

Aquatic Species Biological Assessment for the Carmen Creek Cattle & Horse Allotment

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

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Signature

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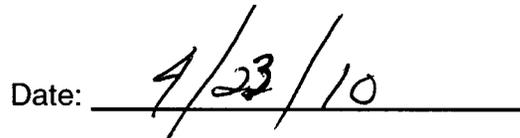
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1 INTRODUCTION

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

2 BACKGROUND INFORMATION

The Carmen Creek Allotment grazing activities are conducted within one 5th field hydrologic unit code, the Carmen Creek - Salmon River (HUC 1706020305).

The following is a general description of the Carmen Creek Allotment. The Carmen Creek Allotment is located approximately 10 miles northeast of Salmon, Idaho. In the Carmen Creek – Salmon River 5th field HUC the Carmen Creek Allotment is entirely within the Carmen Creek drainage. Within the Carmen Creek Allotment boundary there are no private or State lands.

Natural Physical Characteristics

Hydrology

Carmen Creek drainage: Carmen Creek and Freeman Creek are the major perennial streams within this drainage.

Streams in this drainage are generally very high gradient in the upper reaches with a marked change to lower gradients in the lower valley bottoms. As quantified across all stream reaches in this drainage approximately 25% have a gradient of <4%, approximately 25% have a gradient ranging from 4-10% and approximately 50% have stream gradients in excess of 10%. Topography is very steep in this drainage and is reflected in the stream gradients.

Land Description

Carmen Creek drainage: Carmen Creek originates high in the mountains, dropping as much as 6000 feet in elevation toward the Salmon River. Freeman Creek is a major perennial tributary stream to Carmen Creek. Most sources are found in high mountain springs which form intermittent stream channels that descend through densely forested slopes and open sagebrush/bunchgrass canyons to form the perennial stream. Almost the entire valley bottom is privately owned for both Carmen Creek and Freeman Creek.

Soils and Geology

Carmen Creek drainage: The upper portions of this drainage, within the Carmen Creek Allotment, are dominated by fairly stable quartzite.

Vegetative Characteristics (see Figure 6)

Riparian Vegetation

Carmen Creek drainage: Carmen Creek and Freeman Creek, within the allotment boundary are dominated by woody vegetation; with a mixture of aspen and conifers in the lower elevations and conifers in the higher elevations. Sedges dominate only in the very highest wet meadows where the streams arise. This vegetation is very healthy, with lots of regeneration apparent.

Upland Vegetation

The majority of this allotment is dominated by a forested overstory community.

Carmen Creek drainage: Upland vegetation is dominated by coniferous forests with deciduous hardwoods interspersed along the riparian areas. Highly productive mixed conifer stands at low to middle elevations consist mainly of ponderosa pine, Douglas-fir, grand fir and lodgepole pine. At higher elevations, the moderately productive conifer species are Engelmann spruce, subalpine fir and lodgepole pine. Understory vegetation in the forested areas consists of various shrubs, forbs and grasses. Drier areas support grassland vegetation on sites where trees are scattered or absent. These lower elevation lands consist of a sagebrush/grass complex, Condition is felt to be predominately good, with a static to upward trend.

Human Uses

Recreational values in the Carmen Creek drainage are predominantly tied to unconfined, dispersed use. Big game hunting and associated camping along with trail riding and off highway vehicle riding are the most significant recreational activities within the drainage. Use occurs primarily in the fall, coinciding with hunting seasons.

Impacts from recreational use at this time are most evident in and immediately adjacent to the riparian areas, and on a few, unmentioned "two-track" roads in the drainage. Education of the recreating public through personal contact should be emphasized.

Carmen Creek drainage: The human influences within this drainage are associated with existing roads, mining, private land, logging, firewood gathering and recreation. Access is limited in the Carmen Creek and Freeman Creek drainages and is essentially tied to existing logging roads and trails.

3 PROPOSED ACTION

3.1 PROJECT AREA

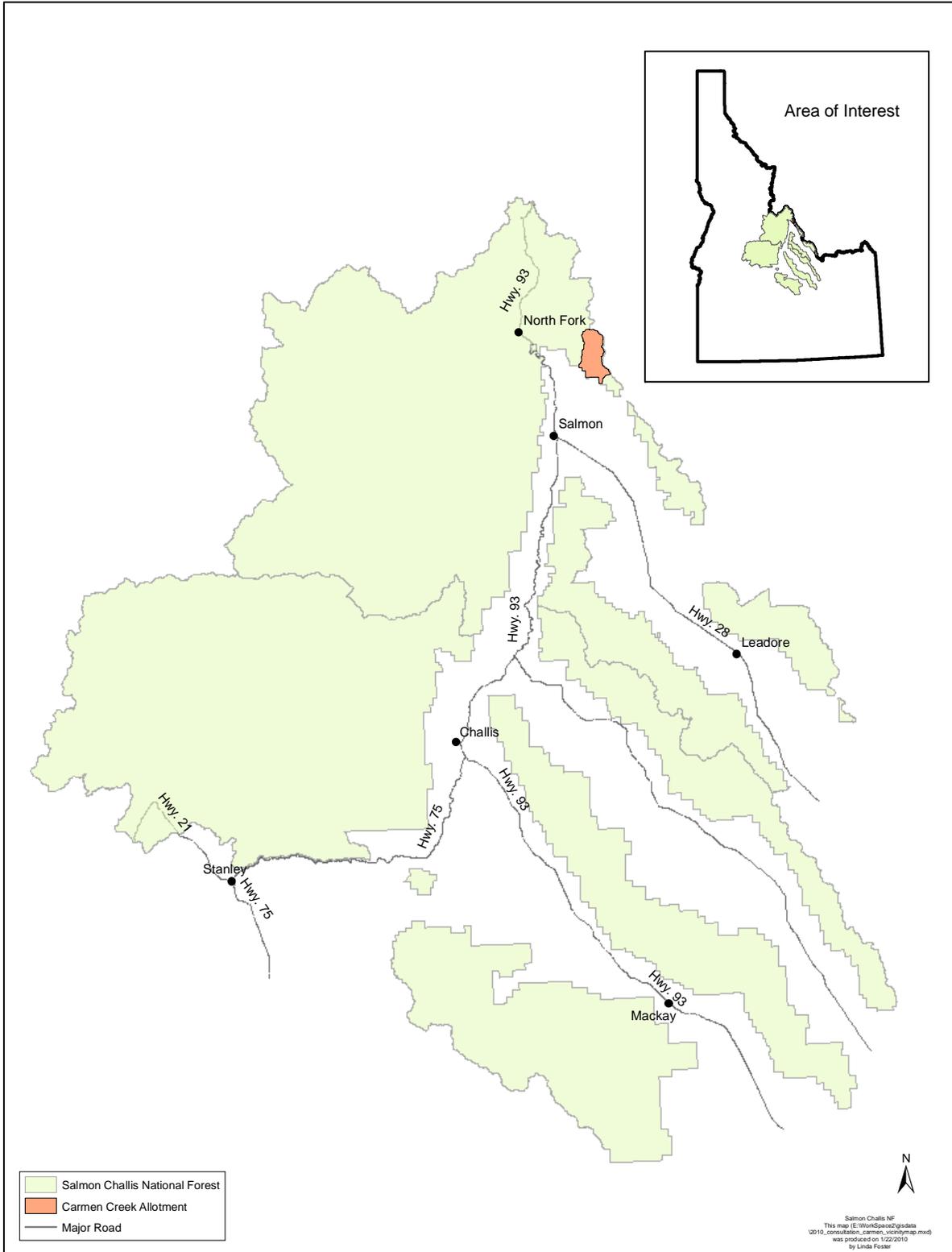
The Carmen Creek Allotment is located approximately 10 air miles northeast of Salmon, Idaho on National Forest System lands within the Carmen Creek drainage (Figure 1). This allotment contains 14,870 acres of National Forest System lands. The proposed project area is located

within the Carmen Creek - Salmon River (HUC 1706020305) 5th field HUCs of the Middle-Salmon Panther 4th field HUC (17060203).

The allotment is divided into 2 units on National Forest System lands: Carmen Creek Face and Carmen Creek Units.

This allotment contains ESA fishery habitat in Carmen Creek within the Carmen Creek Face Unit and the Carmen Creek Unit. (See Tables 12 – 13).

Figure 1 - Carmen Creek Allotment Vicinity Map



3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The Carmen Creek Cattle and Horse Allotment is currently permitted for 55 cow/calf pairs (195 Head Months) from 6/16 – 9/30. The last seven years, the permittee has only used the allotment from 7/01 to 9/1. The permit number is 20021 and expires on 12/31/2012.

3.2.2 GRAZING SYSTEM

The allotment is divided into 4 units: Carmen Creek Face Unit, Carmen Creek Unit, Davis Canyon RNA Unit and the Boundary Unit. The Davis Canyon RNA Unit and the Boundary Unit are not currently used and are not being proposed for use in this biological assessment. This biological assessment will only analyze livestock grazing activities in the Carmen Creek Face Unit and the Carmen Creek Unit. The following rotations will be used on this allotment every year.

Table 1- Unit Rotations (see figure 2 for Unit locations)

Year 1
Carmen Creek Face Unit
Carmen Creek Unit

Carmen Creek Face Unit:

- Bull Trout: Livestock will be out of the unit before August 15th every year.
- Trailing: No trailing impacts.

Carmen Creek Unit:

- Bull Trout: Livestock will be in the unit after the August 15th up to 7 weeks every year. The last seven years, livestock have been in the unit up to 4 weeks after the August 15th.
- Trailing: No trailing impacts

Entry:

Livestock are trailed onto the allotment from the BLM Badger Springs allotment into the Carmen Creek Face Unit. The BLM Badger Springs Allotment and Carmen Creek Face unit are used concurrently. The permittee does not push livestock onto the Carmen Creek Allotment until the first of July.

Unit Movements:

Livestock start on the Carmen Creek Face Unit every year. Then, livestock are trailed to the Carmen Creek Unit around the first of August every year. Livestock are trailed up the Carmen

Creek road (FS RD #60069) past a gate and cattle guard which prevent livestock from drifting back to the Carmen Creek Face Unit. Duration of each move is approximately one day.

Exit:

Livestock are trailed from the Carmen Creek Unit down the Carmen Creek Road (FS RD #60069) to the BLM Badger Springs allotment. Duration of each move is approximately one day.

Total Removal from NFS Lands:

All livestock will be removed from the allotment by 09/30.

3.2.3 CONSERVATION MEASURES

The following measures will be implemented as part of the Carmen Creek Allotment's annual operating instructions (AOI) to avoid and reduce potential impacts to ESA listed fish:

1. 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.
2. 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.
3. 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.
4. Permittees will continue to distribute livestock away from streams and associated riparian areas (ride) at least once every two weeks, reducing potential impacts on spawning areas and designated critical habitat.
5. Fences and water developments have been placed to reduce livestock use on streams and their associated riparian areas. This will continue to reduce impacts on spawning areas and designated critical habitat.

3.2.4 CHANGES FROM EXISTING MANAGEMENT

- The monitoring attribute of browse use will be added to sites that are dominated by woody browse species. Greenline stubble will continue to be monitored at these sites.

3.2.5 RESOURCE OBJECTIVES AND STANDARDS

Resource Objectives and Effectiveness Monitoring: The allotment is being managed to achieve the following resource conditions in riparian areas. Resource objectives are the Forest's description of the desired land, plant, and water resources condition within riparian areas in the allotment. Some resource objectives are Riparian Management Objectives (RMOs) from PACFISH and its corresponding Biological Opinions (U.S Department of Commerce, National Marine Fisheries Service, 1998). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon and Challis Forest Plans in 1995.

Effectiveness monitoring for resource objectives will be monitored every 3-5 years at Designated Monitoring Areas (DMAs) using the Multiple Indicator Monitoring (MIM) technical reference or other best available science as it becomes available. DMAs are areas

representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. They should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream (MIM, Technical Manual). Results from monitoring will be available at (<http://www.fs.fed.us/r4/sc/projects/range/index.shtml>).

Resource Objectives:

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

Resource Standards (PACFISH):

- GM-1 - Modify grazing practices (e.g., accessibility of riparian area to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives and avoiding adverse effects on listed anadromous fish (PACFISH).
- GM-2 – Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met.

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

3.2.6 ANNUAL GRAZING USE INDICATORS

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

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

- Livestock grazing in the uplands and riparian areas will be limited to 50% use on key herbaceous species within key areas of the allotment during the grazing season.
- When the relevant resource objectives are being met (section 3.2.5) annual use indicators, within riparian areas will be 50% browse on multi-stemmed species, 30% browse on single-stemmed species, and 4" residual stubble height.
- When the relevant resource objectives (see section 3.2.5) are not being met annual endpoint indicators, allowable use, will be 30% browse on multi-stemmed species, 20% browse on single-stemmed species, and 6" residual stubble height.
- In priority watersheds, when bank stability is 90% or greater the bank alteration **annual use indicator** will be 20%
- In priority watersheds, when bank stability is 70-89% the bank alteration **annual use indicator** will be 10-20%
- In priority watersheds, when bank stability is less than 70% the bank alteration **annual use indicator** will be 10%
- In non-priority watersheds, when bank stability is 80% or greater the bank alteration **annual use indicator** will be 20%
- In non-priority watersheds, when bank stability is 60-79% the bank alteration **annual use indicator** will be 10-20%
- In non-priority watersheds, when bank stability is less than 60% the bank alteration **annual use indicator** will be 10%

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

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

Table 2 - Annual Use Indicators

Key Area Locations	Unit – Creek ²	Monitoring Attribute ¹	Annual Use Indicator	Key Species	Trigger
MIM	Carmen Creek Unit – Carmen Cr.	Browse use	50%	Willow	45%
			30%	Alder	25%
		Greenline stubble	4 in.	Hydric spp.	5 in.
		Bank Alteration	20%	N/A	15%
Upland Sites	All Units	Utilization	50%	Upland grass species	45%
Riparian Areas	All Units	Utilization by Key Species	50%	Riparian grass species	45%

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

²Carmen Creek Face Unit is extremely steep terrain and totally inaccessible by livestock. No riparian monitoring will occur. The Forest will use upland annual use indicators to determine use levels and moves.

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, as displayed in Figure 2, will be maintained in accordance with the term grazing permit. For example; 1) fences will be maintained to function as designed (ie. to keep livestock in or out of an area, 2) water troughs will be maintained to keep water within the trough (ie. no holes in the trough) and to have a functioning float system so water does not continuously over flow the trough.

Potential Future Improvements:

At this time there are no identified potential future improvements associated with this allotment that would benefit ESA listed fish.

3.3 GRAZING MONITORING

Two types of monitoring will be used, implementation and effectiveness monitoring. Both qualitative and quantitative monitoring methods will be used in accordance with the following:

1. Implementation monitoring: The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be periodically monitored while livestock are in each grazing unit to evaluate the status of the standards and to determine when livestock need to be moved from the unit. The specific triggers for moving livestock from the unit will be based on the time needed to move the livestock from the unit and may vary between units and years. The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be monitored utilizing MIM protocols or other best available science at DMAs within each unit at the end of the grazing season to ensure that the standards have been met.
2. Effectiveness monitoring: The condition of resource objectives will be evaluated in the following manner: greenline successional status, bank stability, width:depth ratio, water temperature, and woody recruitment will be monitored every three to five years to evaluate resource conditions. Monitoring results will be available at (<http://www.fs.fed.us/r4/sc/projects/range/index.shtml>)

3.4 INTERDEPENDENT ACTIONS

Interdependent actions are actions that have “no independent utility apart from the action under consideration” (50 CFR§402.02). The Forest has not identified any interdependent actions associated with the proposed action.

3.5 INTERRELATED ACTIONS

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

3.6 ADAPTIVE MANAGEMENT

The adaptive management strategy described below and depicted in Appendix F diagrams 1.0 (Long-term) and 2.0 (Annual) is intended for allotments requiring consultation. It will be used to ensure: 1) sites at desired condition remain in desired condition; 2) sites not in desired condition have an upward trend or an acceptable static trend to be agreed upon with the Services and the Forest Service; and 3) direction from consultation with the Services is met. The overall strategy consists of a long-term adaptive management strategy and an annual adaptive management strategy. The long-term strategy describes how adaptive management will be used to ensure the three objectives previously stated are achieved and to maintain consistency with Forest Plan level direction. The annual adaptive management strategy describes how adjustments will be made within the grazing season to ensure annual use indicators and other direction from consultation is met. Both strategies describe when and how regulatory agencies will be contacted in the event direction from consultation is not going to be met.

