value recorded at this site was related to factors other than livestock impact.

Streambank stability data for Silver Creek, which lies outside the livestock exclosure, showed a trend similar to that observed within the exclosure area. Bank stabilities in lower Silver Creek dropped below 80

percent only after the 1997 runoff, and showed a slightly faster recovery to levels above 80 percent than observed within mainstem and West Fork Camas Creek monitoring sites within the exclosure fence. Similar to the exclosure sites, bank stability trends in lower Silver Creek were considered to reflect the influence of high 1997 streamflow levels, which additionally breached numerous beaver dams within the lower portions of the stream. MIM data collected in lower Silver Creek between 1994 and 2007 support the observations of the longer term hydrology data. Higher in the drainage, streambank stabilities at the upper Silver Creek monitoring station remained in excess of 80 percent during all monitoring surveys and appeared to be less impacted by the high flows of the 1997 runoff. Overall, 88 percent of streambank stability readings within the Silver Creek drainage between 1994 and 2009 have exceeded 80 percent bank stability, and 53 percent reflected full attainment of the 90 percent streambank RMO for priority watersheds.

Monitoring of streambank stability in Castle Creek and Furnace Creek additionally identified periods of reduced streambank stability in the early 2000s, followed by recovery to desired conditions in recent years. Surveys identified streambank stability readings varying both above and below the 80 percent level in these streams between 1994 and 2004, while recording streambank stabilities improving to near-90 percent levels in both streams during the 2007 survey.

Streambank stability measurements taken in association with Panther Creek sediment monitoring operations near the Silver Creek Road junction have identified bank stabilities consistently in excess of 80 percent, and in excess of 90 percent during eight of eleven surveys.

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 areas are considered to be Functioning Appropriately except within the Silver Creek drainage, which is considered to be Functioning at Risk. The riparian habitat conservation areas within the Upper Camas Creek Watershed are largely untouched. These conservation areas provide adequate shade, large woody debris, habitat protection, and connectivity. Historic cottonwood component is lacking, however. Additionally, an outfitter and guiding camp currently located within the RHCA of Castle Creek may be reducing the density of riparian vegetation of the stream at that site. Most of the Lower Camas Creek Watershed is Functioning Appropriately for riparian reserves. Some RHCA's in Lower Camas Creek have been affected by grazing and road encroachment, however. A subdivision of summer homes in the Silver Creek drainage likely encroaches on RHCA's and reduces the density and extent of riparian vegetation on these private land areas. The Lost Springs, and Meyer's Cove/Everett Decora campgrounds are also located within the RHCAs, and associated near stream recreation activities in these campgrounds may be reducing density and extent of riparian vegetation at these Silver Creek and Camas Creek sites.

Monitoring operations within the action area indicate that of the seven sites monitored since the early 90's, five are in upward trend or at Late Seral/ Potential Natural Condition (PNC) (Appendix C, Table 13). The monitoring sites on Furnace Creek and Main Camas Creek outside the exclosure area are in a downward trend. All sites will have a bank alteration monitoring attribute with a endpoint indicator of less than 20 percent.

Castle Creek (M227): Greenline Ecological Status (GES) trend is up. The site is dominated by boulders and woody species. Bank stability is up and current bank alteration was 2 percent, which indicates livestock have little impact to riparian area. The objective for Castle Creek was changed to woody use instead of stubble height, due to the lack of good hydric species and the abundance of woody species (63 percent). The monitoring attributes of browse use and greenline stubble will be used with the endpoint indicators at 50 percent browse use and 4 inches greenline stubble.

Main Camas Creek (M226): GES trend is down. Bank alteration is at 2 percent. Low bank alteration readings indicate livestock use is low on the stream banks. Low Bank Stability and GES are due to past events, high water flows, and fire activity in the watershed. Based on the flashiness of this system, it is predicted that variation in GES and bank stability will continue to occur. The Forest Hydrologist has

collected bank stability on Main Camas since 1993. The data shows major fluctuations in bank stability from year to year. For example, in 1999 bank stability was 70 percent. The next year bank stability went down to 53 percent. Livestock will not cause such rapid changes bank stability. High flow events and fire can cause these major fluctuations in bank stability. The monitoring attributes of bank alteration and greenline stubble will be used with the endpoint indicators at 20 percent bank alteration and 6 inch greenline stubble.

Main Camas Creek exclosure (M306): GES is up having moved from very early seral to mid seral over the past five years. Only two readings are available from this site. The site, for the most part, is excluded from livestock grazing. Trend shows variation in seral status even though livestock have been excluded since the 1990's. This site acts as a baseline or control for Camas Creek. The site displays how removing livestock does not change the variable nature of the creek. No monitoring attributes have been assigned to site because it is inside of exclosure and should not have any livestock utilization.

Lower Silver Creek (M229): GES has moved up in seal stage from the baseline 1992 reading (Early Seral) through 2007 (Late Seral). Although there seems to be some fluctuation between sample periods possibly explained by natural disturbance of this reach. It is apparent that there is overall upward trend in GES since the baseline 1992 measurement to present. In management of the riparian sites towards objectives, greenline stubble attribute for Lower Silver unit was set with an endpoint indicator of 6 inches due to declining seral status in the 1990's. The endpoint indicator will continue to be 6 inches. If it is determined no bull trout are present in Lower Silver Creek the endpoint indicator will be changed to 4 inches.

Upper Silver Creek (M230): GES is at late seral to near PNC. No apparent trend is detected between these two readings. The site is dominated by Willow and Alder species, making it an undesirable area for livestock. The monitoring attributes of browse use and greenline stubble will be used with the endpoint indicators at 30 percent browse use and 6 inches greenline stubble. If site remains at PNC a change in endpoint indicators to 50 percent browse use and 4 inch greenline stubble may be considered.

Furnace Creek (M228): Site trend is down. The downward trend is attributed to beaver dams established in the area after 1998 reading. When these dams blew out, a large amount of sediment was deposited over the greenline site. Vegetation has not completely re-established on the site. Continued monitoring will aid in evaluating livestock effects to the site. The monitoring attributes of browse use and greenline stubble will be used with endpoint indicators, which include 30 percent browse use on Willow and 20 percent browse use on Alder and 6 inch greenline stubble. These endpoint indicators will limit livestock impacts which could aid in moving GES trend upward.

West Fork of Camas Creek (M242): West Fork tend is up. Upward trend is due to a number of management changes. Livestock use has been very light only using unit for 7 - 10 days. Livestock use has been well distributed in the uplands. Season of use was shifted from mid-summer to early summer. Cooler early summer temperatures keep livestock from utilizing riparian area as heavily. Stubble height objective for West Fork of Camas Creek is 4 inches. The West Fork of Camas Creek site is in an upward trend, so the current stubble height objective appears to be aiding in the upward movement of the seral status.

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 fish and their aquatic and riparian habitats. These include:

- Strategic Rotation: Unit rotation strategies designed to move livestock off streams during critical spawning periods can avoid direct impact to spawning fish or their incubating redds.

- Fencing: Fencing sensitive riparian areas can be an effective way of protecting riparian resources, fish habitat and fish populations. Platts (1991) found that, in 20 of 21 studies, stream and riparian habitats improved when grazing was prohibited in fenced riparian zones.

- Salting: Placing salt or mineral supplements in upland areas can decrease the amount of time livestock spend in riparian areas. Ehrhart and Hansen (1997) provide evidence that salt, when used in conjunction with alternate water sources, can help distribute livestock over open range

- Off-Stream Water Development: McInnis and McIver (2001) found that off-stream water and salt can attract cows to the uplands enough to significantly reduce uncovered and unstable streambanks,

- Herding: Utilizing riders to keep livestock away from riparian areas can avoid direct impacts to spawning fish and incubating redds.

- Utilization Standards: Establishing utilization standards for forage utilization and moving livestock when these standards are approached or reached, can help avoid many of the adverse effects that livestock grazing can have on fish and their habitat.

The Forest has integrated each of these measures into its grazing strategy for the Camas Creek Allotment to reduce the potential for adverse effects to listed fish and aquatic and riparian habitats within the action area. Rotation schedules have been refined to best avoid direct impact to spawning fish and incubating redds. Existing exclosure fences exclude livestock from significant Chinook salmon spawning reaches of Camas Creek and its West Fork, and fences in the Castle and Furnace Creek drainages prevent reentry of livestock to mainstem Camas Creek reaches during critical Chinook salmon spawning periods. Salting is employed in the Camas Unit to keep livestock off stream areas, and troughs in the West Fork Unit provide off-stream watering opportunities. Riders are employed to keep livestock in upland areas and away from Camas Creek, Castle Creek and Furnace Creek during critical Chinook salmon spawning and incubation periods. Utilization standards have been identified and revised for the various units 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 (ibid).

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

7.1.1 SPAWNING AND INCUBATION

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

Chinook salmon, steelhead and bull trout all spawn within portions of the Camas Creek 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 Camas Creek allotment are discussed individually below.

7.1.1.1 CHINOOK SALMON

Chinook salmon occur within mainstem Camas Creek, West Fork Camas Creek and Castle Creek. Chinook salmon spawning currently occurs within mainstem reaches of Camas Creek and within its West Fork and Castle Creek tributaries. Chinook salmon spawning is not believed to currently occur within

Silver Creek. Under the proposed grazing strategy, all grazing of the West Fork Unit is conducted prior to the onset of Chinook salmon spawning. Livestock are moved off the West Fork Unit between the first and second weeks of July, and in most years moved directly to the Furnace/Castle Creek area of the Camas Creek Unit. Trailing routes utilized during this movement follow an established roadway route crossing Camas Creek at two hardened and one unhardened ford locations before following the Castle Creek road to final upland destinations. In some years, when a full time rider is available, livestock would be moved from the West Fork Unit directly to private lands of the Hidden Valley Ranch prior to movement into the Camas Creek Unit. Trailing routes to these lands would also follow the roadway route, but would cross two hardened and three unhardened fords of Camas Creek, and one unhardened ford of Furnace Creek. In years when the Hidden Valley Ranch property is grazed, livestock would be removed from mainstem Camas Creek reaches by July 26, again crossing three unhardened roadway fords of Camas Creek and one unhardened ford of Furnace Creek, then trailing up Furnace Creek to final upland destinations within the Camas Creek Unit. Under both scenarios, all livestock movements associated with West Fork Unit to Camas Creek Unit rotation would be conducted prior to the onset of Chinook salmon spawning, livestock would be removed from both mainstem Camas Creek and West Fork Camas Creek Chinook salmon spawning reaches, and there would be no potential for livestock interaction with Chinook salmon spawning or incubation.

While within the Furnace and Castle Creek drainages of the Camas Creek Unit, livestock are kept out of lower Furnace Creek and lower Castle Creek with gated fences on lower Furnace and Castle Creeks, salting, and utilization of a part-time rider to keep cattle high in the tributary streams. It is expected, however, that some uncollected stray livestock may still remain along Camas Creek below the mouth of Furnace Creek after July 26 each year due to difficulties collecting and moving animals from that area. It is estimated that this potential residual presence would typically number less than ten percent of the permitted livestock number. These individuals would be located collected and moved by the rider to the ridge between Pole Creek and Furnace Creek prior to August 15.

Livestock graze within the Camas Creek Unit until approximately August 31, and their presence in the Castle Creek drainage extends into the early timeframe of potential Chinook salmon spawning. However, as riders generally attempt to concentrate livestock in the upper portions of the drainage outside the areas of historic spawning, and fences preclude any incidental access downstream to the lower portions of the stream, potential direct impacts to any Chinook salmon redds in Castle Creek would be limited to the one mile reach between the lower fenceline and Castle Creek Ranch. In light of passive (fences) and active (rider) management to limit livestock access to the spawning areas of lower Castle Creek, the generally steep sideslopes adjacent to the stream channel in this reach, and the suspected infrequent use of the drainage by spawning salmon, it is considered that the potential for livestock impacts on Chinook salmon redds within the Castle Creek drainage is unlikely but not discountable.

Trailing of livestock out of the Camas Creek Unit to the final rotation unit within the Silver Creek drainage is conducted via the Castle Creek and Camas Creek roadways, which are both well off their respective stream channels for the majority of the route. Livestock are expected to access stream channel environments only at one hardened and one partially hardened ford along the trailing route. However, as operations would be conducted within known spawning reaches of Camas Creek during Chinook salmon spawning periods, potential impacts to Castle Creek or Camas Creek Chinook salmon redds in association with this trailing operation cannot be considered discountable.

As Chinook salmon spawning is not occurring in Silver Creek, neither grazing activities within the Silver Creek Units nor final trailing of livestock out of the Camas Creek drainage along the Silver Creek road are expected to impact Chinook incubation in that stream. Final trailing routes would be conducted along upland routes through the Cabin Creek drainage, crossing Panther Creek on Forest lands once during final pasturing on private lands east of Panther Creek, then once more when livestock leave the private units. As the trailing route crosses Panther Creek in an area several miles above both historic and current Chinook salmon spawning areas of Panther Creek, no impacts to Chinook salmon incubation would be expected to occur as a result of livestock crossings of Panther Creek.

The proposed grazing strategy for the Camas Creek Unit reflects Conservation Measures (see Section 3.2.3), designed to minimize potential interactions between livestock and spawning Chinook salmon. These measures were first implemented during the 2006 grazing season, and were judged successful

during that and successive 2007 and 2008 grazing seasons in avoiding livestock/fish interactions (Garechana, 2008). While these measures significantly reduce the potential for spawner or redd disturbance to minimal levels, these potentials cannot be considered discountable, due to potential incidental occurrence of stray livestock along Camas Creek after July 26.