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, indirect or cumulative affects to listed species or designated/proposed critical habitat. This project’s ESA Action Area is defined as the entire Carmen Creek Allotment (see Figure 2). There are no Priority Watersheds within the ESA Action Area.

The ESA fish bearing streams within the ESA Action Area include: Carmen Creek (see Tables 12 - 13).

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

Figure 2 - Carmen Creek Allotment ESA Action Area Map

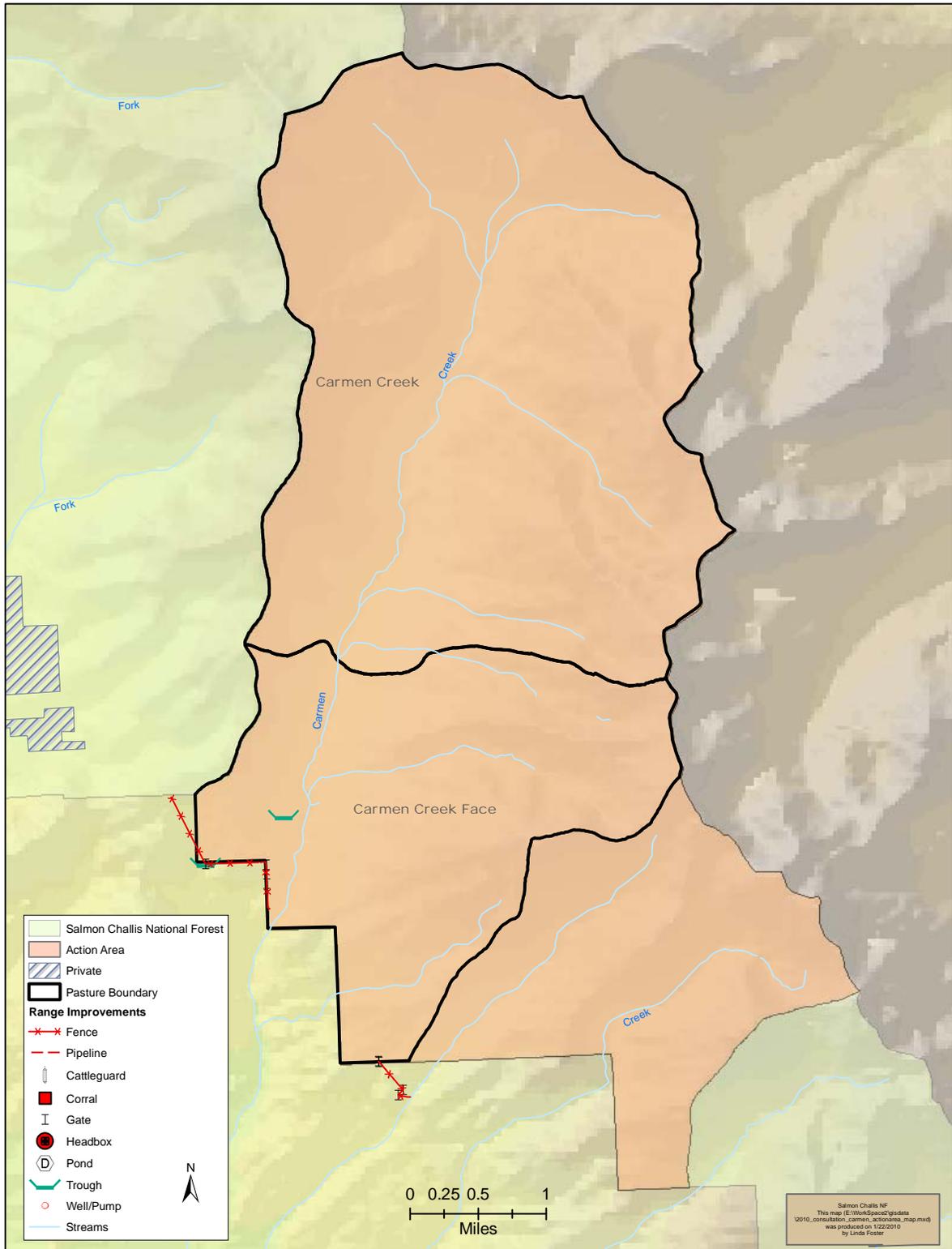
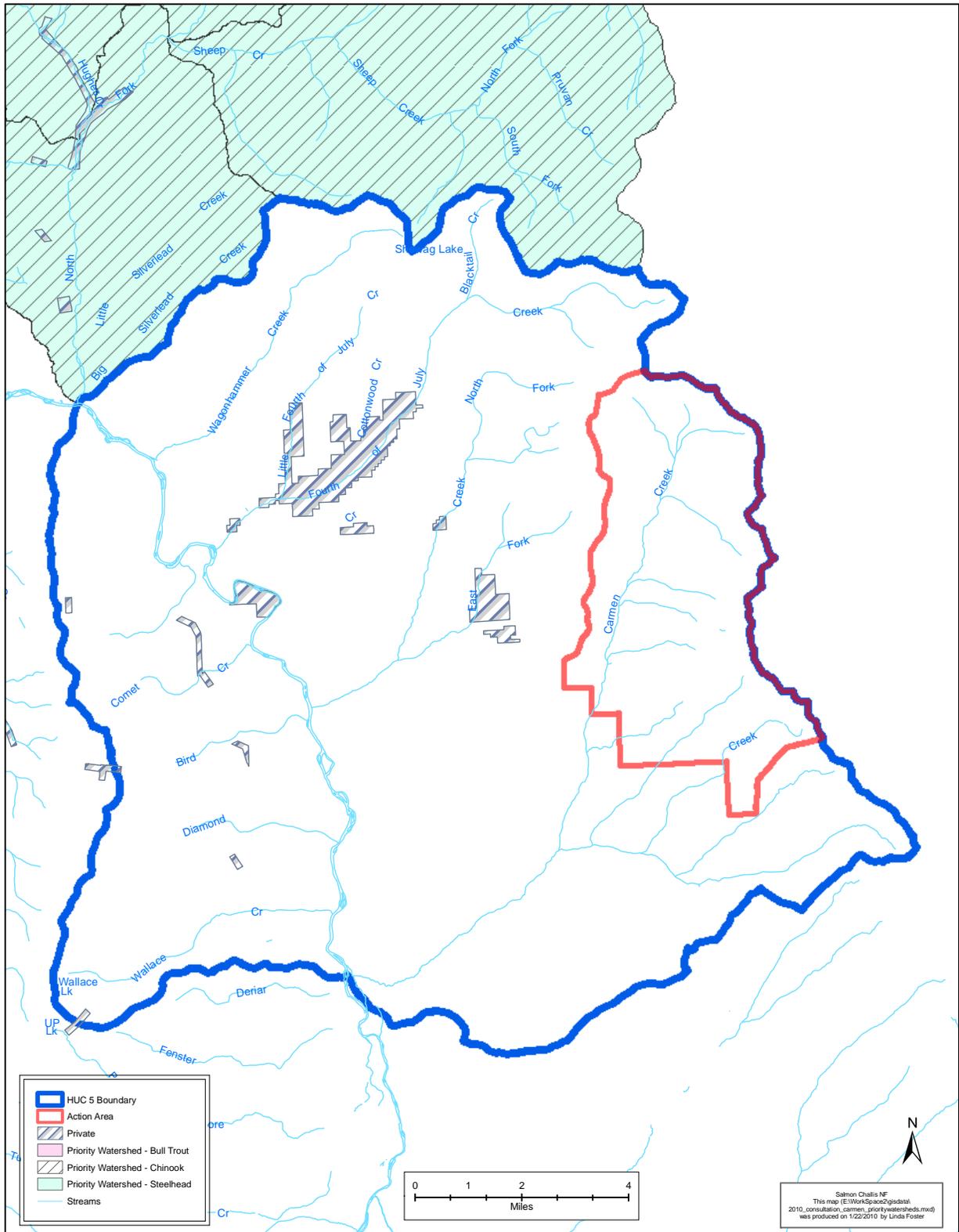


Figure 3 – Carmen Creek - Salmon River HUC 5 Map with NO Priority Watersheds



5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

According to the U.S. Fish and Wildlife Service's (USFWS's) Semi-annual Species List Update Letter, 14420-2010-SL-0089 received December 30, 2009 to Harv Forsgren, R4 - Regional Forester, the federally listed or proposed listed fish species occurring within the Salmon-Challis NF administered boundaries include;

- Snake River sockeye salmon (*Oncorhynchus nerka*) (Endangered) (Federal Register 56FR58619)
- Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*) (Threatened) (Federal Register 57FR14653)
- Snake River steelhead (*Oncorhynchus mykiss*) (Threatened) (Federal Register 62FR43937)
- Columbia River bull trout (*Salvelinus confluentus*) (Threatened) (Federal Register 63FR31647)

Salmon-Challis National Forest and Idaho Department of Fish and Game fish surveys indicate that one ESA fish species occur within the ESA Action Area. This species is the bull trout (Figure 4). Sockeye salmon use the mainstem Salmon River as a migration corridor to and from spawning and juvenile rearing areas within lakes of the Salmon River headwaters, but do not occupy or use waters within the ESA Action Area (Federal Register 56FR58619). Sockeye salmon, Chinook salmon and steelhead do not occur within the ESA Action Area.

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 as identified in Appendix D. Using this process, the Forest has identified NO streams within the ESA Action Area supporting critical habitat for Chinook salmon.

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 ESA 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 not present within the ESA Action Area.

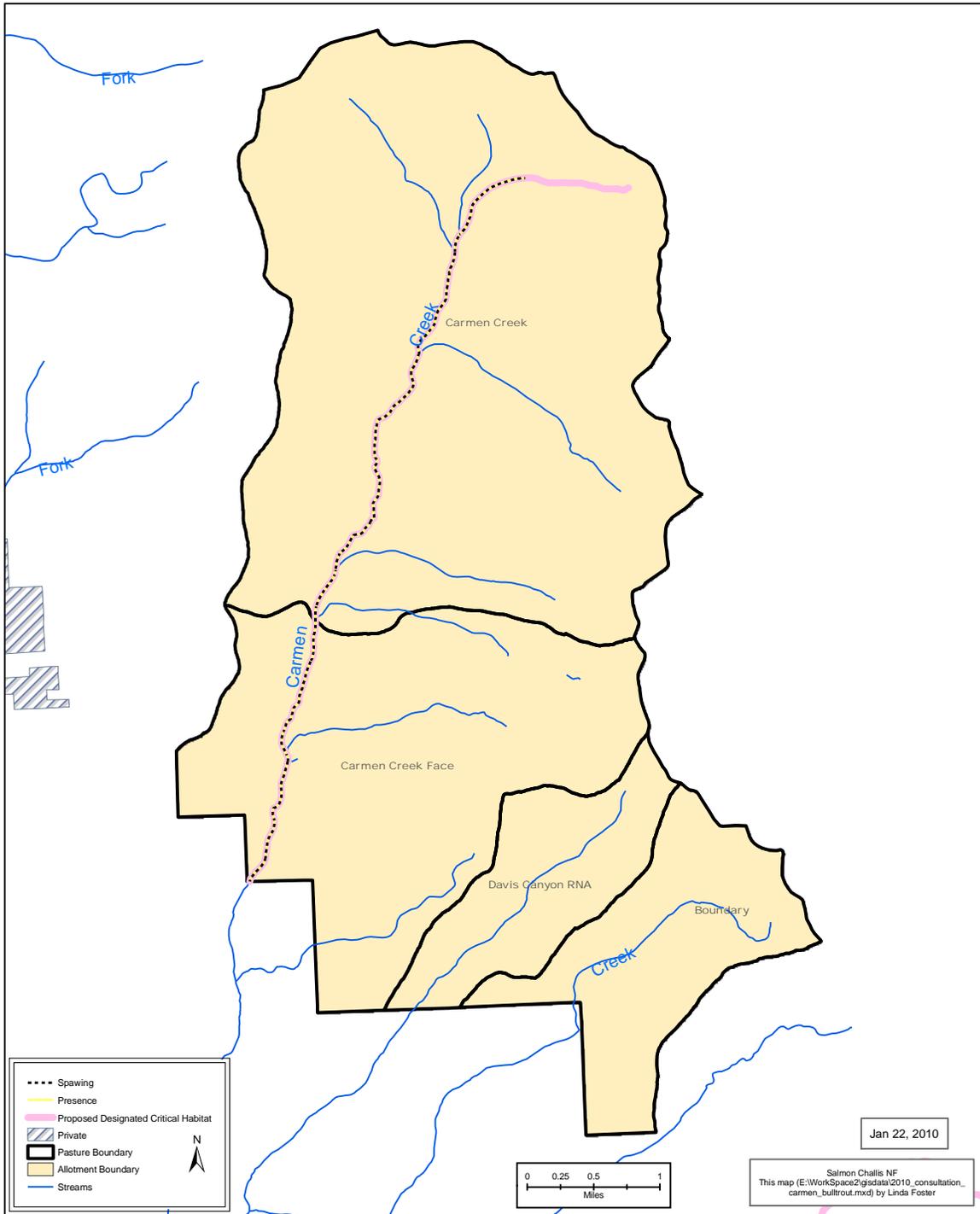
5.2.4 COLUMBIA RIVER BULL TROUT

Critical habitat was designated for bull trout on September 26, 2005. This designation did not include any areas encompassed by the proposed action. Currently, however, the U.S. Fish and Wildlife Service has published public notice (January 13, 2010, Federal Register 75FR2270) that

it is proposing to revise the 2005 designated critical habitat. Proposed bull trout critical habitat is present within the ESA Action Area and includes Carmen Creek (Figure 4). The Forest desires to assess the potential impact to the Primary Constituent Elements (PCEs) of proposed bull trout critical habitat. These are defined on page 2360 of the referenced Federal register notice.

Because these elements are important to areas on the Forest where bull trout are present, the Forest would like to demonstrate that potential impacts to the PCEs have been assessed and considered in the proposed action (Appendix E).

Figure 4 - Carmen Creek Allotment bull trout Map



6 ENVIRONMENTAL BASELINE DESCRIPTION

The ESA Action Area is within one 5th field hydrologic unit code, the Carmen Creek - Salmon River (HUC 1706020305). Baseline Matrices of Diagnostic Pathways and Indicators for this 5th field HUC is provided in Appendix B.

Below is a general summary of baseline conditions within the ESA Action Area. While the baseline matrix included in Appendix B reflects aquatic/riparian condition and trend at the 5th field HUC scale, the baseline descriptions provided below focus only on baseline conditions within the ESA 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 ESA Action Area.

The Carmen Creek Allotment encompasses one stream which support populations of, and/ or habitat for, ESA listed fish species. This stream is Carmen Creek. Carmen Creek is also being proposed for critical habitat designation. All other streams within areas that will be grazed do not contain ESA listed fish or support designated critical habitat. However, livestock grazing in these areas may indirectly affect ESA listed fish and designated critical habitat in other streams within the allotment.

6.1.1 CHINOOK SALMON

Within the ESA Action Area there has been no documentation of the presence of Chinook salmon, juvenile or adult. There is also no Designated Critical Habitat within the ESA Action Area.

6.1.2 STEELHEAD

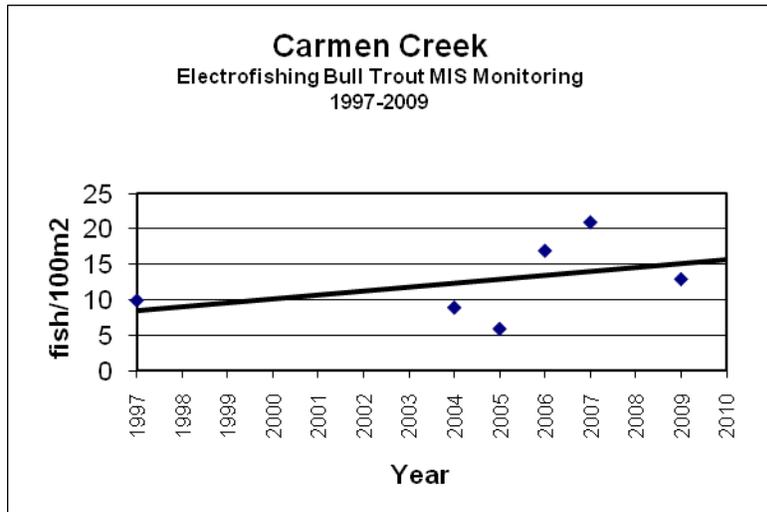
Within the ESA Action Area there has been no documentation of the presence of Chinook salmon, juvenile or adult. There is also no Designated Critical Habitat within the ESA Action Area.

6.1.3 BULL TROUT

Within the ESA Action Area, bull trout are currently present in Carmen Creek. There is an estimated 6.18 miles of bull trout presence and spawning habitat and 6.99 miles of Proposed Critical Habitat within the ESA Action Area (see Table 12-13).

The Salmon-Challis National Forest completed a Forest Plan Amendment for its Management Indicator Species (MIS) in 2004. In this Forest Plan Amendment the bull trout is the MIS fish species on the Salmon-Challis Forest. There is one stream within the ESA Action Area which the Forest monitors long term population trends for bull trout. This one bull trout MIS monitoring site, within the ESA Action Area, shows bull trout populations of approximately 10 fish/100 m².

It is my professional judgment that bull trout populations within the ESA Action Area are depressed from historic numbers because of private land migration barriers and unscreened diversions associated with irrigation practices. Fluvial forms are not present within the ESA Action Area.



6.2 GENERAL DESCRIPTION OF HABITAT CONDITIONS

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

The Carmen Creek Allotment encompasses one stream which support populations of, and/ or habitat for, ESA listed fish species. This one stream is Carmen Creek. All other streams within areas that will be grazed do not contain ESA listed fish or support designated critical habitat. However, livestock grazing in these areas may indirectly affect ESA listed fish and designated critical habitat in other streams within the allotment.

Table 3 - Mean Annual Monthly Flows

Snake River Adjudication Site

Station	DA (sq. mi.) (drainage area)	QA (cfs) Yearly Average Discharge	QB (cfs) Bankful Discharge (flood stage)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
				Carmen Creek 1A (core site)	17.14	17.45	85.74	5.5	5.5	6.1	12.6	50.9	70	22	9.4

6.2.1 CARMEN CREEK

Fish habitat conditions of Carmen Creek within the ESA Action Area 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. There is some connectivity problems associated with private land irrigation practices in lower Carmen Creek below the ESA Action Area. There is also two private land culverts that are fish passage barrier problems on mainstem Carmen Creek. These two culverts do not totally block upstream fish migration but they both would be considered partial migration barriers at lower flows and for smaller fish.

6.3 MAJOR LIMITING FACTORS

Factors most likely to be limiting ESA listed fisheries resources, within the ESA Action Area, from achieving full carrying capacity are:

- Year to year stream flow conditions associated with good or bad snowpack levels.
- Nutrient deficiencies associated with high mountain, high gradient streams. Some of these nutrient deficiencies can be attributed to the decline in the number of anadromous fish, both steelhead and Chinook salmon, returning to streams within the ESA Action Area to spawn, die and decay in the stream.
- Carmen Creek, on private land downstream of the ESA Action, has unscreened diversion. Unscreened diversions can affect fish by entrainment and impact fish passage. Fish entrainment is associated with flow alterations. This occurs when water is removed from the stream and fish are subsequently stranded in dewatered habitats.

More specific details on status and trends of habitat within the ESA Action Area are provided below.

6.4 GRAZING FOCUS INDICATORS

This analysis will analyze six grazing focus indicators to assess livestock impacts to ESA listed fish and designated critical habitat. These indicators are 1) spawning and incubation, 2) temperature, 3) sediment, 4) width:depth ratio, 5) streambank condition and 6) riparian conservation areas. These six indicators are referred to as the grazing focus indicators and reflect aquatic/riparian baseline pathway and indicator elements considered most likely to be impacted by grazing activities within a watershed.

A description of the condition of these indicators within the action area is provided below.

6.4.1 SPAWNING AND INCUBATION:

6.4.1.1 CHINOOK SALMON SPAWNING AND INCUBATION

There is NO Chinook salmon spawning and incubation within the ESA Action Area.

6.4.1.2 STEELHEAD SPAWNING AND INCUBATION

There is NO steelhead spawning and incubation within the ESA Action Area.

6.4.1.3 BULL TROUT 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 bull trout in the Carmen Creek drainage ranging from the second week of August through the second week of October, with egg incubation through the third week of April. For the purpose of this analysis August 15th will be used for the start of bull trout spawning.

Table 4 - Bull Trout Spawning Streams and Miles

Carmen Creek	6.18 miles
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Bull trout have the potential to spawn in one stream within the ESA Action Area (see Table 4). These lengths reflect continuous mapping reaches and are likely a significant overestimate of actual spawnable area within the allotment's streams.

Information on bull trout spawning within the ESA Action Area is limited. This analysis basis potential bull trout spawning streams on known or suspected presence of bull trout through electrofishing surveys. Carmen Creek within the ESA Action Area does not support fluvial 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/INFISH identifies a rearing temperature criteria of less than 64 degrees F (17.8 degrees C) and a spawning temperature criteria of less than 60 degrees F (15.6 degrees C) as components of its suite of Riparian Management Objectives. Water temperature conditions within the ESA Action Area are considered to be Functioning Appropriately for rearing, spawning and incubation relative to these criteria.

Seasonal water temperature regimes have been monitored on one stream within the ESA Action Area. The stream temperature graphs for Carmen Creek can be seen in Appendix G. Carmen Creek has had stream temperature data collected in 1994-2003 and 2005-2009.

Overall, observed water temperature regimes within the Carmen Creek Allotment have all fallen within the PACFISH water temperature criteria. There are no streams within the ESA Action Area that are listed as an IDEQ 303(d) streams with a pollutant, which includes water temperature (IDEQ, 2008). Bull trout are not present when an observed mean water temperature is greater than 12.0°C (Gamett, 2002). Water temperature is not considered a limiting factor to fish production within the ESA Action Area.

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). The Salmon-Challis National Forest's Watershed Program has collected stream sediment data, using the core sampling methodology, since 1993.

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). Results of all assessments are expressed as percent fines less than ¼ inch in diameter. Analysis of depth fines additionally considers drainage geology. As agreed to with the Salmon-Challis National Forest, National Marine Fisheries Service and the US Fish and Wildlife Service during ESA informal consultation on steelhead and bull trout Watershed Biological Assessments for Ongoing Activities, the following are evaluation criteria for stream sediment based wholly or primarily in quartzite geology:

20% depth fines (<1/4" diameter) = Properly Functioning
 21-25% depth fines (<1/4" diameter) = Functioning at Risk
 >25% depth fines (<1/4" diameter) = Not Properly Functioning

Within the ESA Action Area there is one core sampling monitoring sites. Core sampling is used in trend monitoring to determine the amount of percent fines within the stream's substrate. Anadromous streams receive a 6-inch dig and resident fish streams receive a 4-inch dig. The

amount of percent fines is used in determining the stream's biotic potential (Stowell, et al. 1983). Biotic potential is the condition of spawning substrate quality, which maximizes survival and emergence of fish embryos.

Forest wide analysis of data collected since 1993 shows a wide range of variability for stream sediment. Stream sediment data is highly influenced by natural processes such as geology, stream gradient, winter snow pack, springtime runoff, summer time high intensity storms and human impacts associated with roads. The variability in stream sediment data shows in some years at some stations streams may naturally fluctuate between Properly Functioning, Functioning at Risk, and Not Properly Functioning.

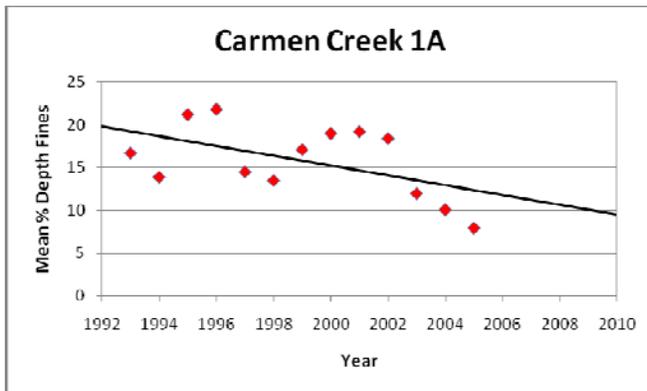
Table 5 - Core Sampling Mean % Fines by Depth

Summary of Depth Fines Measurements Recorded on the Salmon-Challis National Forest from 1993 through 2009.

Mean Percent Fines <25" at Depth																	
Station	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Carmen Creek 1A	16.7	13.9	21.2	21.8	14.5	13.5	17.1	19.0	19.2	18.4	12.0	10.1	8.0	no data	no data	no data	no data

A = Anadromous fish spawning site
R = Resident fish spawning site

Carmen Creek has one site that has been monitored thirteen years in the last seventeen years. Using nineteen years of local knowledge of Carmen Creek and thirteen years of actual data, it is my professional judgment that Carmen Creek is "Functioning Appropriately" because the sediment data in Table 5 shows 11 out of 13 years the sediment data is below 20%. This data and its trend graph indicate stream sediment is not a major limiting factor for fish production in Carmen Creek.



There are no streams within the ESA Action Area that are listed as an IDEQ 303(d) streams with a pollutant, which includes sediment (IDEQ, 2008).

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 reduces habitat suitability (Platts and Nelson, 1989).

Data is limited for average wetted width/maximum depth ratio on streams within the ESA Action Area. There is one ESA fish stream within the ESA Action Area with Range program MIM monitoring data (see Appendix C Table 15). But there is no wetted width:depth ratio data on this stream within the ESA Action Area. PACFISH and Range MIM width:depth ratio is measured using the mean wetted width divided by depth. When measuring using mean wetted width there can be a great variance in your calculated width:depth ratio because of different stream flows from year to year and from the beginning of your summer field monitoring season to the end of your summer field monitoring season.

A more accurate monitoring methodology for calculating width:depth ratios would be using bankfull widths divide by bankfull depths where your monitoring site's bankfull width is determined by an experienced hydrologist who permanently marks the location of bankfull using a permanent monument marker like rebar. This will ensure the year to year measurements recorded are more reflective of the width:depth ratio change or lack of change that is taking place at the monitoring site. This will not only give you a more accurate description of the current stream's width:depth ratio at your monitoring site it will also make a more accurate comparison of the change and trend taking place with width:depth ratios at the monitoring site over the years.

There are no current width:depth ratios, using bankfull width, on streams within the ESA Action Area, but there is historic stream habitat data collected, within the ESA Action Area, for the Snake River Adjudication process that includes one site that has been permanently marked on one stream within the ESA Acton Area (see Table 6). This stream habitat data was collected between 1988 and 1990 and measured and located bankfull width and bankfull depths. The *User's Guide to Fish Habitat: Descriptions that Represent Natural Conditions in the Salmon River Basin, Idaho* (Overton, 1995) shows a mean width to depth ratio of 24 for "B" channel types (Rosgen, 1994).

Table 6 - Width:Depth Ratio

Station	Bankfull Width	X-Sectional Area	Bankfull Depth	Width/Depth Ratio	Rosgen Channel Type	Natural Condition Database Width:Depth Ratio
Carmen Creek 1A	26	41.27	1.59	16.4	"B"	24

The past and current effects of the proposed project could have played a role in decreasing or increasing average wetted width/maximum depth ratio within the ESA Action Area. The direct correlation between the proposed project's past and current activities and a negative increase in average wetted width/maximum depth ratio would be if livestock grazing activities were allowed to break down streambanks and significantly decrease the stability of streambanks. Range improvements such as fences and water developments that helped to minimize and keep livestock grazing activities away from riparian areas and streambanks can also help to restore degraded stream reaches where the average wetted width/maximum depth ratio is greater than 10. Recent past and current livestock grazing activities were and are being managed so as not

to degrade riparian areas and bank stability which could have increased average wetted width/maximum depth ratio. Current streambank conditions at this one long term trend monitoring site shows high streambank stability.

Stream width:depth ratios are not considered a major limiting factor to fish production within the ESA Action Area. Based on nineteen years of local knowledge of the one ESA fish bearing stream within the ESA Action Area and the bankfull width:depth ratios at the one Snake River Adjudication sites in Table 6 it is my professional judgment that stream width:depth ratios are considered to be Functioning Appropriately and are not a major limiting factor to fish production because the stream banks are heavily armored with boulders and dense vegetation, and the streambank conditions are over 90 percent stable.

6.4.5 STREAMBANK CONDITION

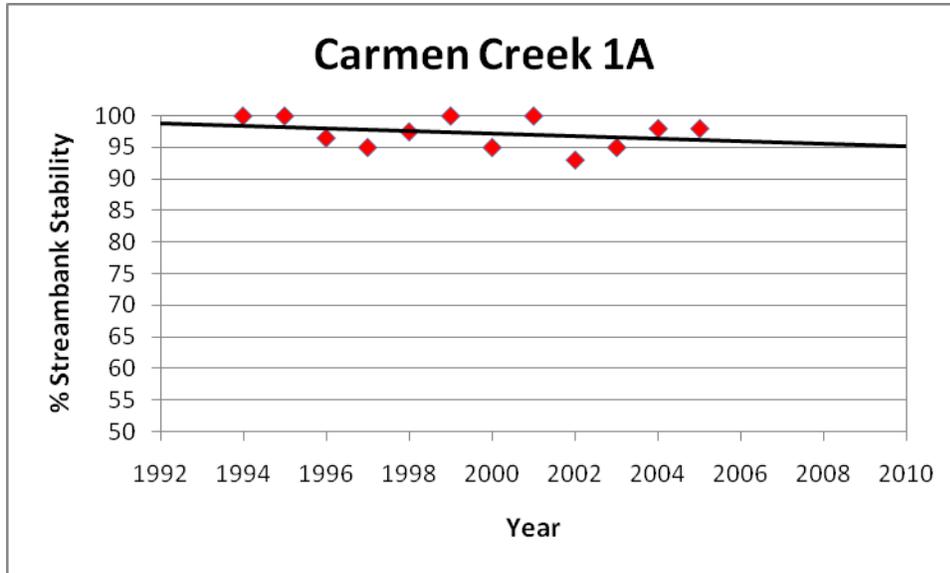
Streambank condition can influence the overall stability and resilience of stream channels. Reduced streambank stability can result in reduced structural stability of the stream channel resulting in negative impacts on fish productivity (Platts,1991).

The Carmen Creek drainage is not considered to be a PACFISH priority watershed, with an identified Riparian Management Objective (RMO) of 90 percent or greater bank stability. Therefore we used a PACFISH RMO of 80 percent or greater bank stability. Streambank stability was monitored by the Forest's Watershed Program at their core sampling locations. Based upon the Matrix of Pathway and Indicator functionality criteria of 80 percent or greater streambank stability, streambank conditions are considered to be "Functioning Appropriately" within Carmen Creek.

Table 7 - Percent Bank Stability

Summary Bank Stability Measurements Recorded on the Salmon-Challis National Forest from 1993 through 2009.																	
Percent Bank Stability																	
Station	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Carmen Creek 1A	no data	100.0	100.0	96.5	95.0	97.5	100.0	95.0	100.0	93.0	95.0	98	98.0	no data	no data	no data	no data

Streambank conditions within the ESA Action Area have been monitored in association with sediment monitoring operations since 1994. Bank stability data in Carmen Creek is above 90%. The trend line is slightly decreasing but still shows streambank stability above 95%. The data and its trend graph indicate bank stability is not a major limiting factor for fish production in Carmen Creek.



The ESA fish bearing streams with Range program MIM monitoring of stream bank stability (see Appendix C Table 15) in general show good bank stability. The MIM monitoring of bank stability, last read on this allotment in 1995, showed Carmen Creek had a reading of 100% stable streambanks. Using the limited MIM bank stability data from the Range program and the bank stability readings from the Watershed Program it is my professional judgment that stream bank stability conditions are not considered a major limiting factor to fish production within the ESA Action Area because at the Forest's long term trend monitoring site all twelve readings in the last seventeen years show bank stability ratings above 90%.

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 within the ESA Action Area. The riparian habitat conservation areas (RHCA), within the ESA Action Area, for Carmen Creek are largely untouched by permitted livestock grazing due to steep, rocky topography and dense overstory and understory vegetation. These conservation areas provide adequate shade, large woody debris, habitat protection, and connectivity.

Monitoring operations within the ESA Action Area indicate that the one site monitored in 1995 and again in 2009 is static and has a Greenline Ecological Status (GES) of Potential Natural Community (PNC). Greenline Ecological Status (GES) typically is the element in which interpretations of ecological status and trend are discussed.