In summary, it is concluded that recently adopted measures incorporated into the proposed action, including unit rotation strategies to avoid livestock presence in Camas Creek, West Fork Camas Creek, and Castle Creek during spawning and incubation periods, utilization of riders to keep livestock off stream channels, off channel salting, utilization of off channel trailing routes and crossing of livestock at hardened fords or locations which do not support spawning habitats will collectively minimize potential for direct or indirect impacts to spawning Chinook salmon or salmon redds within the Camas Creek Allotment action area. While minimal, a non-discountable potential for spawner or redd disturbance will continue to exist within the action area due to potential incidental occurrence of livestock along reaches of Camas Creek and/ or Castle Creek during identified Chinook salmon spawning periods.

7.1.1.2 STEELHEAD

Mainstem Camas Creek, Castle Creek, Furnace Creek, Silver Creek, Birdseye Creek, Duck Creek, West Fork Camas Creek, and Martindale Creek support populations of steelhead as well as Designated Critical Habitat for Snake River Basin steelhead. It is considered that all of these streams except Duck Creek and Martindale Creek additionally support spawning habitat for the species.

Based upon proposed grazing activities, and spawning and incubation periodicities identified by the Upper Salmon Basin Technical Team, potential livestock impacts to incubating steelhead redds exist within Silver Creek, and lower Birdseye Creek, which are grazed from June 1 through June 20, and within West Fork Camas Creek, which is grazed between June 21 through the first week of July. In years when livestock are moved directly from the West Fork Unit to the Camas Creek Unit (~9 of 10 years), potential impacts to incubating steelhead redds additionally exist within the Castle Creek and Furnace Creek drainages, as well as along the Camas Creek trailing route to these drainages.

Information on use of these streams by adult spawners is largely non-existent, although the observation of six steelhead redds in West Fork Camas Creek in 1990 (Appendix F) suggests a low redd density. Potential for direct impacts to redds in Silver Creek and West Fork Camas Creek is minimized by the high streamflows occurring during this period. Salmon-Challis National Forest streamflow data identify a nominal June mean monthly discharge of fifty-two cfs for Silver Creek, and June-July mean monthly flows of 102 and 32 cfs for West Fork Camas Creek. It is believed that streamside livestock activity at this time would be largely limited to watering at the banks of the stream by the high water velocities associated with runoff flows. The exclosure of the lowermost one-half mile of West Fork Camas Creek's 5.3 miles of steelhead spawning habitat additionally reduces potential livestock exposure to incubating redds in this stream during the short timefames that livestock graze within the West Fork Unit.

Livestock must cross Camas Creek at one hardened ford during trailing operations from Silver Creek to the West Fork Camas Creek Unit in late June as water conditions allow, and at two to three fords during trailing operations from the West Fork Unit to either the Camas Creek Unit or Hidden Valley Ranch area in early July. In most years, grazing rotation would be conducted from the West Fork Unit directly to the Camas Creek Unit, with trailing operations following the Camas Creek roadway course, crossing two hardened and one unhardened Camas Creek fords, then proceeding up the Castle Creek roadway to upland ridge areas of the Camas Creek Unit between Pole Creek and Furnace Creek. In years when the Hidden Valley Ranch property would be grazed prior to movement into the Camas Creek Unit, trailing from the West Fork Unit would also cross the two hardened Camas Creek fords, but would follow the roadway route past Castle Creek, crossing three additional unhardened Camas Creek fords and one unhardened ford of Furnace Creek to private ranch lands. In these years, livestock would additionally be moved from Hidden Valley Ranch to the Camas Creek Unit on July 26, again crossing two unhardened Camas Creek fords before being trailed up the Furnace Creek drainage to ridgetop areas between Furnace Creek and Pole Creek. As these operations are conducted during periods of relatively high flow conditions, livestock are not expected to remain within the stream for any extended period of time during actual stream crossings. Crossings are conducted at specific sites with little opportunity for dispersal of livestock off the roadway ford locations. Each of the unhardened fords above the mouth of Castle Creek

are at stream locations determined in the 2005 Camas Creek Watershed BA (Pg UC 39) to have conditions of depth, velocity or substate compositions considered unsuitable for spawning (Salmon-Challis National Forest, 2005a). Due to the limited locations and timeframes associated these operations, potential impacts to steelhead redds associated with trailing operations within steelhead incubation periods are considered to minimized in both time and scope, but cannot be considered discountable.

In most years, the grazing rotation strategy would move livestock into the Furnace and Castle Creek drainages during the latter portions of steelhead incubation. Potential impacts to steelhead incubation in these streams could occur over an approximate two week period if incubation extended through mid July, or over a six week period if incubation were to extend into mid-August as suggested by Thurow's observations in other areas of the Middle Fork Salmon River drainage.

In years when livestock were grazed on private lands on Hidden Valley Ranch prior to movement into the Camas Creek Unit, all livestock trailing in the Camas Creek drainage and grazing in the Furnace and Castle Creek drainages would occur after conclusion of steelhead incubation, unless it extended into August. If steelhead incubation within the Camas Creek drainage were to extend into August, impacts to steelhead redds on mainstem Camas Creek could additionally occur due to the presence of a residual number of livestock (typically less than ten percent of the herd), not collected and moved beyond the Furnace Creek fence during the July 26 trailing from the Hidden Valley Ranch area.

However, given the general elevation range of the allotment and analysis of available water temperature data from within the action area, it is not believed that the late incubation observed by Thurow within other portions of the Middle Fork drainage is occurring within streams of the Camas Creek allotment. Such a delayed emergence would reflect late initiation of spawning activity and/or an extended incubation period due to unusually cold water temperature regimes which do not appear to be suggested by the available temperature data, despite the unusually cool spring and summer conditions observed in 2009. Rather, it is believed that steelhead incubation periodicities in Camas, Furnace, and Castle Creeks reflect the timeframes identified for the Camas Creek drainage by the Upper Salmon Basin Technical Team, and that the above described potential impacts to steelhead incubation within the Camas Creek Unit would be limited to an incubation period concluding in mid -July.

Trailing operations from the Camas Creek Unit to the Silver Creek Unit via Castle Creek and the Camas Creek road trailing route would be conducted well after the latest potential emergence of steelhead fry, as would late season grazing within the Silver Creek drainage and final trailing to the Silver Creek holding corrals. Final trailing of livestock out of the Camas Creek drainage along the Silver Creek road and Cabin Creek Trail to private land units on the east side of Panther Creek would also be conducted well past the period of steelhead incubation in Silver Creek and Panther Creek, and is not expected to have any impacts to steelhead incubation in those streams.

No potential livestock impacts to steelhead incubation would occur in Martindale Creek or Duck Creek due to the absence of steelhead spawning habitat in these streams. No potential impacts to steelhead incubation in lower Rams Creek would occur due to livestock exclusion from this private land area.

In summary, given consideration of anticipated incubation timeframes within the action area and recognition that streamflow regimes would naturally discourage instream livestock presence and dispersal on streams, and that trailing operations would limit direct interaction of cattle and redds, it is concluded that there exists a minimal, but non-discountable potential for direct impact of livestock on incubating steelhead eggs within the Silver Creek, West Fork Camas Creek, Furnace Creek, Castle Creek, and mainstem Camas Creek stream channels.

7.1.1.3 BULL TROUT

Mainstem Camas Creek, Castle Creek, Furnace Creek, Sheep Creek, Silver Creek, Birdseye Creek, West Fork Camas Creek and Martindale Creek support populations of bull trout. It is considered that each of these streams additionally support spawning habitat for the species.

Data developed by the Upper Salmon Basin Watershed Project Technical Team (Upper Salmon Basin Watershed Project Technical Team, 2005) identify a general spawning periodicity for bull trout in the

Camas Creek drainage ranging from mid August to mid October. Based upon initiation of bull trout spawning as early as August 15, potential livestock impacts to incubating bull trout redds could occur within Furnace Creek and Castle Creek, which have livestock present in the drainage through approximately August 31. Impacts to bull trout incubation could additionally occur within Lower Silver Creek, and within the upper Silver Creek tributary Birdseye Creek, which are grazed between approximately September 1 and September 20 in alternating years.

Within the Camas Creek Unit, livestock are moved off Camas Creek to the ridgeline area between Furnace Creek and Pole Creek prior to the potential onset of bull trout spawning. Initial trailing to ridgeline areas high in the drainage and subsequent employment of a part time rider in this unit will minimize cattle presence along most areas of the Furnace and Castle Creek stream channels during the time that livestock are in this area of the unit. However, livestock will be present within both the Furnace Creek and Castle Creek drainages for a two week period after August 15 at which time impacts to bull trout redds from incidental livestock presence could occur if spawning activity in these streams has been initiated. General dates of initiation of bull trout spawning activity have not been specifically verified for either the Furnace Creek or Castle Creek drainages, however bull trout spawning was observed in Castle Creek near the Castle Creek Ranch on September 14, 2006, with pre-spawning activity observed in the same area as early as August 24. (Tim Page, personal communication). It is likely, therefore that some level of bull trout spawning activity would be initiated during the late period of grazing within the Castle Creek and Furnace Creek drainages prior to rotation of livestock out of that unit.

Under the proposed grazing strategy, the final unit rotation of the season utilizes either the Upper or Lower Silver Creek Unit, with late use alternating between the two units on a two year rotation cycle. Under the proposed action, livestock would graze the Lower Silver Creek Unit after the general August 15 date of bull trout spawning initiation identified by the Upper Salmon River Basin Watershed Project Technical Team every other year, and remain in the unit to September 20 when approximately ninety percent of livestock are collected and removed, though the final off date for remaining incidental individuals is October 5. Both temperature and available spawning survey data suggest that potential bull trout spawning in mainstem Silver Creek may occur at a significantly later date than that indicated for the Camas Creek drainage by the Upper Salmon Basin Watershed Project Tech Team report. Available water temperature data for the Silver Creek drainage between 2000 and 2005 (Appendix C) indicate that temperature regimes generally remain elevated significantly past August 15, typically not dropping to the 10 degree C range until the second to fourth week of September. Water temperature monitoring data for the 2009 season additionally identify a late-September seasonal drop in water temperatures, despite being characterized as a relatively cool year. The observed temperature regimes suggest a late season initiation of bull trout spawning activity within mainstem Creek, which would significantly reduce timeframes of potential livestock-bull trout interactions

Observed water temperature regimes within the Silver Creek tributary Birdseye Creek do not display the elevated seasonal temperature regimes of Silver Creek, and late season grazing of the Upper Silver Creek Unit would expose bull trout spawning reaches of Birdseye Creek to livestock after the August 15 date of bull trout spawning initiation identified by the Upper Salmon Basin Watershed Project Technical Team. Livestock could continue to be present in Birdseye Creek until final gathering beginning on September 20. There exists, therefore, potential for livestock impact to bull trout redds in Birdseye Creek from August 15 to October 5 in years that the Upper Silver Creek Unit is grazed late.

Final trailing operations out of the Lower Silver Creek Unit on years that this unit is grazed late would likely result in numbers of livestock crossing Silver Creek to the Silver Creek road trailing route at random locations along the stream. As approximately ninety percent of livestock would be removed from the unit by September 20, it is likely that potential direct impacts to bull trout redds would result primarily in association with potential stream crossings of individuals from the approximately ten percent of livestock remaining incidentally in the unit after September 20. This late-season trailing operation would occur in one of every two years. Final trailing operations to private lands in the Panther Creek drainage would result in one to two ingress crossings and one final egress crossing of mainstem Panther Creek during bull trout spawning and incubation periods. Potential impacts to incubating bull trout eggs could occur during these crossing periods if bull trout redds were present at the road-based crossing site.

In summary, while bull trout spawning timeframes are not well defined for any streams within the project action area, it is concluded that direct disturbance of spawning bull trout or bull trout redds could occur in Castle, Furnace, Birdseye or lower Silver Creeks at some time within the latter portion of the grazing periods of those areas, and in Panther Creek during final trailing operations to and from private land units on the east side of that stream. While not considered to be either discountable or insignificant, the potential scope or level of impacts under the proposed action is minimized in Castle and Furnace Creeks by active measures designed to minimize areas of those streams accessible by livestock, and in lower Silver Creek and Birdseye Creek by the alternating late-season use between the Upper and Lower Silver Creek units. Potential impacts to incubating bull trout eggs in Panther Creek are minimized both by active driving which minimizes exposure time, and concentration of livestock at the stream crossing site, with surrounding vegetation limiting livestock dispersal off the established roadway route .

7.1.2 WATER TEMPERATURE

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

Water temperature is considered one of the two identified limiting factors influencing fish habitat quality within the Camas Creek Allotment action area.

While some streams within the Camas Creek Allotment area display periodic exceedences of salmonid spawning 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. The limiting effects of elevated water temperatures in mainstem Silver Creek appear to be a result of sequential and cumulative summer warming of that stream due to the presence of numerous small beaver dams along a significant portion of the stream course. Both upper and lower reaches of this stream are currently exceeding 90 percent streambank stability, and either at PNC or at late seral stage with an upward trend. In the absence of observed impacts to these influencing habitat parameters, it is concluded that recent livestock grazing within the Camas Creek Allotment is not resulting in detectable effects to water temperatures or water temperature regimes within the streams of the action area.

The proposed action includes measures, including new livestock movement schedules, salting, and employment of riders to keep livestock away from critical stream reaches, which should result in livestock having even less potential impact on stream temperatures than has occurred in the past. Conservation measures designed primarily to avoid livestock exposure to spawning areas will additionally serve to reduce potential livestock impact on water temperatures by minimizing riparian vegetation use and livestock impact to streambanks within Upper Camas Creek, Furnace Creek, Castle Creek and Silver Creek. The existing Meyers Cove exclosure will continue to exclude livestock from historically impacted portions of lower mainstem Camas Creek and West Fork Camas Creek.

Livestock will also graze along several tributary streams that are not occupied by listed fish but 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 Camas Creek.

All livestock trailing activities associated with Camas Creek grazing operations utilize existing road crossing locations, with exposure times at stream crossings minimized by active livestock driving. Trailing operations are therefore not expected to result in any impacts to water temperatures which could be meaningfully measured, detected or evaluated.

In summary, while elevated water temperatures and less- than-optimal water temperature regimes are periodically occurring at areas within the Camas Creek Allotment, contributing impacts on water temperature related to grazing activities are considered to be insignificant, and are not expected to be, in and of themselves, generating any additional measureable increases in water temperatures. 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. The proposed action is expected to maintain the condition of the Water Temperature Focus Indicator.

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 (see section 6.4.7). Livestock grazing and unmanaged trailing activities can impact sediment levels in areas that are grazed by livestock and in areas downstream from where grazing occurs.

Stream sediment is considered one of the two identified limiting factors influencing fish habitat quality within the Camas Creek Allotment action area.

Livestock activity within the Camas Creek drainage is not currently considered to be a significant factor influencing sediment levels. Approximately three quarters of a mile of mainstem Camas Creek is excluded from cattle access, and upstream unfenced areas are primarily utilized by livestock only during trailing operations. These areas are largely unattractive to persistent use by any incidental livestock due to steep channel topography, limited riparian extent, and generally unsuitable forage conditions.

Strategies and Conservation Measures of the proposed action, while designed primarily to avoid livestock presence within stream channels during critical spawning periods, additionally serve to minimize potential sediment generation to allotment streams from near-stream livestock activity. Measures including alternating rotations of Upper and Lower Silver Creek Units, the short residence time within the West Fork Unit, rapid movement of livestock through trailing areas, salting and fencing, and use of range riders to keep livestock in upland 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. The existing Meyers Creek exclosure fence will additionally continue to preclude livestock access to critical reaches of Camas Creek and West Fork Camas Creek while stream substrate conditions in this area continue to recover from historic land management impacts.

Periodic elevated sediment levels observed within mainstem Camas Creek reaches are considered attributable to high flow impacts to depositional areas of the stream. The 1997 runoff within the drainage, in particular, produced lasting impacts to fines in mainstem Camas Creek which are only recently recovering to goal levels, despite extended exclusion of livestock from a significant portion of its streambanks. While sediment monitoring data in Silver Creek reveal elevated levels of substrate fines, supplemental streambank stability data do not indicate or suggest exacerbation of sediment levels due to cattle grazing within the drainage. The elevated levels of fines observed in Silver Creek are believed, rather, to be primarily reflective of the significant beaver activity in the drainage. Forest sediment monitoring operations have typically observed levels of substrate fines in the 30 to 40 percent range in low gradient streams with significant beaver activity (SCNF Watershed Dept Monitoring Files 1993-2009). While displaying a period of reduced stability in association with high runoff flows in the late 1990's and early 2000's, associated monitoring of streambank conditions at Silver Creek sediment monitoring sites has revealed 80 percent or greater streambank stability during fifteen of nineteen surveys (79%). While areas of the lower Silver Creek drainage appear to be more accessible to cattle relative to areas of the Upper Silver Creek Unit, monitoring has revealed streambank stabilities to be similar between the two areas.

Livestock trailing activities associated with Camas Creek grazing operations utilize existing road crossing locations. Crossings are hardened with parallel concrete pillars at the two lowermost sites above the confluence of Silver Creek and partially hardened at the crossing below Castle Creek. All upper crossings

have been determined to be in locations not supporting substrate compositions considered suitable for salmonid spawning. While exposure times at stream crossings are minimized by active livestock driving, there will be some generation of turbidity in association with stream crossing activities. 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.

In summary, while elevated stream sediment levels have periodically occurred at locations within the Camas Creek Allotment in response to high flow events, contributing impacts on stream sediment from grazing activities under the proposed action are considered to be insignificant, and are not expected to be, in and of themselves, generating any additional measureable increases in sediment levels. Because of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams, we believe any livestock related impacts to sediment would be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. The proposed action is expected to maintain the condition of the Sediment Focus Indicator.

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

7.1.4 WIDTH: DEPTH RATIO

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

While currently well within the range of values identified in the Natural Condition Database, the general trend of width:depth ratios within the Camas Creek Allotment has been a slight increase in observed ratios over time. These variations do not mirror general streambank stability trends of allotment streams, however, which have shown improvements in recent years, and the implied trend may in fact be a function of measurement variation by different observers over the course of the sampling period. Considering both observed width:depth ratios and 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 Camas Creek allotment which can be meaningfully measured, detected or evaluated. Additionally, the proposed action includes measures, including employment of riders to keep livestock away from critical stream reaches, which should result in livestock having even less potential impact on streambanks and width:depth ratios than has occurred in the past.

Strategies and Conservation Measures of the proposed action, while designed primarily to avoid livestock presence within stream channels during critical spawning periods; additionally serve to minimize potential livestock impacts to channel morphology of action area streams. Measures including alternating rotations of Upper and Lower Silver Creek Units, the short residence time within the West Fork Unit, rapid movement of livestock through trailing areas, salting and fencing, and use of range riders to keep livestock in upland areas will all contribute to minimizing near stream livestock activity and the potential for direct streambank impacts which could affect channel morphology. The existing Meyers Creek exclosure fence will additionally continue to preclude livestock access to critical reaches of Camas Creek and West Fork Camas Creek while stream channel in this area continue to recover from effects of both past management actions and recent high streamflow events.

All livestock trailing activities associated with Camas Creek grazing operations utilize existing road crossing locations, with exposure times at stream crossings minimized by active livestock driving. Trailing operations are therefore not expected to result in any impacts to width:depth ratios which could be meaningfully measured, detected or evaluated.

In summary, it is concluded that direct and indirect effects of the proposed livestock grazing action on channel morphology of allotment area streams are insignificant, and are not expected to have any meaningfully measureable or discernable influence on stream channel width: depth ratios within the action area. The Grazing Strategies and Conservation Measures associated with the proposed grazing action are consideration to be effective in minimizing potential streambank impacts and in reducing sediment impacts to stream channel within the action area. We recognize there could be localized impacts to both streambanks and stream sediment levels when livestock occasionally step on streambanks and introduce minor 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 expected to maintain the condition of the Width:Depth Focus Indicator.

Proposed ongoing MIM and annual indicator monitoring will be effective in identifying both the occurrence and causal mechanisms of any significant changes in width:depth ratios of action area streams which would initiate responsive modification of grazing management strategies for the allotment under the adaptive management strategy.

7.1.5 STREAMBANK CONDITION

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

While both mainstem and tributary streams within the Camas Creek Allotment have displayed periodic streambank impacts from excessive runoff events within the watershed during the monitoring period of record, these impacts do not appear to have been related to or exacerbated by livestock grazing. Trends across the majority of monitoring sites have displayed recovery to levels consistently exceeding 80 percent streambank stability in recent years, and this upward trend does not appear to have been retarded or otherwise limited by livestock grazing within any units of the allotment. While streambank stabilities of some allotment streams remain below the priority watershed RMO of 90 percent, the only streams not displaying improving trends since 2004 are those Camas Creek and West Fork Camas Creek sites within the Meyers Cover exclosure, where livestock has been excluded by exclosure fences since the late 1980's.

Strategies and Conservation Measures of the proposed action, while designed primarily to 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 alternating rotations of Upper and Lower Silver Creek Units, the short residence time within the West Fork Unit, rapid movement of livestock through trailing areas, salting and fencing, and use of range riders to keep livestock in upland areas will all contribute to minimizing near stream livestock activity and the potential for direct streambank impacts on action area streams. The existing Meyers Creek exclosure fence will additionally continue to preclude livestock access to critical reaches of Camas Creek and West Fork Camas Creek while streambanks in this area continue to recover effects of both past management actions and recent high streamflow events.

All livestock trailing activities associated with Camas Creek grazing operations utilize existing road crossing locations, with exposure times at stream crossings minimized by active livestock driving. Trailing operations are therefore not expected to result in any impacts to streambank conditions which could be meaningfully measured, detected or evaluated.

In summary, it is concluded that direct and indirect effects of the proposed livestock grazing actions on streambank conditions within Camas Creek Allotment streams 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 impacts to streambanks 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. The proposed action is therefore expected to maintain the condition of the Streambank Focus Indicator.

Future field data collections in association with ongoing sediment monitoring operations will continue to identify trends of streambank conditions within both grazed and livestock-excluded portions of the Camas Creek Allotment. These monitoring operations, supplemented by ongoing MIM and annual indicator monitoring, will be effective in identifying both the occurrence and causal mechanisms of any significant change in streambank conditions which would initiate responsive modification of grazing management strategies for the allotment under the adaptive management strategy.

7.1.6 RIPARIAN CONSERVATION AREAS

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

Current livestock grazing activities within the action area are not considered to be negatively impacting riparian conditions. Impacts of past livestock grazing strategies within the action area are not continuing to occur and overall riparian conditions are considered to be vastly improved. Approximately three quarters of a mile of mainstem Camas Creek and one half mile of West Fork Camas Creek are excluded from cattle access, and upper reaches of Camas Creek are utilized primarily for trailing purposes, with fencing and riders keeping cattle off channel areas. Observed variability in GES monitoring trends are largely attributable to high flow event impacts. Upward trend has been recorded in the Silver Creek and Castle Creek drainages, while supplemental streambank stability and bank alteration data, along with identified beaver dam failures in Furnace Creek, suggest that observed recent downward trend in that stream are attributable to factors other than livestock grazing.

In summary, 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.

Future field data collections will continue to identify trends of riparian vegetation conditions within the Camas 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.

New future state and private activities that are reasonably certain to occur within the action area include screening and providing fish passage around stream diversions. These activities would occur in the Castle Creek, Arrastra Creek and Duck Creek drainages. Short-term (less than two hour) localized less than one-quarter mile) increases in stream turbidities would be expected during installation of screening devices on these streams. Operation and maintenance of these facilities would not be expected to produce any measureable impacts to aquatic or riparian habitats. Completion of these projects may lead to increased populations of ESA-listed fish in affected streams over time. These activities would be expected to have long-term beneficial effects to bull trout, steelhead and Chinook salmon populations in Castle Creek and steelhead populations in Arrastra Creek in response to elimination of potential diversion entrainment and improved upstream passage capabilities in those streams.

As such, the previously described effects of grazing in these streams can be expected to continue into the future.

7.3 SUMMARY OF EFFECTS

The effects analysis identifies a non-discountable potential for direct impact of livestock on spawning Chinook salmon, 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. 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 3 summarizes effects of proposed Camas Creek 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 CAMAS CREEK 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-FR/FA-FR	YES	YES	YES	YES	YES	YES
	Growth and Survival (including incubation survival)	FA-FR/FA-FR	YES	YES	YES	YES	YES	YES
	Life History Diversity and Isolation	FA/FA	NO	NO	NO	NO	NO	NO
	Persistence and Genetic Integrity	FA/FA	YES	YES	YES	YES	YES	YES
Water Quality	Temperature	FA-FR/FA-FR	YES	YES	YES	NO	NO	NO

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

1/ Upper Camas Subwatershed / Lower Camas Subwatershed

8 EFFECTS DETERMINATION

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

8.1 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

The effects analysis concluded that the proposed action may have direct effects on Chinook salmon or Chinook salmon redds 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 Chinook salmon redds within action area streams. Therefore, the proposed action results in a “MAY AFFECT, LIKELY TO ADVERSELY AFFECT” determination for Chinook salmon.

The effects analysis concluded that the proposed action may have 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 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 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. 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 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 effects analysis concluded that the proposed action may have some effects on proposed bull trout critical habitat. However, these effects are expected to be insignificant or discountable. Therefore, the proposed action results in a “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 CAMAS CREEK ALLOTMENT GRAZING ACTIVITIES

	Chinook Salmon		**Steelhead**		**Bull Trout**	
	Species	Designated Critical Habitat	Species	Designated Critical Habitat	Species	Proposed Critical Habitat
Determination[1]	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
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APPENDIX B
WATERSHED BASELINES WITH
MATRICES OF DIAGNOSTIC PATHWAYS AND INDICATORS

1 LOWER CAMAS CREEK WATERSHED BASELINE

1.1 MATRIX OF DIAGNOSTIC PATHWAYS AND INDICATORS

Agency: USDA Forest Service, Salmon-Challis National Forest	**HU Code and Name: 1706020603, Lower Camas 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
Anadromous Species Population: Middle Fork Salmon River	**Anadromous Species Subpopulation:** Camas Creek
Bull Trout Core Area: Middle Fork Salmon River	**Local Population:** Camas Creek, Silver Creek
Management Actions: Ongoing	**Updated:** 11/15/2009