Carmen Creek: This monitoring site does not meet MIMs greenline protocol. Within the ESA Action Area Carmen Creek does not have a stream reach that meets the MIMs greenline protocol. Therefore this established site will receive photo trend monitoring in the future. Current photo trend monitoring shows little change in the stream since 1995. Carmen Creek is very rocky and steep. Livestock are present and can be near the stream for 29 days but they have limited access to Carmen Creek because of steep topography and dense vegetation. Within the Carmen Creek Unit there is an estimated 1.25 miles of Carmen Creek accessible to livestock

because the riparian area is heavily timbered and rocky. Within the Carmen Creek Face Unit there is an estimated 0.0 miles of Carmen Creek accessible to livestock because of very steep terrain in the valley bottom near the stream and because the riparian area is heavily timbered and rocky.

The best monitoring attribute to manage this monitoring site is browse use with an annual use indicator not to exceed 50%. The monitoring attribute of greenline stubble with an annual use indicator no less than 4 inches will also be used.

It is my professional judgment that Stream Riparian Conservation Areas are not considered a major limiting factor to fish production within the ESA Action Area because monitoring data indicates the GES is at PNC and livestock have very limited access to the Carmen Creek riparian areas because of steep terrain and dense vegetation within the riparian area.

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 8 - 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 units were grazed to four inches of graminoid stubble height; virtually all measurements improved when units were grazed to six inches stubble height, or when units 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, Schultz 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 1991). 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 9. 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). During the early phases of their life cycle, juvenile salmonids have little or no capacity for mobility, and large numbers of embryos or young are concentrated in small areas.

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 livestock to the uplands enough to significantly reduce uncovered and unstable streambanks.
- **Herding:** Using 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 Carmen Creek Allotment to reduce the potential for adverse effects to listed fish and aquatic and riparian

habitats within the ESA Action Area. Rotation schedules have been refined to best avoid direct impact to spawning fish and incubating redds. All of the existing fence range improvements, displayed in Figure 2, will help keep livestock in areas where they are suppose to be and keep livestock out of areas they are not suppose to be grazing as directed by the signed Annual Operating Instructions. All of the existing water developments improvements, displayed in Figure 2, will help distribute livestock throughout a given unit to minimize the time livestock need to spend down in a given stream's riparian area.

Information on the effectiveness of the proposed conservation measures is limited. Erhart and Hansen (1997) found mixed success when only one technique was applied. However, when applied collectively, this suite of measures has been shown to be effective in minimizing direct livestock impact to spawning habitats and avoiding indirect impacts to aquatic and associated riparian habitats.

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

7.1.1 SPAWNING AND INCUBATION

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

The only ESA fish species that spawn in stream reaches within the ESA Action Area is bull trout (see Figure 4). 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 ESA listed fish species spawning and incubation within the Carmen Creek Allotment are discussed individually below.

7.1.1.1 CHINOOK SALMON

Conclusion:

There are NO Chinook salmon spawning or rearing within the ESA Action Area. Therefore it is my professional judgment that the Carmen Creek Allotment's livestock grazing activities have No Effect to Chinook salmon habitat, Chinook salmon spawning, incubation and juvenile rearing in streams within the ESA Action Area.

7.1.1.2 STEELHEAD

Conclusion:

There are NO steelhead spawning or rearing within the ESA Action Area. Therefore it is my professional judgment that the Carmen Creek Allotment's livestock grazing activities have NO Effect to steelhead habitat, steelhead spawning, incubation and juvenile rearing in streams within the ESA Action Area.

7.1.1.3 BULL TROUT

There is no documentation of bull trout redds within the ESA Action Area. But bull trout spawning is believed to be occurring in Carmen Creek within the ESA Action Area because the Forest's electrofishing program has documented juvenile bull trout less than 100mm in length in the stream (see Figure 4).

Analysis Assumptions:

- Bull trout begin spawning within the allotment on August 15th.
- If livestock are grazing in a unit past August 15th that has a bull trout stream there is the potential for livestock to step on bull trout redds and/or disturb/harass spawning adults unless there is a natural physical barrier or a human constructed physical barrier, like a fence, between the stream and where the livestock can graze.
- A bull trout stream does not have 100% available spawning habitat.
- When livestock step on a bull trout redd not every egg within the redd will be destroyed. There may be some eggs within a trampled redd that can survive and become juvenile bull trout.

Carmen Creek Face Unit: The Carmen Creek Face Unit has suspected bull trout spawning occurring in approximately 2 miles of Carmen Creek. Carmen Creek within the Carmen Creek Face Unit is a high gradient boulder dominated stream channel. Bull trout spawning habitat within this Unit would be limited and found in small pockets such as pool tailouts where the stream gradient and substrate have suitable spawning habitat. The PACFISH RHCAs are dominated by steep topography and very dense overstory and understory vegetation. Livestock use adjacent to Carmen Creek within this Unit is very limited because of the steep topography and the dense overstory and understory vegetation. Every year livestock are moved out of the Carmen Creek Face Unit prior to August 15th. But every year at the end of the grazing season livestock are actively trailed back through the Carmen Creek Face Unit along the Carmen Creek road (FS rd #60069) off the Forest Service Allotment and on to the BLM Badgers Springs Allotment. The duration of each move is approximately one day. During the active trailing cattle rarely if ever get off the road near and access Carmen Creek. Steep topography and dense vegetation keep the livestock on the road away from Carmen Creek. Over the last seven years, the permittee has been able to remove the livestock from the Carmen Creek Allotment by September 1st. Livestock are not actively trailed across any stream with bull trout redds. Therefore there are no active trailing concerns.

It is my professional judgment that livestock trampling bull trout redds and/or disturbing or harassing adult spawning fish within this unit would be insignificant and discountable because livestock are moved out of this unit prior to August 15th and when livestock are actively trailed back through this allotment at the end of the season it is on the Carmen Creek road and/or away from Carmen Creek.

Carmen Creek Unit: The Carmen Creek Unit has suspected bull trout spawning occurring in approximately 4 miles of Carmen Creek. Carmen Creek within the Carmen Creek Unit is a high gradient boulder dominated stream channel. Bull trout spawning habitat within this Unit would be limited and found in small pockets such as pool tailouts where the stream gradient and substrate have suitable spawning habitat. The PACFISH RHCAs are dominated by steep topography and/or very dense overstory and understory vegetation. Livestock use adjacent to Carmen Creek within this Unit is very limited because of the steep topography and/or the dense overstory and understory vegetation. Every year livestock are moved into the Carmen Creek

Unit prior to August 15th. Over the last seven years, the permittee has been able to remove the livestock from the Carmen Creek Allotment by September 1st which means he has been gathering up the livestock from the Carmen Creek Unit by around August 15th. The allotment is permitted for grazing through 9/30. This analysis will recognize the last seven livestock have been removed from the allotment around 9/1 but will analyze for livestock grazing through the permitted 9/30 date. Livestock are not actively trailed across any stream with bull trout redds. Therefore there are no active trailing concerns.

It is my professional judgment that there is the potential, be it limited, for livestock to trample bull trout redds and/or disturbing or harassing adult spawning fish within this unit because livestock have access to Carmen Creek at a time bull trout are spawning and/or there are constructed redds.

Conclusion:

There is the potential for livestock to trample bull trout redds and/or disturb or harass spawning adult bull trout within the ESA Action Area because of the time bull trout are suspected to begin spawning in Carmen Creek and the time when livestock are grazing within the Carmen Creek Unit. Spawning adult bull trout and their redds will be at risk between August 15th through September 30th every year. Therefore it is my professional judgment that there is some potential, but it is difficult to quantify, for livestock to step on bull trout redd(s) and/or disturb/harass spawning adults within the ESA Action Area.

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).

While some streams within the Carmen Creek Allotment's ESA Action Area display short periodic exceedences of salmonid spawning temperature criteria, monitoring data does not suggest any significant contribution of temperature impacts as a result of livestock grazing. Monitoring data indicates that riparian conditions are generally in static to upward trend, and width:depth ratios are within the natural range of variability. Both of those focus indicators can affect stream temperatures.

The proposed action includes conservation measures that will help minimize or eliminate livestock grazing away from some stream reaches, which will result in livestock having even less potential impact on stream temperatures than has occurred in the past (see Section 3.2.3). Those conservation measures designed in part 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 the ESA fish bearing streams. Maintaining existing fences and water developments are an important conservation measure that will continue to help distribute livestock use across a larger area to minimize or eliminate livestock grazing impacts on riparian vegetation that directly or indirectly help keep stream temperatures cooler.

Conclusion:

While short periodic exceedences of salmonid spawning temperature criteria may exist along some stream reaches on some streams in some years, 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. We recognize there could be localized impacts to stream temperatures when livestock graze riparian shrubs that provide localized streamside shading. However, because of the expected effectiveness of the project design, associated conservation measures in reducing livestock presence near streams, topography and dense vegetation limiting livestock access to Carmen Creek and current and historic Carmen Creek stream temperatures meet all the life history needs for bull trout it is my professional judgment 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 Water Temperature Focus Indicator both within the ESA Action Area and at the 5th field HUC scale.

In the absence of observed impacts to stream temperature influencing habitat parameters, it is concluded that current and future livestock grazing within the Carmen Creek Allotment is not and will not result in detectable effects to water temperatures or water temperature regimes within the streams of the ESA Action Area. The proposed action is not expected to degrade the condition of the Water Temperature Indicator but is expected to maintain or restore the condition of the Water Temperature Indicator both within the ESA Action Area and at the 5th field HUC scale.

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.

Livestock activity within the Carmen Creek Allotment is not currently considered to be a significant factor influencing sediment levels. Large stretches of many streams within the ESA Action Area are excluded from livestock use because access to these streams and riparian areas are limited and undesirable because of steep channel topography, riparian areas that have dense understory and overstory conifer riparian areas with blow down making livestock movement difficult to impossible and generally unsuitable forage conditions.

Strategies and Conservation Measures of the proposed action, while designed in part 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.

Turbidities associated with active or passive trailing at a stream crossing site are expected to be limited to areas immediately below the crossing locations and short-term in nature. Associated suspended sediment 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.

Long term trend stream sediment levels measured in Carmen Creek are well below the 20% depth fines which are considered "Properly Functioning". Stream sediments are not a major limiting factor to fish production in Carmen Creek.

Conclusion:

The Conservation Measures associated with the proposed grazing action are considered to be effective in minimizing potential generation of sediment to stream channels within the ESA Action Area. 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. We recognize there could be localized impacts to streambanks when livestock occasionally step on streambanks and introduce minor quantities of sediment to the stream. However, because of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams and long term trend stream sediment levels measured in Carmen Creek are well below the 20% depth fines it is my professional judgment those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. The proposed action is not expected to degrade the condition of the Sediment Focus Indicator but is expected to maintain or restore the condition of the Sediment Focus Indicator both within the ESA Action Area and at the 5th field HUC scale.

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.

Conclusion:

The 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 ESA Action Area. Considering width: depth ratios, stream sediment and streambank stability data and their trends, it is concluded that livestock grazing activities is not expected to produce or contribute to any significant impacts on width:depth ratios of streams within the Carmen Creek Allotment which can be meaningfully measured, detected or evaluated.

Low streambank stability and high stream sediment levels can have a negative impact in a stream's width:depth ratio. The Grazing Strategies and Conservation Measures associated with the proposed grazing action are considered to be effective in minimizing potential streambank impacts and in reducing sediment impacts to stream channels within the ESA Action Area. We recognize there could be localized impacts to both streambanks and stream sediment levels when livestock occasionally step on streambanks and introduce minor quantities of sediment to the stream. It is my professional judgment those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale because: of the expected effectiveness of the project design, associated conservation measures in reducing livestock presence near streams, the streambanks are heavily armored with boulders and dense vegetation and the streambank conditions are over 90 percent stable. Therefore the proposed action is not expected to degrade the Width:Depth Focus indicator but it is expected to maintain and/or restore the condition of the Width:Depth Focus Indicator both within the ESA Action Area and at the 5th field HUC scale.

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).

Streambank stability monitoring on the one ESA fish stream within the Carmen Creek Allotment indicate streambanks are very stable at this long term trend monitoring site. There are 12 years of data collected that show all readings are over 90% stable streambanks. Also, during those 12 years of data collected 11 of the 12 years show readings over 95% stable streambanks.

Conclusion:

Considering both observed width: depth ratios and streambank stability data and trends, it is concluded that livestock grazing activities have not directly produced or contributed to any significant impacts on streambank conditions of streams within the Carmen Creek Allotment which can be meaningfully measured, detected or evaluated.

The Grazing Strategies and Conservation Measures of the proposed action, designed in part to avoid livestock presence within stream channels during critical spawning periods, additionally serve to minimize potential livestock impacts to streambanks of ESA Action Area streams. Measures including rapid movement of livestock through trailing areas, salting, use of range improvements such as fencing and water developments all contribute to minimizing near stream livestock activity and the potential for direct streambank impacts on ESA Action Area streams. The Grazing Strategies and Conservation Measures associated with the proposed grazing action are considered to be effective in minimizing potential degradation of streambank stability on stream channels within the ESA Action Area.

The direct and indirect effects of the proposed livestock grazing actions on streambank conditions within the Carmen Creek Allotment streams are insignificant, and not expected to have any meaningfully measureable or discernable influence on streambank stability levels within the ESA 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, the streambanks are heavily armored with boulders and dense vegetation and the streambank conditions are over 90 percent stable, it is my professional judgment those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale. Therefore the proposed action is not expected to degrade the Streambank Focus indicator but it is expected to maintain and/or restore the condition of the Streambank Focus Indicator both within the ESA Action Area and at the 5th field HUC scale.

7.1.6 **RIPARIAN CONSERVATION AREAS**

The condition of riparian areas can have important affects on fish populations. Livestock grazing can impact riparian areas (see section 6.4.7) 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 ESA Action Area are not considered to be negatively impacting riparian conditions.

Conclusion:

Stream Riparian Conservation Areas are not considered a major limiting factor to fish production within the ESA Action Area.

The one MIM site monitored on Carmen Creek in 1995 and in 2009 shows a Greenline Ecological Status of PNC in a Static trend (see Table 15).

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 to riparian conservation areas when livestock graze within a riparian conservation area. It is my professional judgment those impacts will be widely distributed across the landscape, individually minor in nature, and cumulatively immeasurable at the watershed scale because: of the expected effectiveness of the project design and associated conservation measures in reducing livestock presence near streams, the streambanks are heavily armored with boulders and dense vegetation in the riparian area, the streambank conditions are over 90 percent stable, the water temperatures are functioning appropriately and the stream sediment levels are functioning appropriately. Because those focus indicators are currently functioning appropriately Stream Riparian Conservation Areas are not considered a major limiting factor to fish production within the ESA Action Area. Therefore the proposed action is not expected to degrade the condition of the Riparian Focus Indicator but is expected to maintain and/or restore the condition of the Riparian Focus Indicator both within the ESA Action Area and at the 5th field HUC scale.

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 ESA Action Area” (50 CFR§402.02, emphasis added). This definition should not be confused with the definition that is used for the National Environmental Policy Act and other environmental laws. In this context, cumulative effects apply only to future state and private activities that are reasonably certain to occur. Furthermore, if an activity is currently occurring and will likely continue to occur in the future with similar effects, it is not considered under cumulative effects because it has already been considered in the description of baseline conditions.

There are no State or Private lands within the ESA Action Area. There is no risk of adverse cumulative effects to the fisheries resource because of the design features and standard and guides associated with the Carmen Creek Allotment and its activities.

7.3 SUMMARY OF EFFECTS

The effects analysis identifies a non-discountable potential for direct impact of livestock on spawning 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. There is no Chinook salmon or steelhead present within the ESA Action Area. There is no Chinook salmon or steelhead Designated Critical Habitat within the ESA Action Area. 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 focus indicators at their current levels of functionality.

Table 9 summarizes the effects of the proposed Carmen Creek Allotment's grazing operations on aquatic/riparian Pathways and Indicators, including the six identified Focus Indicators (highlighted) addressed in the Effects section of this document.

The Matrix of Diagnostic Pathways and Indicators (Appendix B) and Table 9 below are completed following two documents, the NMFS August 1996 *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS, 1996) and the USFWS February 1998 *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS, 1998).