Subpopulation Characteristics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Subpopulation Size	**FA** $_{BT}$ **FR** $_{CK,\ SH}$	**Bull Trout -Bull Trout are distributed throughout the Lower Camas Creek Watershed. All life stages are present. Fluvial individuals are present, and apparently increasing in recent years. There are lower densities within the Silver Creek Sub-watershed, possible related to water temperature.** **Chinook Salmon - Annual counts of Chinook salmon redds were conducted in Camas Creek between 1997 and 2009 The Idaho Department of Fish and Game also conducts aerial redd counts from Hammer Creek to Castle Creek. Trend counts in Camas Creek for Chinook salmon indicate that this population is on a fluctuating downward trend.** **By definition, independent populations must have the potential to persist over a 100-year time frame. Many authors have addressed the issue of minimum population size necessary to reduce genetic and demographic risks (i.e. to be viable over a reasonable time period. McElhany et al. (2000) reviewed this work. They suggest that to reduce the genetic effects of small population sizes that for salmon and steelhead, a breeding population of approximately 417 (based on the methods of Franklin 1980 and Soule 1980) to 4170 (based on the methods of Lande 1995) is necessary. Waples and Wainwright (1998) note that larger population sizes are likely necessary if demographic factors are considered as well. Because of these considerations, all the populations we defined had estimated historical run**

		sizes and/or habitat potential (determined by historical records or professional judgment) sufficient to support a minimum of 500 spawners, since populations with lower abundance would likely be at high risk (Allendorf et al. 1997). Generally speaking, by the redd count estimates and the minimum number of spawners needed to sustain the population, the size of this population is functioning at risk. **Steelhead - Little is known of the status of steelhead populations within the Upper Camas Watershed. It is assumed that subpopulation characteristics are similar to those described for Chinook salmon.**
Growth and Survival	**FA $_{BT}$** **FR $_{CK,\ ST}$**	**Bull Trout - The local population should be able to recover from short-term disturbance. Connectivity below Rams Creek is excellent and would allow for recruitment** **Chinook Salmon and Steelhead - While rearing habitat is relatively undisturbed and in good condition, elevated sediment levels within mainstem Camas Creek spawning reaches may currently be limiting egg-to-fry emergence success of both Chinook salmon and steelhead.**
Life History Diversity and Isolation	**FA $_{BT,\ CK,\ ST}$**	**Bull Trout - The migratory form of bull trout is present in limited but increasing numbers. Resident population is strong. The subpopulation exists in close proximity to other spawning and rearing groups. Migratory corridors and rearing habitat are in good to excellent condition for the species.** **Chinook Salmon - Adult Chinook salmon migrate into the Middle Fork Salmon River, and into Camas Creek from April through July and spawn witnin the subwatershed from August through September in mainstem Camas Creek and West Fork Camas Creek. Chinook salmon utilization of Silver Creek is unknown but considered unlikely due to elevated summer water temperature regimes. Fry begin to emerge in February and March. Juveniles may rear in the watershed for as little as several months, migrating downstream in the fall following emergence, or as much as a year or more, migrating downstream from March through June.** **Steelhead - Steelhead spawn and rear in Camas Creek and its tributaries. However, because of difficult access due to heavy snow accumulation in the watershed, no spawning surveys have occurred to document exact spawning locations or numbers of redds in Camas Creek. However, surveys have revealed juvenile rainbow trout/steelhead presence throughout Camas Creek. Based on steelhead elsewhere in the region, Camas Creek steelhead probably spawn during April and May, with emergence occurring from July to mid-August.**
Persistence and Genetic Integrity	**FA $_{BT,\ CK,\ ST}$**	**Bull Trout - Connectivity is high within Camas Creek and all the tributaries within the Lower Camas Creek Watershed, as well as the Middle Fork Salmon River.** **Chinook Salmon - NOAA TRT has rated the genetic integrity of this Chinook population as very high. This population is essentially free from hatchery influence (Thurow, 2000) This genetically pure wild population of Chinook has historically been very strong. This population has likely evolved over thousands of years to select individuals capable of making the 800 mile journey to Camas Creek and surviving numerous other threats. This population is important to the overall ESU because it possesses genetic traits that increase the entire ESU's likelihood of survival in the wild.** **Steelhead - Steelhead in Camas Creek are essentially free of hatchery influence. NOAA Fisheries has**

		rated Camas Creek as a high priority watershed. It scored a 17 out of a possible 18 on the steelhead population prioritization scale. It supports one of only five populations within the ESU that are important strongholds of genetically unique steelhead.
Water Quality		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Temperature (7day average. Maximum, ^{o}C)	**FA** $_{1\ BT,\ CK,\ ST}$ **FR** $_{2\ BT,\ CK,\ ST}$	**HOBO temperature data was collected sporadically in the Lower Camas watershed from 1993 through 2009. Data indicates that water temperatures, particularly within the Silver Creek drainage, are often exceeding PACFISH and INFISH spawning criteria during the hottest part of the summer (mid-July through mid-August).**
Sediment	**FR** $_{BT,\ CK,\ ST}$	**SO Watershed personnel utilize McNeil core sampling methodologies to monitor substrate depth fines annually on selected streams. Analysis of core sampling data correlates measured levels of depth fines in spawning habitats to predicted egg incubation success values determined by Stowell, et al (1983).** **Sediment data was collected between 1993 and 2009 at two mainstem Camas Creek sites, two Silver Creek sites and one site on the West Fork of Camas Creek. Mean fines a depth ranged from 17 to 40 percent in mainstem Camas Creek, from 7.5 to 39.1 percent in Silver Creek, and from 10.8 to 37.9 percent in the West Fork of Camas Creek. Of the 51 sediment surveys between 1993 and 2009, 49 percent were considered functioning at unacceptable risk, 35 percent were considered functioning at risk, and 17 percent were considered functioning appropriately. The highest sediment levels were recorded in Camas Creek below West Fork Camas Creek. The lowest levels were recorded in West Fork Camas Creek near the mouth.**
Chemical Contaminants/Nutrients	**FA** $_{BT,\ CK,\ ST}$	**There are no 303d streams listed for chemical contaminants within the Lower Camas Creek Watershed. Baseline water chemistry was normal for all measured parameters including DO and pH**
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	**FR**$_{BT,\ CK,\ ST}$	**An earthen dam on private land along Silver Creek above the confluence with Rams Creek, has been breeched in recent years and is no longer a migration barrier on mainstem Silver Creek. Another dam on private land on lower Rams Creek, however, remains a migration barrier to all fish in that stream. Because the Ram Creek dam continues to prevent upstream and downstream migration at all flows, this indicator is considered functioning at risk.**
Habitat Elements		

Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Substrate Embeddedness		Refer to Sediment
Large Woody Debris	FA BT, CK, ST FR West Fork Cams Creek	Data is limited for large woody debris in the Lower Camas Creek Watershed. Professional judgment is large woody debris is generally functioning appropriately, except in the West Fork of Camas Creek.
Large Pools or Pool Frequency and Quality	FA BT, CK, ST	Silver Creek and the West Fork of Camas Creek have been surveyed for pool frequency and quality. Most of the surveyed reaches meet or exceed values identified in the Natural Condition Database for these habitat indicators.
Off-channel Habitat	FA BT, CK, ST	Forest Service Road 108 constricts the stream in some areas, and past mining in the headwaters around the Rabbits Foot Mine reduces off-channel habitat. There has been no loss of channel habitat in all other areas within the Lower Camas Creek Watershed, however.
Refugia	FA BT, CK, ST FR Silver Creek	An earthen dam on Rams Creek is a barrier to the migration of listed species into the Upper Silver Creek. In general, there, is a reduction of salmonid living space due to the presence of the dam. High temperatures also limit coldwater within the lower reaches of Silver Creek
Channel Condition & Dynamics		
Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Average Wetted Width/Maximum Depth Ratio	FR BT, CK, ST	The average wetted width / maximum depth ratio varies considerably depending on the location in the watershed. Monitoring sites in Silver Creek and the West Fork of Camas Creek do not meet PACFISH standards for width:depth ratios, but fall within the range of the Natural Condition Database. Grazing on the Morgan Creek Allotment continues to aggravate the downcut reaches, thus not allowing for significant recovery
Streambank Condition	FR BT, CK, ST	Streambank stability varies considerably throughout the Lower Camas Creek Watershed. Grazing on the Morgan Creek Allotment continues to aggravate the downcut reaches, thus not allowing for any recovery. For the rest of the Watershed, data is very limited within the Lower Camas Creek Watershed. Reaches surveyed have had the most disturbance but MIM data indicates bank stability meets long-term objectives in all sites except the Meyers Cove grazing exclosure, which is still recovering from peak flow impacts. Much of the watershed is undisturbed. Professional judgment is the watershed is functioning at risk for streambank condition.
Floodplain Connectivity	FA BT, CK, ST	Most stream reaches within the Lower Camas Creek Watershed can access their floodplains. Some reaches of Silver Creek cannot access the floodplain because of encroachment by the Silver Creek Road and downcutting. However, most of Silver Creek does have access to the floodplain. Some trails and campgrounds are also located within the floodplain, however these locations are not armored. Non-permitted road construction in the floodplain near Duck Creek likely reduces floodplain linkage in this area. Thirty-two percent of the roads in Lower Camas Creek are within the RHCA (SCNF Hydrology File, 2009). Less than one quarter of floodplains are significantly impacted. It

		appears that this indicator is functioning appropriately.
Flow/Hydrology		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Change in Peak/base Flows	**FA** BT, CK, ST **FR** Silver Creek	**There are three diversions in Upper Silver creek that likely disrupt peak/base flows. All other areas of the Lower Camas Creek Watershed have had no great disturbance or diversions to disrupt flow.**
Increase in Drainage Network	**FA** BT, CK, ST	**There has been no human-caused increase of the drainage network within the Lower Camas Creek Watershed.**
Watershed Condition		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Road Density and Location	**FR** BT, CK, ST	**The Lower Camas watershed has 81.9 miles of roads with a road density of 052 miles of roads per square mile (SCNF Hydrology Files, 2009). Thirty-two percent of these roads are within the RHCA. The roads in this watershed are located in volcanic soils which are highly erosive.**
Disturbance History	**FA** BT, CK, ST **FR** Silver Creek	**The ECA for the Lower Camas Creek Watershed is 18.6 percent (SCNF Hydrology Files, 2009), which is considered a Moderate Risk Rating. This rating is caused by timber harvest within the Upper Silver Creek Sub-watershed and historic fires. An ECA rating of greater than 15 percent is considered functioning at risk. Additionally, Eastern brook trout have been reported above the private inholdings on Silver Creek, being most likely introduced by private landowners. Their presence has likely disrupted the natural populations.**
Riparian Conservation Areas	**FA** BT, CK, ST **FR** Silver Creek	**Much of the Lower Camas Creek Watershed is in Wilderness and most of the watershed is functioning appropriately for riparian reserves. Some RHCA's in Lower Camas Creek have been affected by grazing and roads, however. A sub-division of summer homes in the Silver Creek drainage likely encroaches on RHCA's. The Lost Springs, Everett-Decora, and Meyer's Cove campgrounds, as well as some Outfitter and Guiding camps are also located within the RHCA.**
Disturbance Regime	**FA** BT, CK, ST	**The natural processes of the Lower Camas Creek Watershed are stable.**
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	**FA** BT, CK, ST	**Much of the watershed is within wilderness and habitat is in excellent condition. Main Camas Creek was historically overgrazed and continues to lack historic cottonwood component. Significant reaches of streambanks are less stable then desired. The watershed supports good spawning habitat, however, and Chinook salmon and other salmonids continue to spawn here. Tributaries to the Main Camas Creek are very steep. Historic human-caused disturbance includes historic mineral**

		exploration in Duck and Hammer Creek drainages, and grazing along the main Camas Creek. Currently the Main Camas Creek is within a grazing exclosure.

$_{BT}$ Bull Trout, $_{CK}$ Chinook, $_{SH}$ Steelhead, $_{1}$ Rearing, $_{2}$ Spawning/Incubation, $_{TRIB}$ Tributaries

2 UPPER CAMAS CREEK WATERSHED BASELINE

2.1 MATRIX OF DIAGNOSTIC PATHWAYS AND INDICATORS

Agency: USDA Forest Service, Salmon-Challis National Forest	**HU Code and Name: 1706020602, Upper Camas 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
Anadromous Species Population: Middle Fork Salmon River	**Anadromous Species Subpopulation:** Camas Creek
Bull Trout Core Area: Middle Fork Salmon River	**Local Population:** Camas Creek, Silver Creek
Management Actions: Ongoing	**Updated:** 11/15/2009

Subpopulation Characteristics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Subpopulation Size	**FA $_{BT}$** **FR $_{CK, SH}$**	Bull Trout –The migratory form is present in mainstem Camas Creek and Castle It is unknown if it is present in Furnace Creek. There are no limiting factors. Habitat is in good condition. Livestock grazing is not likely having significant effect on the local population size. Chinook Salmon - Annual counts of Chinook salmon redds were conducted in Camas Creek between 1997 and 2009. The Idaho Department of Fish and Game also conducts aerial redd counts from Hammer Creek to Castle Creek. Trend counts in Camas Creek for Chinook salmon indicate that this population is on a fluctuating downward trend. By definition, independent populations must have the potential to persist over a 100-year time frame. Many authors have addressed the issue of minimum population size necessary to reduce genetic and demographic

		risks (i.e. to be viable over a reasonable time period. McElhany et al. (2000) reviewed this work. They suggest that to reduce the genetic effects of small population sizes that for salmon and steelhead, a breeding population of approximately 417 (based on the methods of Franklin 1980 and Soule 1980) to 4170 (based on the methods of Lande 1995) is necessary. Waples and Wainwright (1998) note that larger population sizes are likely necessary if demographic factors are considered as well. Because of these considerations, all the populations we defined had estimated historical run sizes and/or habitat potential (determined by historical records or professional judgment) sufficient to support a minimum of 500 spawners, since populations with lower abundance would likely be at high risk (Allendorf et al. 1997). Generally speaking, by the redd count estimates and the minimum number of spawners needed to sustain the population, the size of this population is functioning at risk. Steelhead - Little is known of the status of steelhead populations within the Upper Camas Watershed. It is assumed that subpopulation characteristics are similar to those described for Chinook salmon.
Growth and Survival	**FA** $_{BT}$ **FR** $_{CK,\ ST}$	Bull Trout - Habitat is relatively undisturbed and in good condition. There are no reasons that local populations are not resilient. Livestock grazing in the Camas Creek Allotment is not likely having significant effect on growth and survival. Chinook Salmon and Steelhead - While rearing habitat is relatively undisturbed and in good condition, elevated sediment levels within mainstem Camas Creek spawning reaches may currently be limiting egg-to-fry emergence success of both Chinook salmon and steelhead.
Life History Diversity and Isolation	**FA** $_{BT,\ CK,\ ST}$	Bull Trout - There is excellent connectivity throughout the upper portions of the Camas Creek drainage. The migratory form of bull trout is present in the Main Camas Creek in low numbers. Neighboring local populations are healthy. Chinook Salmon - Adult Chinook salmon migrate into the Middle Fork Salmon River, and into Camas Creek from April through July and spawn from late July through September in mainstem Camas Creek and perhaps some of the larger tributaries. Fry begin to emerge in February and March. Juveniles may rear in the watershed for as little as several months, migrating downstream the fall following emergence, or as much as a year or more migrating downstream from March through June. Steelhead - Steelhead spawn and rear in Camas Creek and its tributaries. However, because of difficult access due to heavy snow accumulation in the watershed, no spawning surveys have occurred to document exact spawning locations or numbers of redds in Camas Creek. However, surveys have revealed juvenile rainbow trout/steelhead presence throughout Camas Creek. Based on steelhead elsewhere in the region, Camas Creek steelhead probably spawn during April and May, with emergence occurring from July to mid-August.
Persistence and Genetic Integrity	**FA** $_{BT}$	Bull Trout - Connectivity is high among multiple local populations with low risk of extinction. There are no brook trout in this subwatershed.
Water Quality		

Pathways Indicators	Baseline	Discussion of Baseline – Current Condition
Temperature (7day average. Maximum, ^{o}C)	**FA** $_{2\ BT,\ CK,\ ST}$ **FR** $_{1\ BT,\ CK,\ ST}$	Water temperatures exceed preference for juvenile rearing for short periods in the Upper Camas Creek Watershed during the hottest days of July and August.
Sediment	**FR** $_{BT,\ CK,\ ST}$	SO Watershed personnel utilize McNeil core sampling methodologies to monitor substrate depth fines annually on selected streams. Analysis of core sampling data correlates measured levels of depth fines in spawning habitats to predicted egg incubation success values determined by Stowell, et al (1983). Sediment data was collected between 1993 and 2004 on Upper Camas Creek and Lower Castle Creek. Mean fines at depth ranged from 14.7 to 33.1 percent in mainstem Camas Creek, and from 14.9 to 24.5 percent in Castle Creek. Of the 17 sediment surveys in the Upper Camas Watershed between 1993 and 2004, 71 percent found sediment levels to be functioning appropriately, 18 percent were functioning at risk, and 12 percent were functioning at unacceptable risk.
Chemical Contaminants/Nutrients	**FA** $_{BT,\ CK,\ ST}$	There are no 303d listings for chemicals within the Upper Camas Watershed. Baseline water chemistry monitoring showed normal levels for all parameters including pH and DO.
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	**FA** $_{BT,\ CK,\ ST}$	There are no human-caused migration barriers within the Upper Camas Watershed.
Habitat Elements		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Substrate Embeddedness		Refer to Sediment
Large Woody Debris	**FA** $_{BT,\ CK,\ ST}$	According to R1/R4 survey reaches LWD within Upper Camas Creek streams is about half that identified within the R4 Natural Conditions Database. However, survey notes indicate areas with very high LWD densities, particularly in reaches of Camas Creek between Castle and Sheep Creeks, and White Goat and Fly Creeks. Professional judgment is that LWD is functioning appropriately within the Upper Camas Creek Watershed.
Large Pools	**FA** $_{BT,\ CK,\ ST}$	See pool frequency and quality
Off-channel Habitat	**FA** $_{BT,\ CK,\ ST}$	There are 10.5 miles of roads in the RHCA(SCNF Hydrology Files, 2009). This indicator is likely functioning appropriately. There has been no loss of off-channel habitat due to roads within the Upper Camas Creek Watershed. All ongoing federal actions will maintain the existing off channel habitat for all listed species.
Refugia	**FA** $_{BT,\ CK,\ ST}$	A large portion of the sub-watershed is within Wilderness. Roads and trails are not likely to limit coldwater refugia in this watershed due to the low density. There is relative little habitat disturbance, and all habitats are

		connected. Habitats capable of supporting strong and significant populations are protected and are well distributed and connected.
Channel Condition & Dynamics		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Average Wetted Width/Maximum Depth Ratio	**FA** $_{BT, CK, ST}$	Much of the watershed has been undisturbed. Limited data indicate that width/depth ratios fall within Natural Condition Database ranges. Professional judgment is the watershed is functioning appropriately for average wetted width/maximum depth ratio. .
Streambank Condition	**FR** $_{BT, CK, ST}$	Data is limited within the Upper Camas Creek Watershed. Reaches surveyed have had the most disturbance. Much of the watershed however is located within wilderness and generally undisturbed. Data indicate that tributary streams of the watershed are functioning appropriately for streambank condition, while a significant portion of mainstem Camas Creek is functioning at risk.
Floodplain Connectivity	**FA** $_{BT, CK, ST}$	All streams within the Upper Camas Creek Watershed have access to their floodplains. There are some minor segments of trail that lie within the floodplain, but overall connectivity is good. This watershed has 10.5 miles of riparian roads with a density of 0.17 roads per square mile (SCNF Hydrology Files, 2009). Livestock grazing is not affecting floodplain connectivity.
Flow/Hydrology		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Change in Peak/base Flows	**FA** $_{BT, CK}$ **FR** $_{SH}$	The Upper Camas Watershed has an ECA of 21.8%, which is considered a Moderate risk rating (SCNF Hydrology Files, 2009). Scour events and debris torrents in the South Fork of Camas Creek are possible due to historical fire activity.
Increase in Drainage Network	**FA** $_{BT, CK, ST}$	There has not been any increase in drainage network due to human caused activities within the Upper Camas Creek Watershed.
Watershed Condition		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Road Density and Location	**FA** $_{BT, CK, ST}$	Overall road density within the Upper Camas Creek Watershed is low at 0.17(SCNF Hydrology Files, 2009). This gives the watershed a Low Risk determination. The highest sub-watershed road density is within the White Goat Sub-watershed and has a road density of 0.29 miles per square mile, which is also considered a Low Risk determination. A jeep trail goes from Meyers Cove to White Goat Creek. This road does not confine the Creek, but crosses Camas Creek and one tributary stream at seven locations. Two of these crossings have been hardened to preclude Chinook salmon spawning in gravels otherwise softened by repeated vehicle travel. One hardened crossing is currently in need of maintenance. Other crossings are located in areas identified as unsuitable for spawning due to large substrate size.

		Functioning Appropriately – All Species Functioning At Risk – All Species (Unmaintained road ford in spawning areas.)
Disturbance History	**FR** $_{BT, CK, ST}$	Much of the watershed is undisturbed. The overall ECA for the Upper Camas Watershed is 21.8 percent, which is considered a Moderate Risk (SCNF Hydrology Files, 2009). The South Fork of Camas Creek Sub-watershed has had a historical fire of 4,379 acres, however, with an ECA of 36 percent. Scour events and debris torrents in the South Fork of Camas Creek are possible. Based upon the matrix standard requiring no areas of disturbance concentration for functioning appropriately determination, this indicator is considered to be functioning at risk.
Riparian Conservation Areas	**FA** $_{BT, CK, ST}$	The riparian habitat conservation areas within the Upper Camas Creek Watershed are virtually untouched. These conservation areas provide adequate shade, large woody debris, habitat protection, and connectivity. Much of the watershed is within wilderness. Historic cottonwood component is lacking.
Disturbance Regime	**FA** $_{BT, CK, ST}$	Natural processes appear to be stable. The risk of catastrophic fire is not known. Frequency of droughts and floods is not known. Historic hydrograph information is not known. This indicator appears to be functioning appropriately.
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	**FA** $_{BT, CK, ST}$	Habitat quality is good and connectivity is excellent. Migratory bull trout are present in low numbers and appears to be increasing. Local populations are resilient. Much of the watershed is within Wilderness with some grazing allowed in Upper Camas Creek including Camas Meadows in the Eddy Creek Allotment. Past disturbance from overgrazing within Camas Meadows and Camas Creek below Castle Creek may have altered channel equilibrium and decreased historic cottonwood components. Current grazing practices are a great improvement over past practices. Some recovery of willow is occurring within the Meyers Cove exclosure. Private land use within Castle Creek includes a summer home and an outfitter and guide business. All activities within the Upper Camas Creek Watershed should not have any effect on the integration of species or habitat conditions..

$_{BT}$ Bull Trout, $_{CK}$ Chinook, $_{SH}$ Steelhead, $_{1}$ Rearing, $_{2}$ Spawning/Incubation, $_{TRIB}$ Tributaries, $_{CAMAS}$ Camas Creek

3 UPPER PANTHER CREEK WATERSHED BASELINE

3.1 MATRIX OF DIAGNOSTIC PATHWAYS AND INDICATORS

Agency: USDA Forest Service, Salmon-Challis National Forest	**HU Code and Name: 1706020309, Upper Panther Creek**

Unit: Salmon-Cobalt Ranger District	**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: Chinook – Upper Salmon River Steelhead – Salmon River	**Anadromous Species Subpopulation:** Chinook – Panther Creek Steelhead – Panther Creek
Bull Trout Core Area: Middle Salmon-Panther	**Local Population:** Panther Creek (Iron Lake)
Management Actions: Camas Creek Allotment	**Updated:** 12/29/2009

Subpopulation Characteristics		
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 within Panther Creek reaches of the watershed and in Moyer Creek up to the South Fork. Small numbers of Chinook have spawned in Panther Creek as farr upstream as the 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 300-400mm bull trout that inhabit Panther Creek above Big Deer Creek. Upper Panther Creek tributaries are well connected.
Persistence and Genetic Integrity	**FA**	Connectivity remains high among local bull trout populations. Brook trout predominate in lower reaches of the watershed, bull trout predominate in upper reaches. Chinook salmon 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** $_{BT, CK, ST}$	SO Watershed personnel utilize McNeil core sampling methodologies to monitor substrate depth fines annually on selected streams. Analysis of core sampling data correlates measured levels of depth fines in spawning habitats to predicted egg incubation success values determined by Stowell, et al (1983). Most

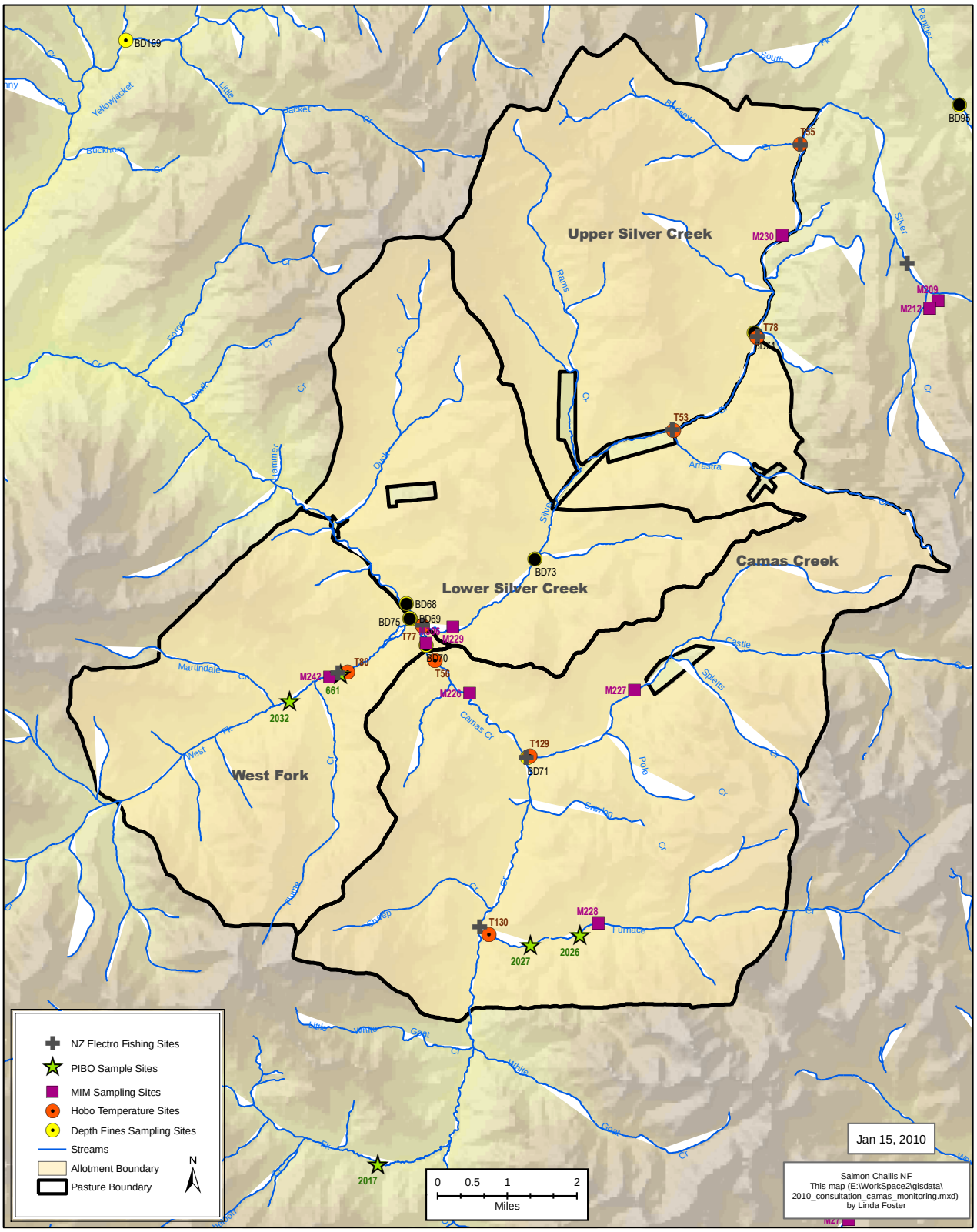
		monitoring locations within the watershed reflect Appropriately Functioning conditions.
Chemical Contaminants/Nutrients	**FA** BT, CK, ST	There are no 303d listings for chemicals within the Upper Panther Creek Watershed. All ongoing federal actions will maintain the existing chemical contamination/ nutrients for all listed species. .
Habitat Access		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Physical Barriers	**FA** BT, CK, ST	There are no human-caused migration barriers within the Upper Panther Creek Watershed.
Habitat Elements		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Substrate Embeddedness		Refer to Sediment
Large Woody Debris	**FR** BT, CK, ST	Because of the small size of streams within this watershed, little LWD is transported downstream from forested reaches. LWD is scarcer in meadow reaches compared to forested areas.
Large Pools/ Pool Frequency and Quality	**FA** BT, CK, ST	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** BT, CK, ST	All subwatersheds have valley bottom roads which affect both quality and quantity of side-channel and backwater habitat.
Refugia	**FA** BT, CK, ST	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** BT, CK, ST	All surveyed reaches meet Natural Condition Database for width/depth ratio.
Streambank Condition	**FR** BT, CK, ST	Most surveyed reaches exceed 80% bank stability
Floodplain Connectivity	**FA** BT, CK, ST	Except for short reaches of Porphyry 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** $_{BT, CK, ST}$	Diversions are present in the watershed but changes in peak/base flows do not appear to be significant.
Increase in Drainage Network	**FA** $_{BT, CK, ST}$	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** $_{BT, CK, ST}$	Overall road density is 1.27 miles per square mile. Density within the Moyer Creek drainage is 0.45 miles per square mile. Density within the Cabin Creek drainage is 1.69 miles per square mile. Density within the Moyer Creek drainage is 0.45 miles per square mile.
Disturbance History	**FA** $_{BT, CK, ST}$	Overall ECA is 11.8%. Risk of Cumulative Watershed Effects is Low
Riparian Conservation Areas	**FR** $_{BT, CK, ST}$	Riparian conditions along mainstem Panther Creek have improved. Reduced grazing pressure on mainstem Panther Creek has shifted pressure to a few tributaries including Fourth of July Creek, lower Porphyry Creek, Sawmill Gulch and McGowan Gulch.
Disturbance Regime	**FA** $_{BT, CK, ST}$	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. The hydrograph is predictable.
Integration of Species and Habitat Conditions		
Pathways Indicators	**Baseline**	**Discussion of Baseline – Current Condition**
Habitat Quality and Connectivity	**FA** $_{BT, CK, ST}$	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 channelization 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 concern in this watershed.