Table 9 - Effects Summary for the Carmen Creek Allotment's Grazing Activities

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

Pathway	Indicators	Functionality Of Baseline	Response Column A			Response Column B		
			Will the proposed action or any interrelated or interdependent actions likely generate any direct or indirect effects to this indicator?			Are these effects expected to exceed beneficial, insignificant, or discountable?		
			CH	SH	BT	CH	SH	BT
Channel Condition and Dynamics	Width:Depth Ratio	FA to FR	NO	NO	YES	NO	NO	NO
	Streambank Condition	FA to FR	NO	NO	YES	NO	NO	NO
	Floodplain Connectivity	FA	NO	NO	NO	NO	NO	NO
Flow/Hydrology	Change in Peak/Base Flows	FR	NO	NO	NO	NO	NO	NO
	Increase in Drainage Networks	FA	NO	NO	NO	NO	NO	NO
Watershed Conditions	Road Density and Location	FR	NO	NO	NO	NO	NO	NO
	Disturbance History	FA	NO	NO	NO	NO	NO	NO
	Riparian Conservation Areas	FA	NO	NO	YES	NO	NO	NO
	Disturbance Regime (bull trout only)	FA	NA	NA	Yes	NA	NA	NO
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity (bull trout only)	FA	NA	NA	Yes	NA	NA	NO

Carmen Creek - Salmon River 5th field HUC

Status of Baseline: Functioning Appropriately – FA Functioning at Risk – FR Functioning at Unacceptable Risk – FUR

8 EFFECTS DETERMINATION

The effects determination for each species was made using the above analysis and the effects determination key (Table 9). The specific determinations are identified below and summarized in Table 10.

8.1 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

The effects analysis concluded that the proposed action will have no direct, indirect or cumulative effects on Chinook salmon or Chinook salmon habitat because the species and the habitat are not found within the ESA Action Area. Therefore, it is my determination the proposed action results in a “NO EFFECT” determination for Chinook salmon.

The effects analysis concluded that the proposed action will have no effect on Chinook salmon designated critical habitat because there is no designated critical habitat within the ESA Action Area. Therefore, it is my determination the proposed action results in a “NO EFFECT” determination for Chinook salmon designated critical habitat.

8.2 SNAKE RIVER STEELHEAD

The effects analysis concluded that the proposed action will have no direct, indirect or cumulative effects on steelhead or steelhead habitat because the species and the habitat are not found within the ESA Action Area. Therefore, it is my determination the proposed action results in a “NO EFFECT” determination for steelhead.

The effects analysis concluded that the proposed action will have no effect on steelhead designated critical habitat because there is no designated critical habitat within the ESA Action Area. Therefore, it is my determination the proposed action results in a “NO EFFECT” determination for steelhead designated 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 and/or the potential for livestock to disturb or harass potential spawning adult bull trout within one ESA Action Area stream. Therefore, it is my determination 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 bull trout proposed designated critical habitat. However, these effects are expected to be insignificant or discountable. Therefore, it is my determination the proposed action results in a “MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT” determination for bull trout proposed designated critical habitat.

8.4 SNAKE RIVER SOCKEYE SALMON

The ESA Action Area does not contain sockeye salmon or sockeye salmon designated critical habitat. Therefore, it is my determination the proposed action results in a “NO EFFECT” determination for sockeye salmon and a “NO EFFECT” determination for designated sockeye salmon critical habitat.

8.5 ESSENTIAL FISH HABITAT

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

Table 10 - Effects Determination Summary for the Carmen Creek Allotment's Grazing Activities

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

¹ The ‘Species’ column is for determining effects to the species. The ‘Habitat’ column is for determining effects to designated critical habitat, proposed critical habitat or essential fish habitat.

All of the above effects determinations in Table 10 consider the Analysis of Effects in Section 7 of this BA. The species determinations are made as follows: No Effect (NE) if the species is not present in the ESA Action Area or the proposed action or any interrelated or interdependent actions will not effect on 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 ESA Action Area does not contain designated critical habitat or all of the responses associated with habitat in ‘Response Column A’ are ‘NO’, NLAA if all of the responses associated with habitat in ‘Response Column B’ are ‘NO’, LAA if any of the responses associated with habitat in ‘Response Column B’ are ‘YES’.

APPENDIX A - REFERENCES

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**APPENDIX B – WATERSHED BASELINES WITH MATRICES OF DIAGNOSTIC
PATHWAYS AND INDICATORS**

1 CARMEN CREEK - SALMON RIVER (5TH FIELD HUC) WATERSHED BASELINE

1.1 MATRIX OF DIAGNOSTIC PATHWAYS AND INDICATORS

Agency: USDA Forest Service, Salmon-Challis National Forest	Watershed 5th field HUC: Carmen Creek – Salmon River 1706020305
Unit: North Fork Ranger District	Spatial Scale of Matrix: One 5 th field HUC
Fish Species Present: Bull Trout	Designated or Proposed Critical Habitat Present: Bull Trout
Anadromous Species Population: Upper Salmon River	Anadromous Species Subpopulation: Lemhi River
Bull Trout Recovery Unit: Upper Snake	Bull Trout Critical Habitat Unit: Salmon River Basin
Bull Trout Core Area: Middle Salmon River - Panther	Bull Trout Local Population: Carmen Creek
Management Actions: Range (Ongoing) - Carmen Creek Allotment	Updated: 3/23/2010

Pathway - Subpopulation Characteristics (Bull Trout Only)		
Pathways Indicators	Status of Baseline	Discussion of Baseline – Current Condition
Subpopulation Size	FR _{BT}	<p>Bull Trout -Bull Trout are found in three streams, including the Salmon River, within the Carmen Creek - Salmon River 5th field HUC and in one stream within the ESA Action Area. All life stages are present within the one stream. Fluvial individuals are not present in Carmen Creek but are present in the Salmon River. Bull trout is currently listed as “Threatened” under ESA.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <i>Functioning at Risk</i>. The effects of the proposed project is likely to impact individuals but may not have a trend in decreasing or increasing the bull trout population in the 5th field HUC or the ESA Action Area because the project’s activities will not restore nor degrade stream habitat elements within the next 5 to 10 years. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action’s design criteria and following required standard and guidelines.</p>

<p>Growth and Survival</p>	<p>FA_{BT}</p>	<p>Bull Trout - The sub population, within the Carmen Creek - Salmon River 5th field HUC, has the resilience to recover from short term disturbances or subpopulation declines within one to two generations (5 to 10 years). The subpopulation is characterized as increasing or stable. The one bull trout stream within the ESA Action Area has fair to good connectivity to the Salmon River. This one bull trout stream: 1) Conserve opportunity for diverse life-history expression, 2) Conserve opportunity for genetic diversity, 3) Ensure bull trout are distributed across representative habitats, 4) Ensure sufficient connectivity among populations, and 5) Ensure sufficient habitat to support population viability (e.g., abundance, trend indices).</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <i>Functioning Appropriately</i>. The effects of the proposed project is likely to impact individuals but may not have a trend in decreasing or increasing the bull trout growth and survival in the ESA Action Area because the project's activities will not measurably restore nor degrade stream habitat elements or population size within the next 5 to 10 years. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Life History Diversity and Isolation</p>	<p>FA_{BT}</p>	<p>Bull Trout - The migratory form of bull trout, within the Carmen Creek - Salmon River 5th field HUC, is present and local populations are in close proximity to others spawning and rearing groups. Migratory corridors and rearing habitat are in good to excellent condition for the species.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <i>Functioning Appropriately</i>. The effects of the proposed project is likely to impact individuals but may not have a trend in decreasing or increasing the bull trout life history diversity and Isolation in the ESA Action Area because the project's activities will not measurably restore nor degrade stream habitat elements or population size within the next 5 to 10 years. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Persistence and Genetic Integrity</p>	<p>FA_{BT}</p>	<p>Bull Trout – Bull Trout stream connectivity is moderate to high within the Carmen Creek - Salmon River 5th field HUC. Each of the relevant subpopulations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <i>Functioning Appropriately</i>. The effects of the proposed project is likely to impact individuals but may not have a trend in decreasing or increasing the bull trout persistence and genetic integrity in the ESA Action Area because the project's activities will not measurably restore nor degrade stream habitat elements, population size or the probability of hybridization with eastern brook trout within the next 5 to 10 years. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

Pathway - Water Quality		
Pathway Indicators	Status of Baseline	Discussion of Baseline – Current Condition
Temperature (7day average. Maximum, °C)	FA BT	<p>Since 1993 stream temperature data has been collected on six streams within the Carmen Creek - Salmon River 5th field HUC. Within the ESA Action Area there is one stream with stream temperature data between 1993 and 2009. Data indicates that stream temperatures are not a limiting factor for fish production and meets PACFISH spawning and rearing criteria. PACFISH page C-6. Water temperatures are below 64°F within migration and rearing habitats and below 60°F within spawning habitats. There is no measurable increase in maximum water temperature using the 7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <u>Functioning Appropriately</u>. The effects of the proposed project will not play a role in decreasing or increasing steam temperatures within the ESA Action Area because the project’s activities will not measurably restore nor degrade stream habitat elements that effect stream temperatures. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action’s design criteria and following required standard and guidelines.</p>
Sediment	FR BT	<p>Salmon-Challis National Forest Watershed program uses 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).</p> <p>Since 1993 stream sediment data has been collected on three streams within the Carmen Creek - Salmon River 5th field HUC. Within the ESA Action Area there is one stream with sediment data between 1993 and 2009. The uplands within the ESA Action Area are primarily quartzite geology. In quartzite geology baseline conditions are rated as follows:</p> <ul style="list-style-type: none"> ▪ < 20 % depth fines (<1/4” diameter) = Functioning Appropriately; ▪ 21-25% depth fines = Functioning at Risk; ▪ >25% depth fines = Functioning at Unacceptable Risk <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator within the ESA Action Area is <u>Functioning Appropriately</u> within the ESA Action Area and <u>Functioning at Risk</u> when considering the entire 5th field HUC which includes the Salmon River. The effects of the proposed project will not play a role in decreasing or increasing steam sediment within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project’s activities will not measurably restore nor degrade upland and riparian habitats that influence overland sediment flow into the stream. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action’s design criteria and following required standard and guidelines.</p>

<p>Chemical Contaminants/Nutrients</p>	<p>FR_{BT}</p>	<p>There are two 303d streams listed within the Carmen Creek - Salmon River 5th field HUC. They are the Salmon River for Combined Biota/Habitat Bioassessments and Wallace Creek for Sedimentation/Siltation and Water Temperature. There are no 303d streams listed within the ESA Action Area.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <u>Functioning Appropriately</u> within the ESA Action Area and <u>Functioning at Risk</u> when considering the entire 5th field HUC which includes the Salmon River. The effects of the proposed project will not play a role in decreasing or increasing chemical contaminants/nutrients within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not measurably add any chemical contaminants/nutrients into the stream. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Pathway - Habitat Access</p>		
<p>Pathway Indicator</p>	<p>Status of Baseline</p>	<p>Discussion of Baseline – Current Condition</p>
<p>Physical Barriers</p>	<p>FR_{BT}</p>	<p>There are man-made physical barriers (culverts and diversion dams) within the Carmen Creek - Salmon River 5th field HUC on both public and private lands. There are no physical barriers within the ESA Action Area.</p> <p>Therefore it is my professional judgment that the Environmental Baseline for this indicator is <u>Functioning at Risk</u> when considering the entire 5th field HUC and <u>Functioning Appropriately</u> within the ESA Action Area. The effects of the proposed project will not play a role in decreasing or increasing man made barriers within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not remove nor create any man made barriers within any ESA fish bearing streams. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Habitat Elements</p>		
<p>Pathway Indicators</p>	<p>Baseline</p>	<p>Discussion of Baseline – Current Condition</p>
<p>Substrate Embeddedness</p>	<p>NA</p>	<p>The Salmon-Challis National Forest does not collect substrate embeddedness data. Refer to Sediment.</p>

<p>Large Woody Debris</p>	<p>FA to FR BT</p>	<p>Data is limited for large woody debris within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area.</p> <p>It is my professional judgment that large woody debris is <i>Functioning Appropriately</i> within the ESA Action Area and <i>Functioning Appropriately</i> to <i>Functioning at Risk</i> within the entire 5th field HUC. For those streams adjacent to motorized road corridors there is some amount of unauthorized fuelwood gathering that takes place. Some of those trees removed for personal fuelwood could have made it to the stream channel as large woody debris. Those are the stream reaches that would have a <i>Functioning at Risk</i> call. The effects of the proposed project will not play a role in decreasing or increasing large woody debris within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not remove any overstory trees that could create large woody debris in any ESA fish bearing stream within the ESA Action Area. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Pool Frequency and Quality</p>	<p>FA to FR BT</p>	<p>Data is limited for pool frequency and quality within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area.</p> <p>It is my professional judgment that pool frequency and quality is <i>Functioning Appropriately</i> within the ESA Action Area and <i>Functioning Appropriately</i> to <i>Functioning at Risk</i> within the entire 5th field HUC. For those streams adjacent to motorized road corridors there is some amount of unauthorized fuelwood gathering that takes place. Some of those trees removed for personal fuelwood could have made it to the stream channel as large woody debris and created more quality pools. Those are the stream reaches that would have a <i>Functioning at Risk</i> call. The effects of the proposed project will not play a role in decreasing or increasing pool frequency and quality within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not remove any overstory trees that could create quality pools in any ESA fish bearing stream within the ESA Action Area. Also, livestock grazing is being managed so as not to degrade bank stability which could degrade quality pool habitat. Therefore the effects of this action will <i>Maintain</i> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

<p>Off-channel Habitat</p>	<p>FA_{BT}</p>	<p>Data is limited for off-channel habitat within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area. On non confined stream channel reaches where there should be off-channel habitat there are backwaters with cover and low energy off channel areas.</p> <p>It is my professional judgment that off-channel habitats are <u>Functioning Appropriately</u> and naturally within the 5th field HUC. The effects of the proposed project will not play a role in decreasing or increasing off channel habitat within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not measurably restore nor degrade stream habitat elements that create and maintain off channel habitats. Also, livestock grazing is being managed so as not to degrade bank stability which could degrade off channel habitat. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Refugia</p>	<p>FA_{BT}</p>	<p>Quantifiable data is limited for refugia habitat within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area. It is my professional judgment that Refugia Habitat (important remnant habitat for sensitive aquatic species) does exist and are adequately buffered with intact riparian areas. Existing refugia are sufficient in size, number and connectivity to maintain viable populations or sub-populations.</p> <p>It is my professional judgment that refugia habitat is <u>Functioning Appropriately</u> and naturally within the 5th field HUC. The effects of the proposed project will not play a role in decreasing or increasing Refugia Habitat within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area because the project's activities will not measurably restore nor degrade stream habitat elements or riparian areas that create and maintain Refugia Habitat. Also, livestock grazing is being managed so as not to degrade riparian areas and bank stability which could create and maintain Refugia Habitat. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

Channel Condition & Dynamics		
Pathways Indicators	Status of Baseline	Discussion of Baseline – Current Condition
Average Wetted Width/Maximum Depth Ratio	FA to FR BT	<p>Data is limited for average wetted width/maximum depth ratio within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area (see sections 6.4.4 & 7.1.4 above).</p> <p>It is my professional judgment that average wetted width/maximum depth ratio is <u>Functioning Appropriately</u> to <u>Functioning at Risk</u> on ESA stream reaches within the Carmen Creek - Salmon River 5th field HUC and <u>Functioning Appropriately</u> within the ESA Action Area. The effects of the proposed project could play a role in decreasing or increasing average wetted width/maximum depth ratio within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area. The direct correlation between the proposed project’s activities and a negative increase in average wetted width/maximum depth ratio would be if livestock grazing activities are allowed to break down streambanks and significantly decrease the stability of streambanks. Range improvements such as fences and water developments that help to minimize and keep livestock grazing activities away from riparian areas and streambanks can help to restore degraded stream reaches where the average wetted width/maximum depth ratio is greater than 10. Current and future livestock grazing activities are being managed so as not to degrade riparian areas and bank stability which overtime could improve average wetted width/maximum depth ratio. Current streambank conditions at the one monitored site within the ESA Action Area show high streambank stability. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action’s design criteria and following required standard and guidelines.</p>
Streambank Condition	FA to FR BT	<p>Data is limited for streambank condition within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area (see sections 6.4.5 & 7.1.5 above).</p> <p>It is my professional judgment that streambank condition is <u>Functioning Appropriately</u> to <u>Functioning at Risk</u> on ESA stream reaches within the Carmen Creek - Salmon River 5th field HUC because it includes the Salmon River and <u>Functioning Appropriately</u> within the ESA Action Area . The effects of the proposed project’s activities could play a role in decreasing streambank conditions within the ESA Action Area. The direct correlation between the proposed project’s activities and a negative decrease in streambank conditions would be if livestock grazing activities are allowed to break down streambanks and significantly decrease the stability of streambanks. Range improvements such as fences and water developments that help to minimize and keep livestock grazing activities away from riparian areas and streambanks can help to maintain and restore degraded stream reaches where the percent stable streambanks area higher than desired. Current and future livestock grazing activities are being managed so as not to degrade riparian areas and bank stability. Current streambank conditions at the one monitored site within the ESA Action Area show high streambank stability. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action’s design criteria and following required standard and guidelines.</p>