$_{BT}$ Bull Trout, $_{CK}$ Chinook, $_{SH}$ Steelhead, $_{1}$ Rearing, $_{2}$ Spawning/Incubation, $_{TRIB}$ Tributaries, $_{CAMAS}$ Camas Creek

APPENDIX C
MONITORING DATA AND SUMMARIES

FIGURE 7 – CAMAS CREEK ALLOTMENT MONITORING SITES



Appendix C Table 1 – Camas Creek Allotment Fish Presence

Steelhead Present		Bull Trout Present		Chinook Present	
Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH
Camas Creek Allotment	32.54	Camas Creek Allotment	33.35	Camas Creek Allotment	21.01
Arrastra Creek	1.53	Birdseye Creek	1.98	Camas Creek	9.71
Birdseye Creek	0.46	Camas Creek	9.71	Castle Creek	2.35
Camas Creek	9.71	Castle Creek	4.76	Martindale Creek	0.51
Castle Creek	4.76	Furnace Creek	4.79	Silver Creek	3.15
Furnace Creek	4.79	Martindale Creek	1.79	West Fork Camas Creek	5.30
Silver Creek	5.98	Sheep Creek	1.89	Grand Total	21.01
West Fork Camas Creek	5.31	Silver Creek	3.12		
Grand Total	32.54	West Fork Camas Creek	5.31		
		Grand Total	33.35		

Appendix C Table 2 – Camas Creek Units Fish Presence

Steelhead Present		Bull Trout Present		Chinook Present	
	Sum of LENGTH		Sum of LENGTH		Sum of LENGTH
Camas Creek Unit	18.57	Camas Creek Unit	18.07	Camas Creek Unit	8.97
Arrastra Creek	1.53	Camas Creek	6.63	Camas Creek	6.63
Camas Creek	6.63	Castle Creek	4.76	Castle Creek	2.35
Castle Creek	4.76	Furnace Creek	4.79	Lower Silver Creek Unit	5.38
Furnace Creek	4.79	Sheep Creek	1.89	Camas Creek	2.31
Silver Creek	0.86	Lower Silver Creek Unit	5.35	Silver Creek	3.07
Lower Silver Creek Unit	5.38	Camas Creek	2.31	West Fork Unit	6.66
Camas Creek	2.31	Silver Creek	3.04	Camas Creek	0.77
Silver Creek	3.07	Upper Silver Creek Unit	1.99	Martindale Creek	0.51
Upper Silver Creek Unit	2.43	Birdseye Creek	1.98	Silver Creek	0.07
Birdseye Creek	0.46	Silver Creek	0.00	West Fork Camas Creek	5.30
Silver Creek	1.97	West Fork Unit	7.95	Grand Total	21.01
West Fork Unit	6.15	Camas Creek	0.77		
Camas Creek	0.77	Martindale Creek	1.79		

Silver Creek	0.07	Silver Creek	0.07
West Fork Camas Creek	5.31	West Fork Camas Creek	5.31
Grand Total	32.54	Grand Total	33.35

Appendix C Table 3 – Camas Creek Allotment Fish Spawning

Steelhead Spawning		Bull Trout Spawning		Chinook Spawning	
	Sum of LENGTH		Sum of LENGTH		Sum of LENGTH
Camas Creek Allotment	32.54	Camas Creek Allotment	33.35	Camas Creek Allotment	16.84
Arrastra Creek	1.53	Birdseye Creek	1.98	Camas Creek	9.71
Birdseye Creek	0.46	Camas Creek	9.71	Castle Creek	2.35
Camas Creek	9.71	Castle Creek	4.76	Silver Creek	0.10
Castle Creek	4.76	Furnace Creek	4.79	West Fork Camas Creek	4.68
Furnace Creek	4.79	Martindale Creek	1.79	Grand Total	16.84
Silver Creek	5.98	Sheep Creek	1.89		
West Fork Camas Creek	5.31	Silver Creek	3.12		
Grand Total	32.54	West Fork Camas Creek	5.31		
		Grand Total	33.35		

Appendix C Table 4 – Camas Creek Units Fish Spawning

Steelhead Spawning		Bull Trout Spawning		Chinook Spawning	
	Sum of LENGTH		Sum of LENGTH		Sum of LENGTH
Camas Creek Unit	18.57	Camas Creek Unit	18.07	Camas Creek Unit	8.97
Arrastra Creek	1.53	Camas Creek	6.63	Camas Creek	6.63
Camas Creek	6.63	Castle Creek	4.76	Castle Creek	2.35
Castle Creek	4.76	Furnace Creek	4.79	Lower Silver Creek Unit	2.35
Furnace Creek	4.79	Sheep Creek	1.89	Camas Creek	2.31
Silver Creek	0.86	Lower Silver Creek Unit	5.35	Silver Creek	0.04
Lower Silver Creek Unit	5.38	Camas Creek	2.31	West Fork Unit	5.51
Camas Creek	2.31	Silver Creek	3.04	Camas Creek	0.77
Silver Creek	3.07	Upper Silver Creek Unit	1.99	Silver Creek	0.06

Upper Silver Creek Unit	2.43	Birdseye Creek	1.98	West Fork Camas Creek	4.68
Birdseye Creek	0.46	Silver Creek	0.00	Grand Total	16.84
Silver Creek	1.97	West Fork Unit	7.95		
West Fork Unit	6.15	Camas Creek	0.77		
Camas Creek	0.77	Martindale Creek	1.79		
Silver Creek	0.07	Silver Creek	0.07		
West Fork Camas Creek	5.31	West Fork Camas Creek	5.31		
Grand Total	32.54	Grand Total	33.35		

Appendix C Table 5 – Camas Creek Allotment Fish Designated Critical Habitat (DCH) and Potential

Steelhead DCH		Bull Trout Potential DCH		Chinook DCH	
	Sum of LENGTH		Sum of LENGTH		Sum of LENGTH
Camas Creek Allotment	26.91	Arrastra Creek	2.20	Camas Creek Allotment	23.20
Camas Creek	9.71	Birdseye Creek	4.26	Camas Creek	9.71
Castle Creek	3.12	Camas Creek	9.71	Castle Creek	2.35
Duck Creek	0.03	Castle Creek	4.76	Furnace Creek	0.34
Flume Creek	0.97	Furnace Creek	4.79	Martindale Creek	0.51
Furnace Creek	3.53	Martindale Creek	1.90	Silver Creek	5.00
Martindale Creek	1.04	Sheep Creek	1.89	West Fork Camas Creek	5.30
Silver Creek	3.21	Silver Creek	6.09	Grand Total	23.20
West Fork Camas Creek	5.31	West Fork Camas Creek	5.30		
Grand Total	26.91	Grand Total	40.91		

Appendix C Table 6 – Camas Creek Units Designated Critical Habitat (DCH) and Potential

Steelhead DCH		Bull Trout Potential DCH		Chinook DCH	
	Sum of LENGTH		Sum of LENGTH		Sum of LENGTH
Camas Creek Unit	13.28	Camas Creek	21.14	Camas Creek Unit	9.97
Camas Creek	6.63	Arrastra Creek	2.20	Camas Creek	6.63
Castle Creek	3.12	Camas Creek	6.63	Castle Creek	2.35
Furnace Creek	3.53	Castle Creek	4.76	Furnace Creek	0.34

Lower Silver Creek Unit	**5.40**
Camas Creek	**2.31**
Duck Creek	**0.03**
Silver Creek	**3.06**
Upper Silver Creek Unit	**0.07**
Silver Creek	**0.07**
West Fork Unit	**8.16**
Camas Creek	**0.77**
Flume Creek	**0.97**
Martindale Creek	**1.04**
Silver Creek	**0.07**
West Fork Camas Creek	**5.31**
Grand Total	**26.91**

Furnace Creek	**4.79**
Sheep Creek	**1.89**
Silver Creek	**0.87**
Lower Silver Creek	**5.38**
Camas Creek	**2.31**
Silver Creek	**3.07**
Upper Silver Creek	**6.34**
Birdseye Creek	**4.26**
Silver Creek	**2.08**
West Fork	**8.05**
Camas Creek	**0.77**
Martindale Creek	**1.90**
Silver Creek	**0.07**
West Fork Camas Creek	**5.30**
Grand Total	**40.91**

Silver Creek	**0.66**
Lower Silver Creek Unit	**5.38**
Camas Creek	**2.31**
Silver Creek	**3.06**
Upper Silver Creek Unit	**1.20**
Silver Creek	**1.20**
West Fork Unit	**6.66**
Camas Creek	**0.77**
Martindale Creek	**0.51**
Silver Creek	**0.07**
West Fork Camas Creek	**5.30**
Grand Total	**23.20**

APPENDIX C TABLE 7 – FISH SAMPLING

Stream	Site-ID	Sample Date	Sampling Method
Arrastra	E35	2007/2009	Electroshock
Birdseye	E36	2002/2009	Snorkel /Electroshock
Camas		2002	Snorkel
Castle (lwr)	E92	2009	Electroshock
Castle (upr)		2007	Electroshock
Duck		2000	Snorkel
Flume		2002	Snorkel
Furnace	E93	1994/2009	Snorkel/Electroshock

Lost Spring		2002	Snorkel
Martindale		2002	Snorkel
Rams		2002/2007	Snorkel/Electroshock[1]
Sheep		2002	Snorkel
Silver (lwr)	-----	2009	Electroshock
Silver (upr)	E54	2009	Electroshock
Spletts		2007	Electroshock
WF Camas	E60	2002/2009	Snorkel/Electroshock

APPENDIX C TABLE 8 – WATER TEMPERATURE 2009

Unit	Site ID	Monitoring Period	Maximum Daily Temperature	Maximum of 7 day Moving Maximum	Mean Temperature 7/1 to 9/30
Lower Silver	---- Silver	7/1 – 10/7	21.3	20.2	13.8
Upper Silver	T78 Silver	7/1 – 10/7	17.5	16.4	10.6
	T53 Arrastra	7/1 – 10/7	13.7	13.2	9.0
	T55 Birdseye	7/1 – 10/7	12.2	11.5	8.4
West Fork	T80 West Fork	7/29 – 10/7	17.7	16.2	Insufficient Data
Camas	T56 Camas	7/1 – 10/7	17.9	16.7	10.8
	T129 Castle	7/29 – 10/7	17.5	16.3	Insufficient Data
	T130 Furnace	7/29 – 10/7	14.5	13.6	Insufficient Data
Panther Creek (Trailing)	Panther Cr blw Opal Cr	7/1 – 10/20	14.1	13.3	8.8

APPENDIX C TABLE 9 - PRE-2009 CAMAS CREEK WATER TEMPERATURE MONITORING SUMMARY

Stream Station	Year		Max Daily Max	Date	Max 7 Day Max	Max Daily Mean	Date
			Deg C			Deg C	
Camas Creek above Duck Creek	1996	Spring					
		Fall					
	1999	Spring			Max 17.8 wk1 Aug Temp drop wk3 Sep Drop below 10 wk4 Sep		
		Fall	17.8	21-Aug			
	2000	Spring			Max 20.0 wk2 Aug Insufficient data to identify temp drop timing		
		Fall					
	2001	Spring	20.2	2-Jul	Max 20.0 wk2 Jul Temp drop wk4 Sep Drop below 10 wk4 Sep/wk1 Oct	15.7	6-Jul
		Fall	20.6	18-Aug		15.4	18-Aug
	2002	Spring	21.0	14-Jul	Max 19.4 wk 2 Jul Temp drop wk3 Sep Drop below 10 wk2 Oct	16.4	14-Jul
		Fall	19.0	15-Aug		14.4	15-Aug
	2003	Spring	20.2	11-Jul	Max 20.6 wk4 Jul Temp drop wk1 Sep Drop below 10 wk3/4 Sep?	15.5	12-Jul
		Fall	21.0	16-Aug		16.7	16-Aug
	2005	Spring			Max 18.6 wk4 Aug? Temp drop not well defined Drop below 10 wk2 Oct		
		Fall	19.8	18-Aug		14.4	18-Aug
Camas Creek above Exclosure	1999	Spring					
		Fall	16.1	26-Aug			
	2000	Spring			Max 19.4 wk4 Jul Temp drop wk2 Sep Drop below 10 wk3 Sep		
		Fall					
	2001	Spring	19.4	1-Jul	Max 18.9 wk1 Jul Temp drop wk3 Sep Drop below 10 wk4 Sep	14.6	6-Jul
		Fall	18.7	27-Aug		14.4	18-Aug
	2002	Spring	19.8	14-Jul	Max 18.6 wk2 Jul Temp drop wk3 Sep Drop below 10 wk4 Sep/wk1 Oct	15.3	14-Jul
		Fall	19.9	15-Aug		13.4	15-Aug
	2003	Spring	19.4	11-Jul	Max 18.9 wk4 Jul Temp drop wk1 Sep Drop below 10 after wk3 Sep?	14.5	12-Jul
		Fall	19.4	16-Aug		15.8	16-Aug
	2005	Spring	19.4	13-Jul	Max 16.7 wk3 Aug Temp drop wk2 Sep Final	14.2	13-Jul