<p>Floodplain Connectivity</p>	<p>FA_{BT}</p>	<p>Most all stream reaches within the Carmen Creek - Salmon River 5th field HUC and within the ESA Action Area can access their floodplains. Off channel areas are frequently hydrologically linked to main channels. Overbank flows occur and maintain wetland functions, riparian vegetation and succession.</p> <p>It is my professional judgment that floodplain connectivity is <u>Functioning Appropriately</u> on ESA stream reaches within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area. The effects of the proposed project's activities could play a role in decreasing streambank conditions, within the ESA Action Area, which in turn could negatively affect floodplain connectivity. The direct correlation between the proposed project's activities and a negative decrease in streambank conditions would be if livestock grazing activities are allowed to break down streambanks and significantly decrease the stability of streambanks. Range improvements such as fences and water developments that help to minimize and keep livestock grazing activities away from riparian areas and streambanks can help to maintain and restore degraded stream reaches where the percent stable streambanks area higher than desired. Current and future livestock grazing activities are being managed so as not to degrade riparian areas and bank stability. Current streambank conditions at the one monitored site within the ESA Action Area show high streambank stability. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Flow/Hydrology</p>		
<p>Pathways Indicators</p>	<p>Status of Baseline</p>	<p>Discussion of Baseline – Current Condition</p>
<p>Change in Peak/Base Flows</p>	<p>FR_{BT}</p>	<p>Within the entire Carmen Creek - Salmon River 5th field HUC, below National Forest System lands there are a number of water diversions that take water out of the stream. This would show some evidence of altered peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography. Within the ESA Action Area the watershed hydrograph would indicate peak flow, baseflow and/or flow timing characteristics comparable to an undisturbed watershed of similar size, geology and geography.</p> <p>It is my professional judgment that change in peak/base flows is <u>Functioning at Risk</u> for the Carmen Creek - Salmon River 5th field HUC but would be <u>Functioning Appropriately</u> on ESA stream reaches within the ESA Action Area. The effects of the proposed project's activities will not play a role in changing peak flows and base flows in the Carmen Creek - Salmon River 5th field HUC or within the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

<p>Increase in Drainage Network</p>	<p>FA_{BT}</p>	<p>There has been a zero or minimum increase in active channel length correlated with human caused disturbance within the Carmen Creek -Salmon River 5th field HUC.</p> <p>It is my professional judgment that increase in drainage network is <u>Functioning Appropriately</u> for the Carmen Creek - Salmon River 5th field HUC. The effects of the proposed project's activities will not play a role in changing or increasing the drainage network in the Carmen Creek - Salmon River 5th field HUC or within the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Watershed Condition</p>		
<p>Pathway Indicators</p>	<p>Status of Baseline</p>	<p>Discussion of Baseline – Current Condition</p>
<p>Road Density and Location</p>	<p>FR_{BT}</p>	<p>The Carmen Creek - Salmon River 5th field HUC has 279.2 miles of roads, a road density of 1.6 (mi/mi²) with some valley bottom roads (68.2 miles of road within a PACFISH RHCA and 24.4% of the roads are within a PACFISH RHCA).</p> <p>It is my professional judgment that road density and location is <u>Functioning at Risk</u> for the Carmen Creek - Salmon River 5th field HUC. The effects of the proposed project's activities will not play a role in road density or location in the Carmen Creek - Salmon River 5th field HUC or within the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Disturbance History</p>	<p>FA_{BT}</p>	<p>The ECA for the Carmen Creek - Salmon River 5th field HUC is 6.4 percent with an overall cumulative effects rating of Low. This rating is caused by timber harvest and historic fires within the Carmen Creek - Salmon River 5th field HUC. There are no concentrations of disturbance in unstable areas, and/or refugia, and or riparian areas. An ECA rating of greater than 15 percent is considered functioning at risk.</p> <p>It is my professional judgment that disturbance history is <u>Functioning Appropriately</u> for the Carmen Creek - Salmon River 5th field HUC. The effects of the proposed project's activities will not play a role in disturbance history within the Carmen creek - Salmon River 5th field HUC or within the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

<p>Riparian Conservation Areas</p>	<p>FA_{BT}</p>	<p>The riparian conservation areas provide adequate shade, large woody debris recruitment and habitat protection and connectivity within the Carmen Creek - Salmon River 5th field HUC, buffers or includes known refugia for sensitive aquatic species (>80% intact) and adequately buffer impacts on rangelands. The percent similarity of riparian vegetation to the potential natural community/composition is >50%.</p> <p>It is my professional judgment that riparian conservation areas are <u>Functioning Appropriately</u> for the Carmen Creek - Salmon River 5th field HUC. The effects of the proposed project's activities could play a role in negatively affecting riparian conservation areas. Range improvements such as fences and water developments help to minimize or eliminate livestock grazing activities within some riparian areas. Current and future livestock grazing activities are being managed so as not to degrade riparian conservation areas. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>
<p>Disturbance Regime (bull trout only)</p>	<p>FA_{BT}</p>	<p>The disturbance regime, within the Carmen Creek - Salmon River 5th field HUC, has short lived environmental disturbances with a predictable hydrograph, high quality habitat and watershed complexity providing refuge and rearing space for all life stages or multiple life-history forms. Natural processes are stable.</p> <p>It is my professional judgment that disturbance regimes are <u>Functioning Appropriately</u> for the Carmen Creek - Salmon River 5th field HUC. The effects of the proposed project's activities could play a role in negatively affecting disturbance regimes. Range improvements such as fences and water developments help to minimize or eliminate livestock grazing activities within some riparian areas. Current and future livestock grazing activities are being managed so as not to degrade riparian areas and stream habitat within the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

Integration of Species and Habitat Conditions		
Pathway Indicators	Status of Baseline	Discussion of Baseline – Current Condition
(bull trout only)	FA _{BT}	<p>Within the Carmen Creek - Salmon River 5th field HUC habitat quality and connectivity among subpopulations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth are consistent with pristine habitat. The subpopulation has the resilience to recover from short-term disturbances within one to two generations (5-10 years). The subpopulation is fluctuating around equilibrium or is growing.</p> <p>It is my professional judgment that integration of species and habitat conditions are <u>Functioning Appropriately</u> for the Carmen creek - Salmon River 5th field HUC. The effects of the proposed project's activities could play a role in negatively affecting integration of species and habitat conditions. Range improvements such as fences and water developments help to minimize or eliminate livestock grazing activities within some riparian areas and stream reaches. Current and future livestock grazing activities are being managed so as not to degrade riparian areas and stream habitat within the Carmen Creek - Salmon River 5th field HUC and the ESA Action Area. Therefore the effects of this action will <u>Maintain</u> this environmental baseline condition because of the action's design criteria and following required standard and guidelines.</p>

Status of Baseline: Functioning Appropriately – **FA** Functioning at Risk – **FR** Functioning at Unacceptable Risk – **FUR**

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

Effects of the Action:

- Restore – the action will result in a positive change in the indicator evaluated
- Maintain – the action will have no effect on the status of the indicator evaluated
- Degrade – the action will result in a negative change in the indicator evaluated
- Professional Judgment – **PJ**

APPENDIX C – MONITORING DATA AND SUMMARIES

Figure 5 - Carmen Creek Allotment Monitoring Sites Map

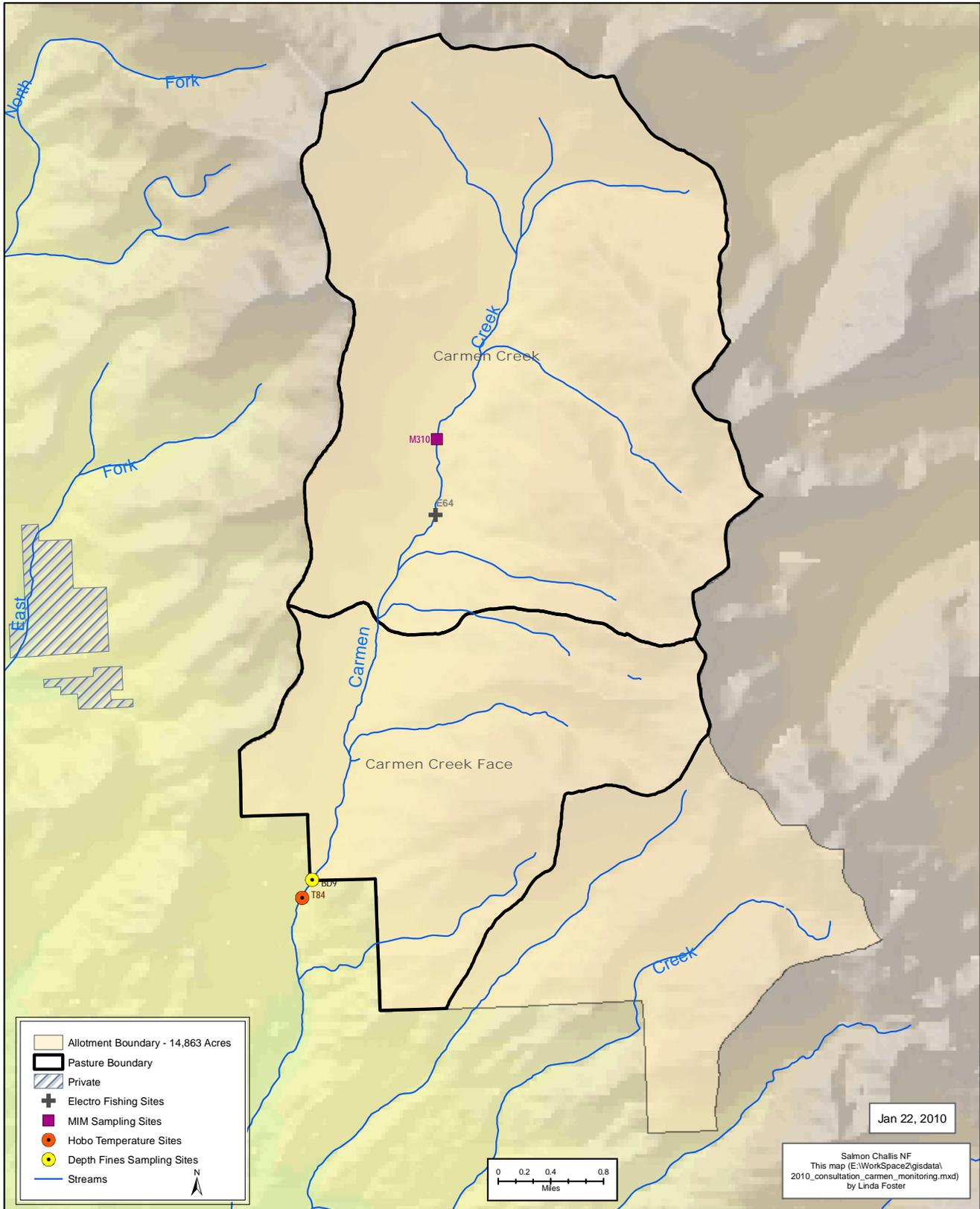


Figure 6 - Carmen Creek Allotment Vegetation Map

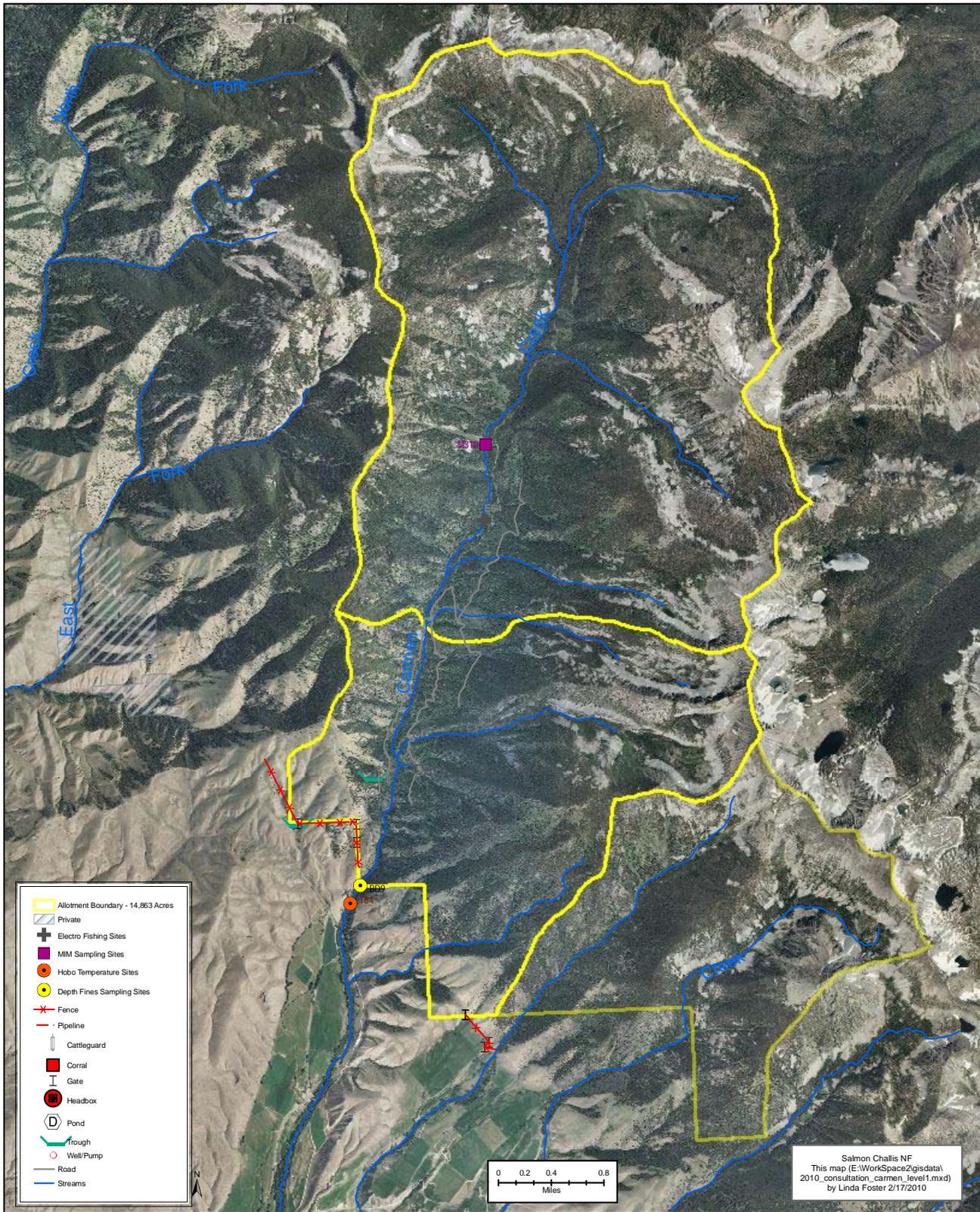


Table 11 - Carmen Creek Allotment Summary of Monitoring Data Collected

<u>Carmen Creek Allotment</u>	Chinook salmon	Chinook Salmon Presence Miles	Spawning Miles	Chinook salmon DCH miles	steelhead	Steelhead Presence Miles	Spawning Miles	steelhead DCH miles	bull trout	Bull Trout Presence Miles	Spawning Miles	bull trout Proposed CH miles	Temperature	Sediment	Electrofishing	Width to Depth Ratio	Streambank Condition	Greenline Ecological Status
Carmen Creek	No	0	0	0	No	0	0	0	Yes	6.18	6.18	6.99	94-01,03, 05-09	93-05	97,99,02-05,07,09	1988	94-05	95,09

Table 12 - Carmen Creek Allotment (bull trout)

Bull Trout Present		Bull Trout Spawning		Bull Trout Proposed CH	
Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH
+ Carmen Creek	6.18	+ Carmen Creek	6.18	+ Carmen Creek	6.99
Grand Total	6.18	Grand Total	6.18	Grand Total	6.99

Table 13 - Carmen Creek Allotment's Units (bull trout)

Bull Trout Present		Bull Trout Spawning		Bull Trout Proposed CH	
Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH	Row Labels	Sum of LENGTH
- Carmen Creek Unit	4.06	- Carmen Creek Unit	4.06	- Carmen Creek Unit	4.86
+ Carmen Creek	4.06	+ Carmen Creek	4.06	+ Carmen Creek	4.86
- Carmen Creek Face Unit	2.13	- Carmen Creek Face Unit	2.13	- Carmen Creek Face Unit	2.13
+ Carmen Creek	2.13	+ Carmen Creek	2.13	+ Carmen Creek	2.13
Grand Total	6.18	Grand Total	6.18	Grand Total	6.99

Table 14 - Water Temperature 2004 – 2009

Unit	Site ID	Year	Monitoring Period	Maximum Daily Temperature	Maximum of 7 day Moving Maximum	Mean Temperature 7/1 to 9/30
Carmen Creek Face	Carmen Creek	2005	6/30 – 9/18	20.2°C	19.3°C	Insufficient Data
		2006	6/29 – 9/18	16.4°C	15.9°C	Insufficient Data
		2007	6/30 – 9/19	17.9°C	16.9°C	Insufficient Data
		2008	7/10 – 11/01	16.0°C	15.2°C	Insufficient Data
		2009	7/1 – 9/30	13.7°C	13.1°C	9.8°C

Table 15 - Multiple Indicators Monitoring (MIM) Summary

Carmen Creek Greenline Summary										
Unit	Creek Name	Site #	Year	Width: Depth Ratio	Bank Stability	Woody Species Regeneration		Greenline Ecological Status (GES)*	GES Trend	Summary of Trend
						Seedling/Young (#/%)	Mature/Dead (#/%)			
Carmen Creek	Carmen Creek	M310	1995	N/A	100	137/49	140/51	85/PNC	Base	Established site does not meet greenline criteria. Photo trend monitoring was established. Photo trend shows little change in the stream since 1995. The stream is very rocky and steep. Livestock are present near the stream for 29 days and have limited access to stream because of steep topography and dense vegetation.
			2009	N/A	N/A	N/A	N/A	PNC	Static	

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

Carmen Creek Allotment Riparian Discussion:

Carmen Creek: The established site does not meet greenline criteria. Therefore photo trend monitoring was established. The photo trend monitoring shows little change in the stream since 1995. The stream is very rocky and steep. Livestock are present near the stream for 29 days but have limited access to stream because of steep topography and dense overstory and understory vegetation. The best monitoring attribute to manage the monitoring site is browse use with an annual use indicator not to exceed 50%. The monitoring attribute of greenline stubble with an annual use indicator no less than 4 inches will also be used.

**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 create a detailed map of those areas that have already been designated by the rule. For the purposes of the project, we assume CSCH to be all areas currently or historically occupied by Chinook salmon. This process includes only those areas within the administrative boundary of the SCNF.

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

Step 1: Add reaches identified by the Intrinsic Potential Model

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

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

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

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

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

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

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

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

Various organizations other than the SCNF have conducted fisheries assessments and resulting data are valuable for identifying areas where Chinook salmon have occurred within the SCNF. Such organizations may include, but not be limited to a) the Idaho Department of Fish and Game, b) the Department of Environmental Quality, and c) Native

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

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

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

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

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

- a) **Proximity to CSCH:** The tributary must connect to a stream or river currently included as CSCH.
- b) **Watershed Size:** An evaluation of the smallest tributaries where Chinook salmon presence was confirmed within the SCNF can be useful in estimating the lower limits to watershed size constraining use of streams by Chinook. The average lower limit to watershed size where Chinook were present or presumed likely to use as refuge on the South Zone of the SCNF was approximately seven square miles. This value or a value that is appropriate for a given geographic area may be used to identify tributaries where it is reasonable to assume that Chinook salmon can access and use as refuge.
- c) **Fish-Bearing Streams:** Streams accessible to other salmonids can reasonably be assumed to be accessible to Chinook. Tributaries that contain other salmonids and are not smaller than the lower limit to watershed size shall be considered for inclusion as CSCH for 0.25 miles upstream from the confluence. Tributaries meeting this criterion, but exhibiting barriers to migration at the confluence shall be considered for exclusion from CSCH.
- d) **Non-Fish-Bearing Streams:** Streams inaccessible to other salmonids can reasonably be assumed to be inaccessible to Chinook and shall generally be considered for exclusion from CSCH.

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

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

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

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

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

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<http://yukonriverpanel.com/salmon/about/yukon-river-salmon/chinook/>

**APPENDIX E – BULL TROUT PRIMARY CONSTITUENT ELEMENTS OF CRITICAL
HABITAT**

Primary Constituent Elements of Critical Habitat

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

The following are the specific PCEs for the proposed bull trout critical habitat (January 13, 2010, Federal Register 75FR2270) and examples of habitat indicators that can be used to assess the condition of the PCEs. Many of the Forest “focus indicators” match the examples (highlighted in the Associated Habitat Indicators). They have been thoroughly addressed within the environmental baseline conditions and the site specific effects analysis. Therefore, they form the basis for the Forest’s determination for effects to the species and potential critical habitat.

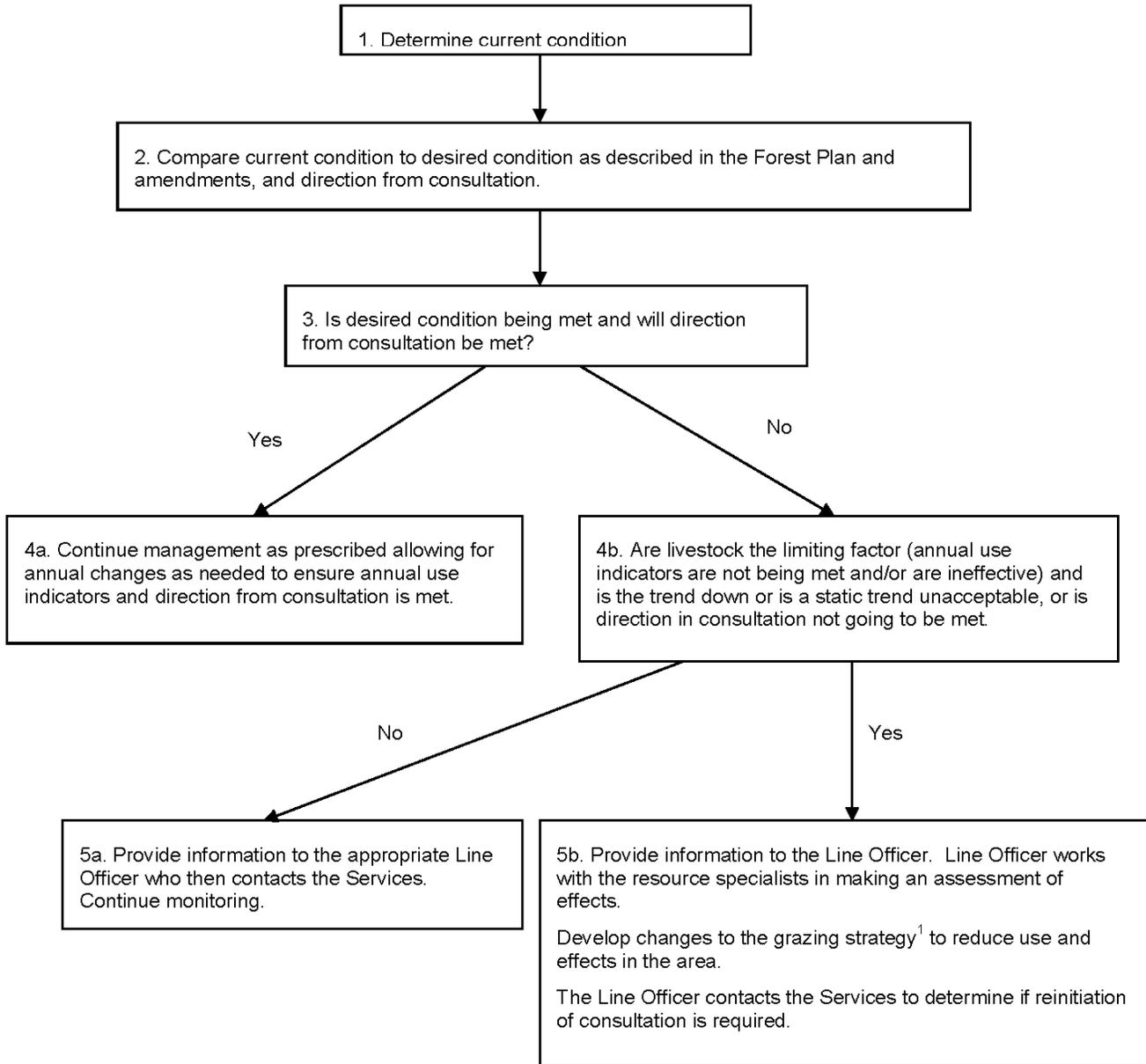
Primary Constituent Elements for Proposed Bull Trout Critical Habitat and Associated Habitat Indicators

PCE #	PCE Description	Associated Habitat Indicators
1.	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	floodplain connectivity, change in peak/base flows, increase in drainage network, riparian conservation areas , chemical contamination/nutrients
2.	Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	life history diversity and isolation, persistence and genetic integrity, temperature , chemical contamination/nutrients, physical barriers, average wetted width/maximum depth ratio in scour pools in a reach , change in peak/base flows, refugia
3.	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	growth and survival, life history diversity and isolation, riparian conservation areas , floodplain connectivity (importance of aquatic habitat condition indirectly covered by previous seven PCEs)

4.	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	large woody debris, pool frequency and quality, large pools, off channel habitat, refugia, average wetted width/maximum depth ratio in scour pools in a reach, streambank condition , floodplain connectivity, riparian conservation areas
5.	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	temperature , refugia, average wetted width/maximum depth ratio in scour pools in a reach , streambank condition , change in peak/base flows, riparian conservation areas , floodplain connectivity
6.	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.	sediment, substrate embeddedness , large woody debris, pool frequency and quality
7.	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	change in peak/base flows, increase in drainage network, disturbance history*, disturbance regime (* Information relative to disturbance history is often found in the baseline narrative)
8.	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	sediment , chemical contamination/nutrients, change in peak/base flows
9.	Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.	persistence and genetic integrity, physical*barriers* (* Information relative to disturbance history is often found in the baseline narrative)

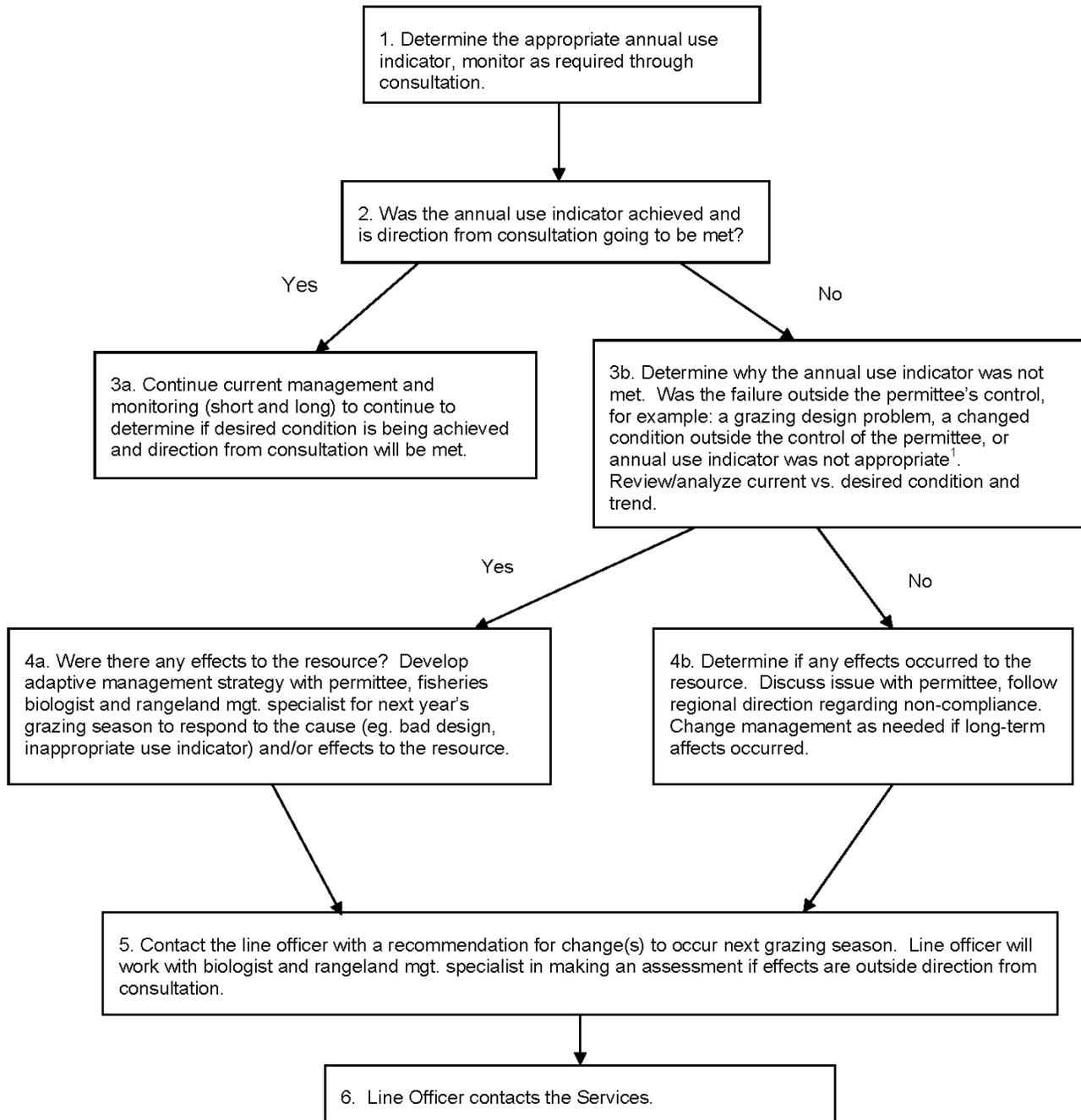
APPENDIX F – ADAPTIVE MANAGEMENT DIAGRAMS

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



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

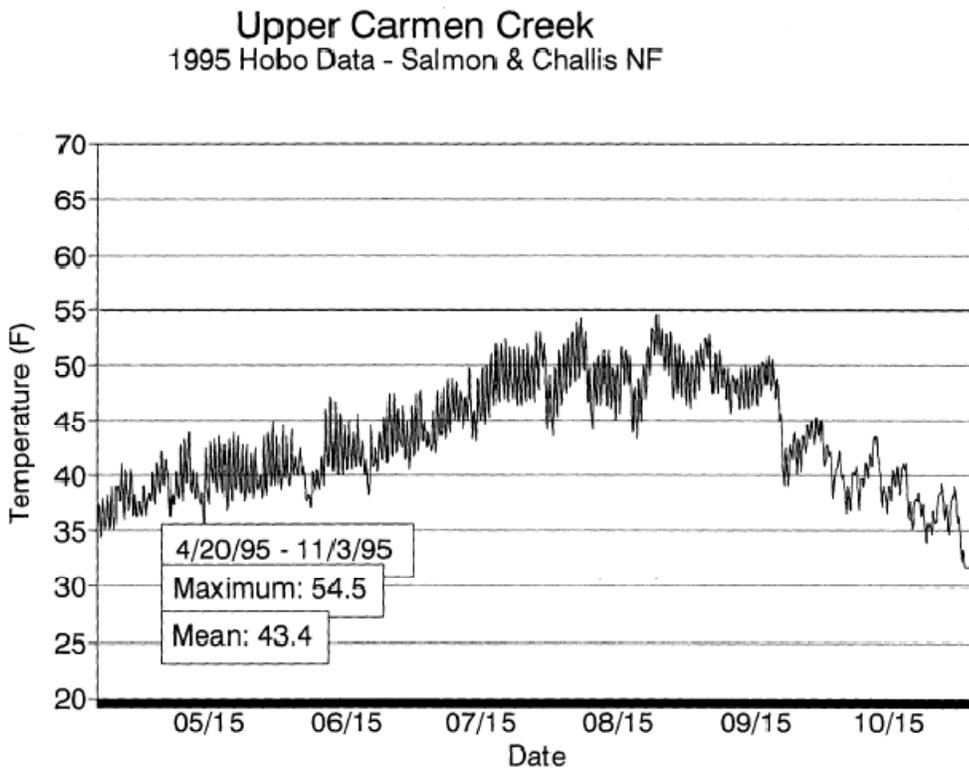
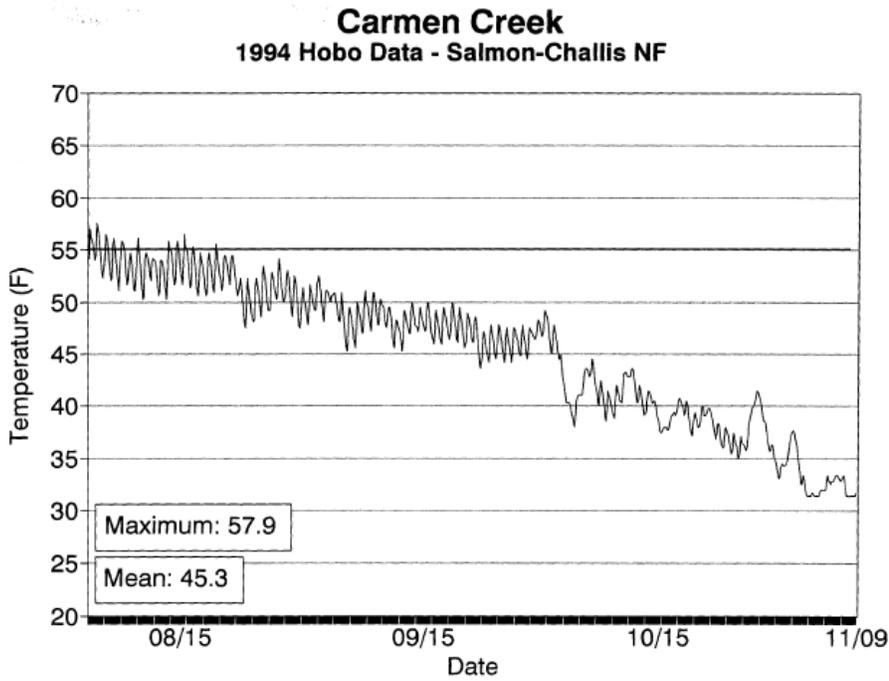
Diagram 2.0 - Implementation of Annual Adaptive Management Strategy for Allotments Requiring Consultation.