		Fall	17.9	21-Aug	drop below 10 wk1 Oct	13.6	21-Aug
Silver Creek below Lost Spring Campground	2000	Spring			Max 26.7 wk1 Aug Temp drop wk4 Aug Drop below 10 after wk2 Sep?		
		Fall					
	2001	Spring			Max 23.8 wk2 Jul Temp drop wk4 Sep Drop below 10 wk4 Sep/wk1 Oct		
		Fall					
	2002	Spring	24.0	14-Jul	Max 22.8 wk2 Jul Temp drop wk2 Sep Drop below 10 wk4 Sep/wk2 Oct	19.4	14-Jul
		Fall	21.3	15-Aug		15.7	15-Aug
	2003	Spring	23.6	11-Jul	Max 23.3 wk4 Jul Temp drop wk1 Sep Drop below 10 after wk2 Sep?	18.0	12-Jul
		Fall	22.5	20-Aug		18.3	16-Aug
Silver Creek near Rabbits Foot Summit	1996	Spring					
		Fall					
	1999	Spring			Max 17.2 wk3 Aug Temp drop wk4 Aug Drop below 10 wk3 Sep		
		Fall					
	2001	Spring			Max 18.9 wk1 Aug Temp drop wk4 Aug Drop below 10 wk3 Sep		
		Fall					
	2002	Spring	21.0	14-Jul	Max 19.4 wk2 Jul Temp drop wk2 Sep Drop below 10 wk4 Sep	16.1	14-Jul
		Fall	17.5	15-Aug		11.9	16-Aug
	2003	Spring	20.6	12-Jul	Max 20.3 wk4 Jul Temp drop wk1 Sep Drop below 10 after wk2 Sep	14.4	12-Jul
		Fall	20.6	16-Aug		15.4	16-Aug
	2005	Spring	19.0	13-Jul	Max 18.1 wk3 Jul Temp drop wk2 Sep Drop below 10 wk3 Sep	13.8	13-Jul
		Fall	17.1	21-Aug		12.8	21-Aug
Silver Creek above Beaver Dams	1996	Spring			Max 18.9 wk1 Aug Temp drop wk4 Sep Drop below 10 wk4 Sep/wk1 Oct		
		Fall					

Appendix C Table 10 - Sediment - Mean Percent Fines <.25" at Depth

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Lower Silver	BD68 Camas	34.9	25.5	32.5	31.5	32.7	30.5	31.4	28.9	27.7	40.0	35.2	39.2	22.1	26.2	39.3		29.5
	BD69 Camas	21.2	25.1	29.8	29.2	17.0	23.5	28.1	29.8	29.1	31.1	32.1	28.8	22.4				
	BD73 Silver	36.6	39.1	27.8	7.5	31.3	26.3	35.9	33.4	30.3	26.0	35.0	30.5		25.2	29.3		39.6
Upper Silver	BD74 Silver								34.2	28.4	27.9	33.3	32.2					36.6
West Fork	BD75 West Fk	19.8	10.8		27.9	26.2	21.4		37.9	28.8	36.1	22.7	22.8					24.3
Camas	BD70 Camas	29.1	19.1	14.7	21.1	12.0	20.1	24.7		33.1	32.8	28.8	27.6					
	BD71 Castle	23.5	24.5							14.9	22.8	14.9	21.6					
Panther Creek (Trailing)	Panther Cr near Silver Cr Road			13.0	24.6	11.1	14.5	13.5	19.7	20.0	24.1	25.5	7.1	7.8				

Appendix C Table 11 - Channel Geometry – Width: Depth Ratio

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Lower Silver	BD68 Camas			62.5	31.1	31.1	53.9	89.6		45.0	43.7	49.4						
	BD69 Camas			19.3	27.6	24.7	32.5	33.6	44.0	19.6	23.3	28.9						
	BD73 Silver			7.2	23.5	11.2	15.0			16.5	20.8	25.6						

Upper Silver	BD74 Silver								21.9	24.0	20.8	29.8						
West Fork	BD75 West Fk				36.7	16.0	21.7		41.2	18.5	21.9	16.1						
Camas	BD70 Camas			24.2	29.4	21.7	20.8	36.2		37.7	28.3							
	BD71 Castle									14.9	11.7	20.7						
Panther Cr (Trailing)	Panther Cr near Silver Cr Rd			10.4	18.7	8.8	23.2	11.5	15.1	11.6	12.3	12.3						

APPENDIX C TABLE 12 - STREAMBANK CONDITION – PERCENT STABLE BANKS

Unit	Site ID	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Lower Silver	BD68 Camas		53.0	94.0	85.5	68.5	72.5	70.0	53.0	73.5	75.5	72.0	91.5	94.5	90.0	89.5		70.0
	BD69 Camas		58.0	95.5	86.0	56.0	38.5	41.0	55.5	54.0	60.0	49.5	72.5	93.0				
	BD73 Silver		80.5	98.5	93.5	59.0	57.5	39.0	73.5	84.5	75.5	88.5	93.5		84.0	97.0		95.5
Upper Silver	BD74 Silver								82.5	92.5	92.0	95.5	82.5					92.0
West Fork	BD75 West Fk		84.5		55.0	48.5	20.5		29.0	22.5	21.5	36.5	89.0					78.5
Camas	BD70 Camas		81.5	93.0	60.5	44.0	34.0	38.5		37.5	55.0	63.0	48.3					80.0
	BD71 Castle		88.5							80.5	73.0	72.0	84.5					
Panther Creek	Panther Cr near Silver			95.0	94.0	80.0	95.5	81.0	92.0	88.5	92.0	94.5	97.0	96.0				

(Trailing)	Cr Road																		

APPENDIX C TABLE 13 - MULTIPLE INDICATORS MONITORING (MIM) DATA

Unit	Site ID	Year	Width:Depth Ratio	Bank Stability (%)	Woody Species Regeneration		Greenline Ecological Status (GES)*	Trend in GES
					Seedling/Young (#/%)	Mature/Dead (#/%)		
Lower Silver	M229 L Silver	1992	n/a	n/a	48/69%	22/31%	39/ES	Base
		1999	n/a	47	89/40%	129/60%	68/LS	Up
		2002	n/a	89	105/55%	87/45%	80/LS	Static
		2007	9.32	83	24/36	42/64	63/LS	Down
Upper Silver	M230 U Silver	1994	n/a	72	158/56	126/44	85/PNC	Base
		2003	n/a	n/a	103/30	237/70	94/PNC	Static
		2009	n/a	n/a	n/a	n/a	PNC	Static
Camas	M226 Camas	1994	n/a	93	278/65	149/35	38/ES	Base
		1998	n/a	89	188/61	122/39	73/LS	Up
		2003	n/a	84	216/62	131/38	53/MS	Down
		2007	34.95	68	21/31	46/69	35/ES	Down
	M227 Castle	1994	n/a	75	133/45	160/55	55/MS	Base
		1999	n/a	79	61/32	127/68	49/MS	Static
		2002	n/a	53	37/40	56/60	46/MS	Static
		2007	15.82	89	19/25	56/75	PNC	Up
	M228 Furnace	1993	n/a	n/a	265/67	129/33	41/MS	Base

		1998	n/a	76	130/70	55/30	54/MS	Up
		2009	15.47	88	17/33	34/67	37/ES	Down
	M306 Camas Exclosure	2002	n/a	52	247/63	145/37	11/VES	Base
		2007	29.4	86	34/74	12/26	43/MS	Up
West Fork	M242 West Fork	1994	n/a	n/a	n/a	n/a	22/ES	Base
		1998	n/a	85	176/74	63/26	41/MS	Up
		2005	n/a	49	166/58	121/42	60/MS	Up
		2009	14.95	86	36/60	24/40	74/LS	Up

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

APPENDIX D

PROTOCOL FOR MAPPING CHINOOK SALMON CRITICAL HABITAT CURRENTLY DESIGNATED

ON THE SALMON-CHALLIS NATIONAL FOREST

This document summarizes the process that will be used by the Salmon-Challis National Forest (SCNF) to map Chinook salmon critical habitat (CSCH) as currently designated by NOAA Fisheries on the SCNF. Critical habitat has been designated for Snake River spring/summer Chinook salmon and includes "river reaches presently or historically accessible…to Snake River spring/summer Chinook salmon" (Federal Register 58(247):68543-68554). However, this designation did not provide a detailed description of the specific areas included in the designation. Such a description is essential when completing site specific consultations to determine if CSCH is present within the action areas. The purpose of this project is to create a GIS layer that delineates the specific areas that are designated as CSCH in this rule. It should be emphasized that this process is not to "designate" CSCH but to portray the SCNF's interpretation 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 National Hydrography Dataset (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 adult? Chinook salmon might move. Based on our review of fish population and stream habitat data from the Salmon River basin, we concluded that Chinook salmon likely do not move more than 0.25 miles up a tributary if the only reason they are in the stream is to seek refugia.

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

a) **Proximity to CSCH:** The tributary must connect to a stream or river currently included as CSCH.

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

c) **Fish-Bearing Streams:** Streams accessible to other salmonids can reasonably be assumed to be accessible to Chinook. Tributaries that contain other salmonids and are not smaller than the lower limit to watershed size shall be considered for inclusion as CSCH for 0.25 miles

upstream from the confluence. Tributaries meeting this criterion, but exhibiting barriers to migration at the confluence shall be considered for exclusion from CSCH.

d) **Non-Fish-Bearing Streams:** Streams inaccessible to other salmonids can reasonably be assumed to be inaccessible to Chinook and shall generally be considered for exclusion from CSCH.

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

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

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

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

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

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APPENDIX E

BULL TROUT CONSTITUENT ELEMENTS OF CRITICAL HABITAT

Primary Constituent Elements for Proposed Bull Trout Critical Habitat and Associated Habitat Indicators PCE # PCE Description Associated Habitat Indicator

PCE #	PCE Description	Associated Habitat Indicators
1	Permanent water having low levels of contaminants such that normal reproduction, growth and survival are not inhibited	sediment, chemical contamination/nutrients, change in peak/base flows
2	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 trou t life history stage and for m, 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
3	Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures	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
4	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions	sediment, substrate embeddedness, large woody debris, pool frequency and quality
5	A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated , a hydrograph that demonstrates the ability to support bull trout populations	change in pea k/base flows, increase in drainage network, disturbance history, disturbance regime
6	Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity	floodplain connectivity, change in peak/base flows, increase in drainage network, riparian conservation areas, chemical contamination/nutrients
7	Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows	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
8	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 hab itat condition indirectly covered by previous seven PCEs)
9	Few or no predatory, interbreeding, or competitive nonnative species present	persistence and genetic integrity, physical barriers

The following rationale supports that the PCEs for proposed bull trout critical habitat are

thoroughly addressed in the current matrix analysis and that the environmental baseline conditions and determination for effects to the species consists of a biological and habitat component addressing in total the PCEs listed in the proposed rule for proposed critical habitat (USDI 2002a).

1. Permanent water having low levels of contaminants such that normal reproduction, growth and survival are not inhibited.

Flow conditions, such as perennial or ephemeral would be analyzed through *changes in peak/base flows*, and addressed in consideration of current base flows. Changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography would be considered. The level of contaminants is addressed directly by the analysis of *chemical contamination/nutrients* and *sediment*. Current listing under 303(d) status should be considered, as well as the causes for that listing. *Sediment* is considered a contaminant especially in spawning and rearing habitat and analysis would apply to this PCE.

2. Water temperatures ranging from 2°to 15°C (36° to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence. This PCE is addressed directly by the analysis of *temperature*. It is addressed indirectly through consideration of *refugia*, which by definition is high quality habitat of appropriate temperature. Availability of refugia is also considered in analysis of *pool frequency and quality* and *large pools*. *Average wetted width/maximum depth ratio in scour pools* is an indication of water volume, which indirectly indicates water temperature, i.e., low ratios indicate deeper water, which in turn indicates possible refugia. This indicator in conjunction with *change in peak/base flows* is an indicator of potential temperature and refugia concerns particularly during low flow periods. *Streambank condition*, *floodplain connectivity* and *riparian conservation areas* address the components of shade and groundwater influence, both of which are important factors of water temperature. Stable streambanks and intact riparian areas, which include part of the floodplain, typically support adequate vegetation to maintain thermal cover to streams during low flow periods.

3. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures. The analysis of *large woody debris*, such as current values and sources available for recruitment, directly addresses this PCE. Large woody debris increases channel complexity and creates pools and undercut banks. *Pool frequency and quality* would also directly address this PCE, showing the number of pools per mile as well as the amount of cover and temperature of water in the pools. *Average wetted width/maximum depth ratio in scour pools in a reach* is an indicator of channel shape and pool quality. Low ratios suggest deeper, 3 higher quality pools. *Large pools,* consisting of a wide range of water depths, velocities, substrates and cover, are typical of high quality habitat and are a key component of channel complexity (USDI 1998e). An analysis of *off-channel habitat* would describe side-channels and other off-channel areas. *Streambank condition* would analyze the stability of the banks, including such features as undercut banks. The analysis of both *riparian conservation areas* and *floodplain connectivity* would directly address this PCE. Floodplain and riparian functions include the maintenance of habitat and channel complexity, the recruitment of large woody debris and the connectivity to off-channel habitats or side channels (USDI 1998e). Complex habitats provide refugia for bull trout and in turn, *refugia* analysis would assess complex stream channels. All of these habitat indicators consider the numerous characteristics of instream bull trout habitat and quantify critical components that are fundamental to creating and maintaining complex instream habitat over time.

4. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions. This PCE is addressed directly by analysis of *sediment* in areas of spawning and incubation and considers directly the size class composition of instream sediments, particularly fine sediments <63 mm. This PCE also is addressed directly by analysis of *substrate embeddedness* in rearing areas, which is a function of sediment size class and bedload transport. Both of these indicators would assess substrate composition and stability in relation to the

various life stages of the bull trout as well as the sediment transportation and deposition. *Large woody debris* and *pool frequency and quality* affect sediment transport and redistribution within a stream and would indirectly assess substrate composition and amounts.

5. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, a hydrograph that demonstrates the ability to support bull trout populations. This PCE is addressed by analysis of *change in peak/base flows*, which considers changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography. Considering *increase in drainage network* and *disturbance history* provides further information. Roads and vegetation management both have effects strongly linked to a stream's hydrograph. *Disturbance regime* ties this information together to consider how a watershed reacts to disturbance and the time required to recover back to pre-disturbance conditions.

6. Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity. This PCE is addressed by analysis of *floodplain connectivity* and *riparian conservation areas*. *Floodplain connectivity* considers hydrologic linkage of off-channel areas with the main channel and overbank flow maintenance of wetland function and riparian vegetation and succession. Floodplain and riparian areas provide hydrologic connectivity for springs, seeps, groundwater upwelling and wetlands and contribute to the maintenance of the water table (USDI 1998e). The analysis of *changes in peak/base flows* would address subsurface water connectivity. *Increase in drainage network* would address potential changes to groundwater sources and subsurface water connectivity. C*hemical contamination/nutrients* would address concerns regarding groundwater water quality.

7. Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows. The biological indicator *life history diversity and isolation* addresses the function of migration and/or subsequent isolation with respect to the population. The biological indicator *persistence and genetic integrity* indirectly reflects the status of migratory corridors. Physical, biological or chemical barriers to migration are addressed directly through water quality habitat indicators, including *temperature*, *chemical contamination/nutrients* and *physical barriers*. The analysis of these indicators would assess if barriers have been created due to impacts such as high temperatures, high concentrations of contaminants or physical barriers. Analysis of *change in peak/base flows* and *average wetted width/maximum depth ratio in scour pools in a reach* would assess whether changes in flow might create a seasonal barrier to migration. An analysis of *refugia,* which considers the habitat's ability to support strong, well distributed, and connected populations for all life stages and forms of bull trout, would also be pertinent to this PCE.

8. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish. An analysis of *floodplain connectivity* and *riparian conservation areas* would assess these contributions to the food base. Floodplain and riparian areas provide habitat to aquatic invertebrates, which in turn provides a forage base to bull trout (USDI 1998e). This PCE is indirectly addressed through the biological indicator of *growth and survival* and *life history diversity and isolation*. Both of these indicators look at habitat quality and subpopulation condition, which provides information on food base. This PCE is a synthesis of the previous PCEs. It is addressed through the analysis of biological and habitat indicators in that, if a bull trout population either exists or could exist in a watershed, then there is an adequate forage base. A healthy habitat provides a forage base for the target species. Any potential impairment to the forage base has been addressed by way of summarizing the biological and habitat indicators.

9. Few or no predatory, interbreeding, or competitive nonnative species present. This PCE is addressed specifically by analysis of the biological *indicator persistence and genetic integrity*. This indicator analyzes the probability of hybridization or displacement by competitive species. An analysis of *physical barriers* may indirectly address non-native species in those areas where a barrier may prevent the invasion of non-native species.

APPENDIX F

CAMAS AND PANTHER CREEK CHINOOK SALMON AND STEELHEAD AERIAL REDD COUNTS 2001-2009

APPENDIX F TABLE 1 – CAMAS CREEK CHINOOK SALMON AERIAL REDD COUNTS 2001-2009 (SOURCE DATA: IDAHO DEPARTMENT OF FISH AND GAME)

Stream	Reach	2001	2002	2003	2004	2005	2006	2007	2008	2009
Camas Creek	Hammer to Castle	94	84	93	19	20	13	No Count	7	12

APPENDIX F TABLE 2 – PANTHER CREEK CHINOOK SALMON AERIAL REDD COUNTS 2001-2009 (SOURCE DATA: IDAHO DEPARTMENT OF FISH AND GAME)

Stream	Reach	2001 1/	2002	2003	2004 2/	2005 2/	2006 3/	2007	2008 4/	2009 4/
Panther Creek	See Comments	10	No Count0	No Count	1	7	15	No Count	4	11

1/ Deep Cr to fourth of July Cr 2/ Moyer Cr to fourth of July Cr 3/ Blackbird Cr to Moyer Cr and Moyer Cr to fourth of July Cr (no Redds observed by Moyer) 2/ Blackbird Cr to Moyer Cr

APPENDIX F TABLE 3 – CAMAS CREEK STEELHEAD AERIAL REDD COUNTS 1987-1998 (SOURCE DATA: IDAHO DEPARTMENT OF FISH AND GAME)

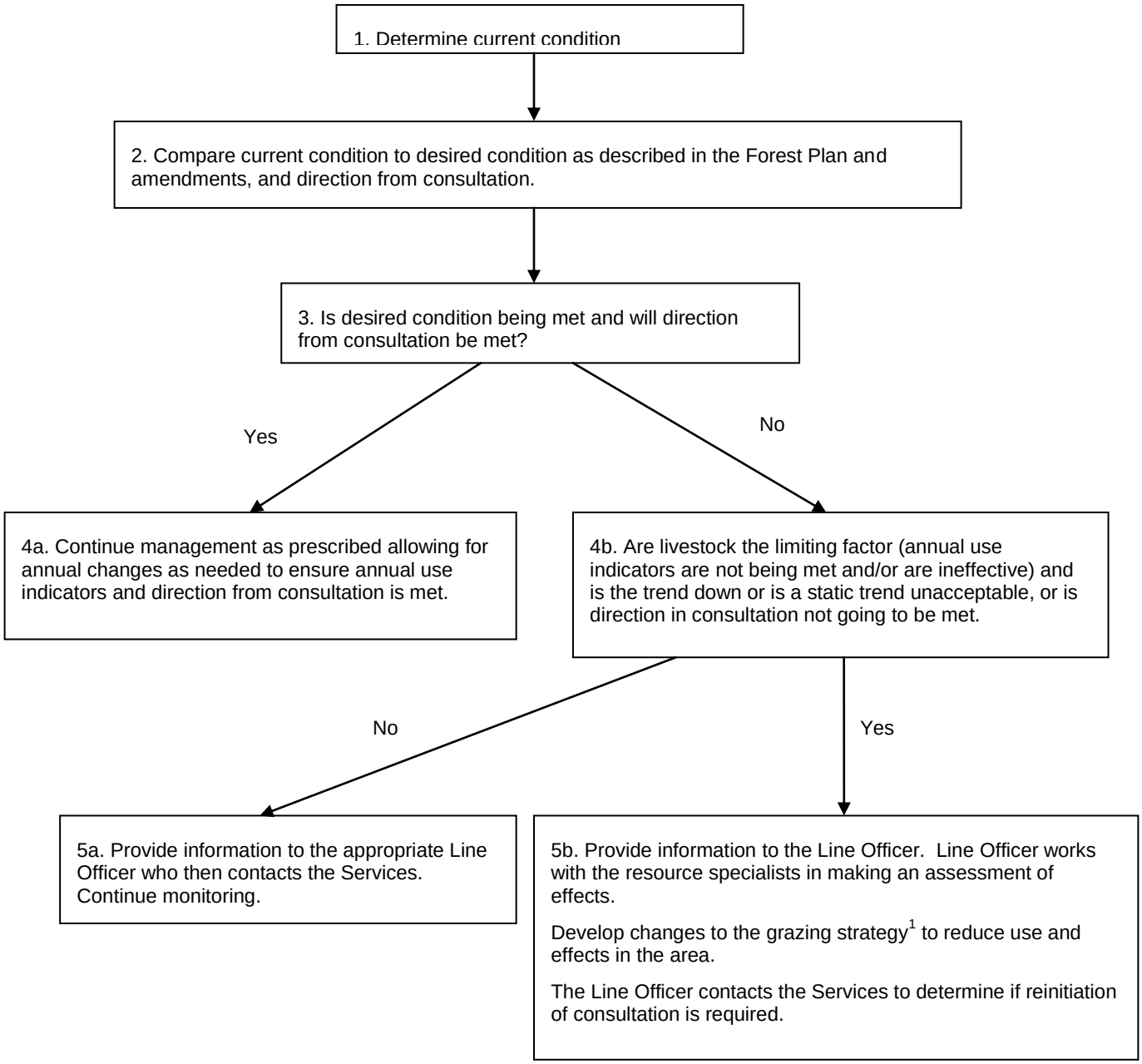
Stream	Reach	1987	1990	1991	1992	1993	1994	1995	1996	1997	1998
Camas Creek	Unspecified	27	55	26	3	No Count	12	10	6	No Count	1

APPENDIX F TABLE 4 – WEST FORK CAMAS CREEK STEELHEAD AERIAL REDD COUNTS 1987-1998 (SOURCE DATA: IDAHO DEPARTMENT OF FISH AND GAME)

Stream	Reach	1987	1990	1991	1992	1993	1994	1995	1996	1997	1998
Camas Creek	Unspecified	No Count	6	No Count	No Count	No Count	No Count	No Count	No Count	No Count	No Count

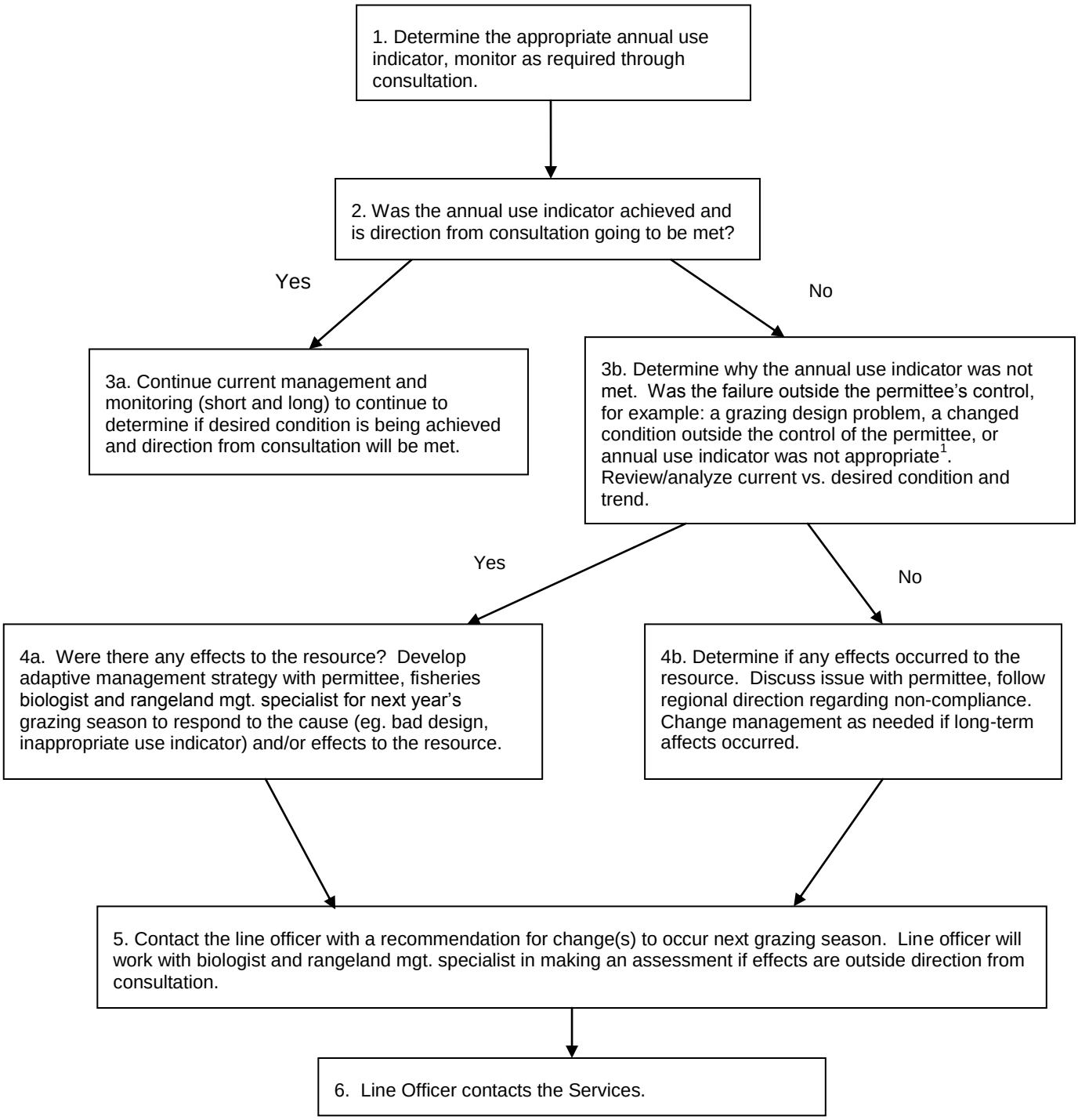
APPENDIX G
ADAPTIVE MANAGEMENT DIAGRAMS

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 end-point 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.