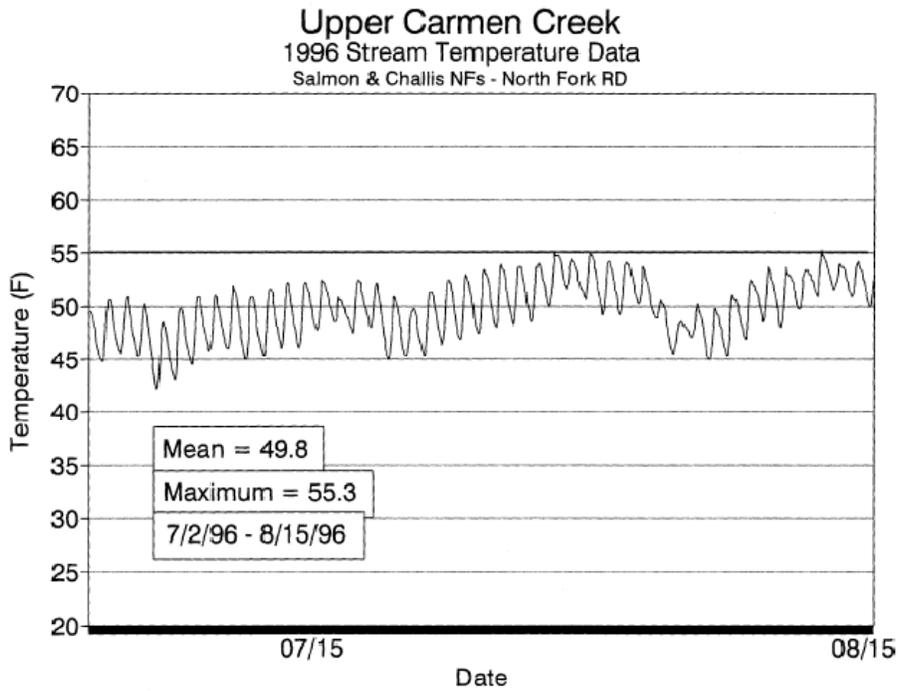


¹An inappropriate annual use indicator is an indicator that does not most accurately identify the weak link or first attribute that would indicate excessive livestock impacts. In this situation, changing to a more appropriate indicator will help achieve or maintain desired conditions.

APPENDIX G – STREAM TEMPERATURE GRAPHS

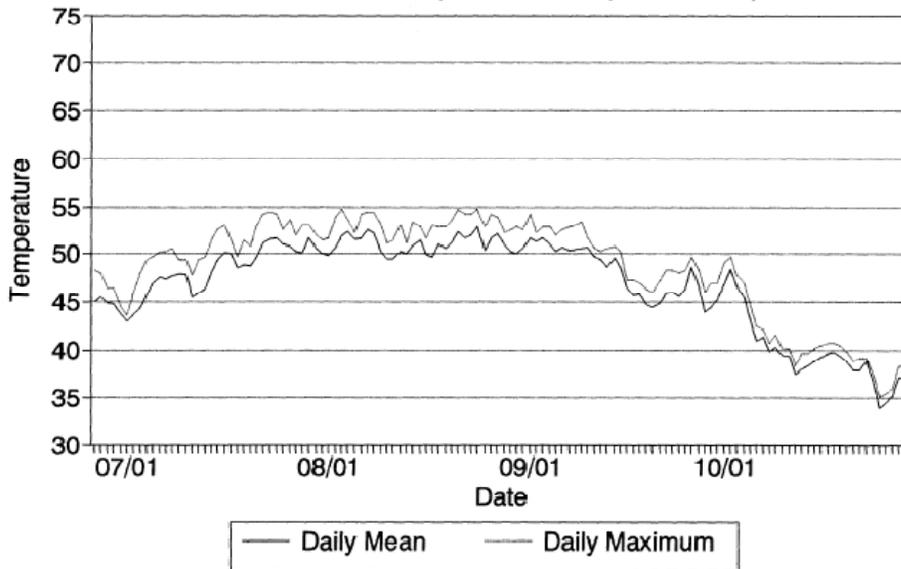
Carmen Creek #2





UPPER CARMEN CREEK Section 7 Upper Salmon River Watershed

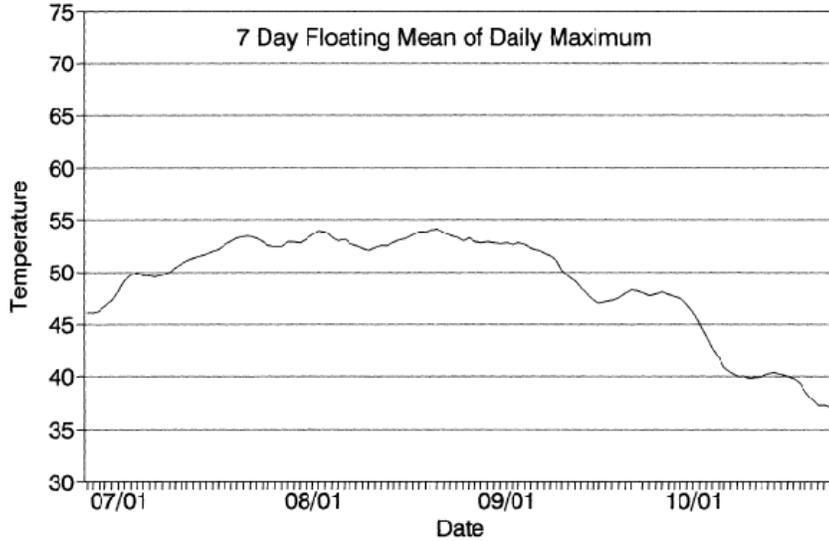
1997 Water Temperature Data (6/26 - 10/29)



UPPER CARMEN CREEK

Section 7 Upper Salmon River Watershed

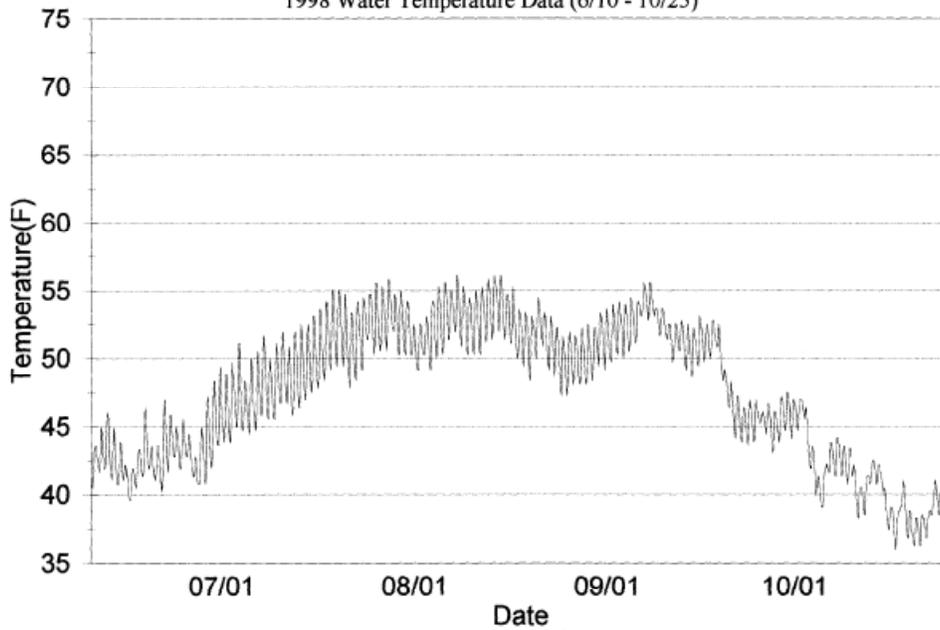
1997 Water Temperature Data (6/26 - 10/29)



UPPER CARMEN CREEK

SEC 7 Upper Salmon R. Watershed

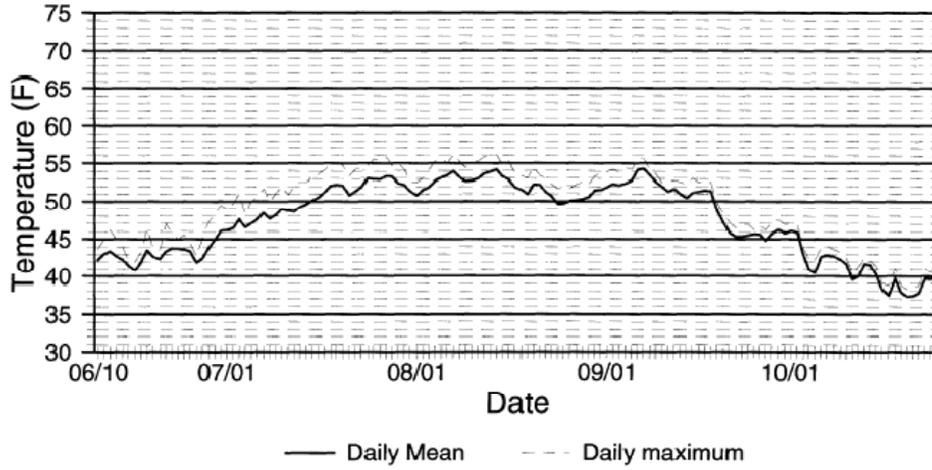
1998 Water Temperature Data (6/10 - 10/25)



UPPER CARMEN CREEK

Section 7 Upper Main Salmon Watershed

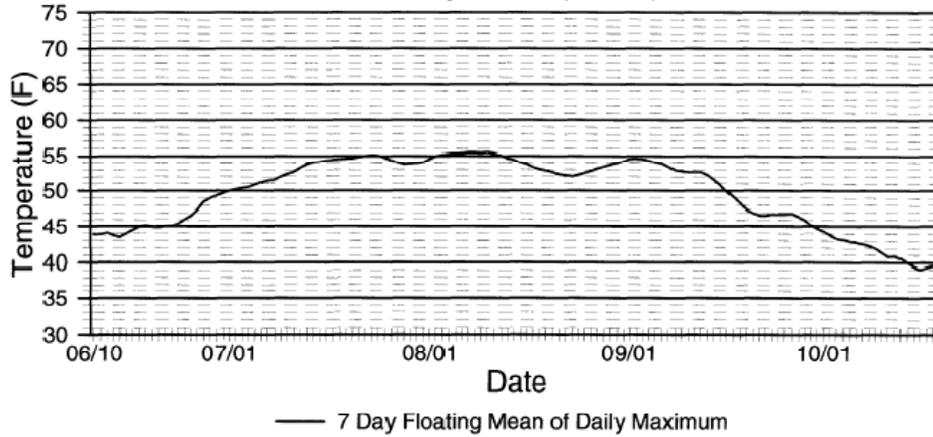
1998 Water Temperature Data (6/10-10/25)

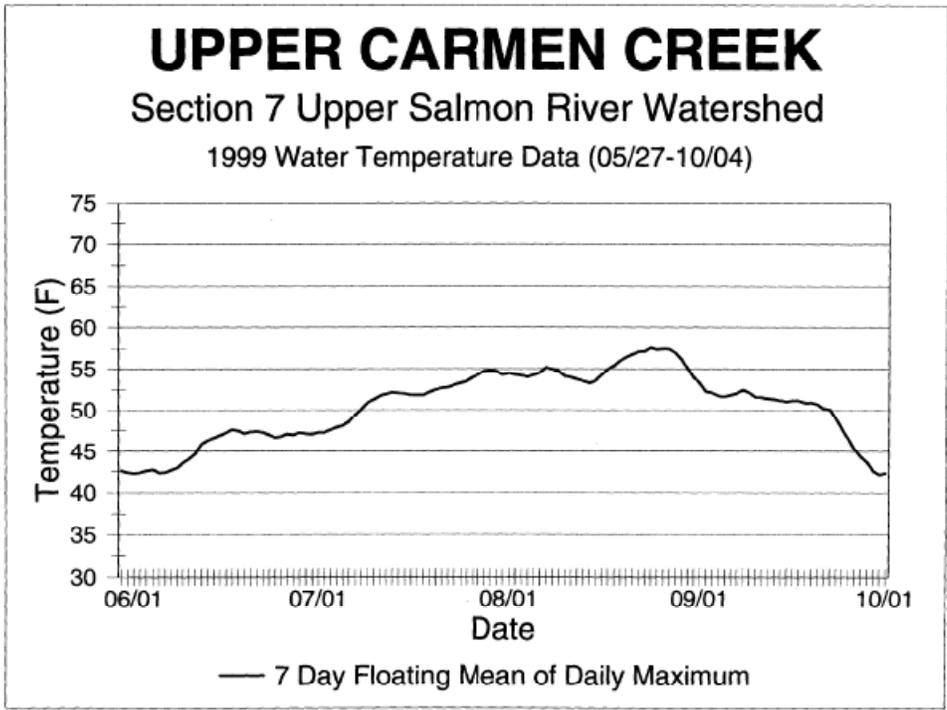
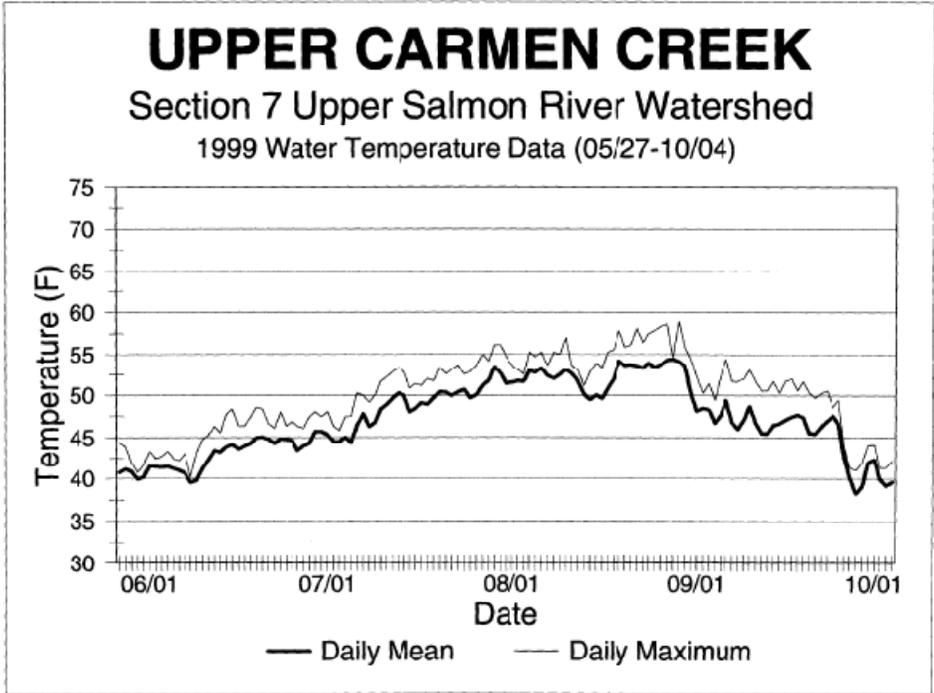


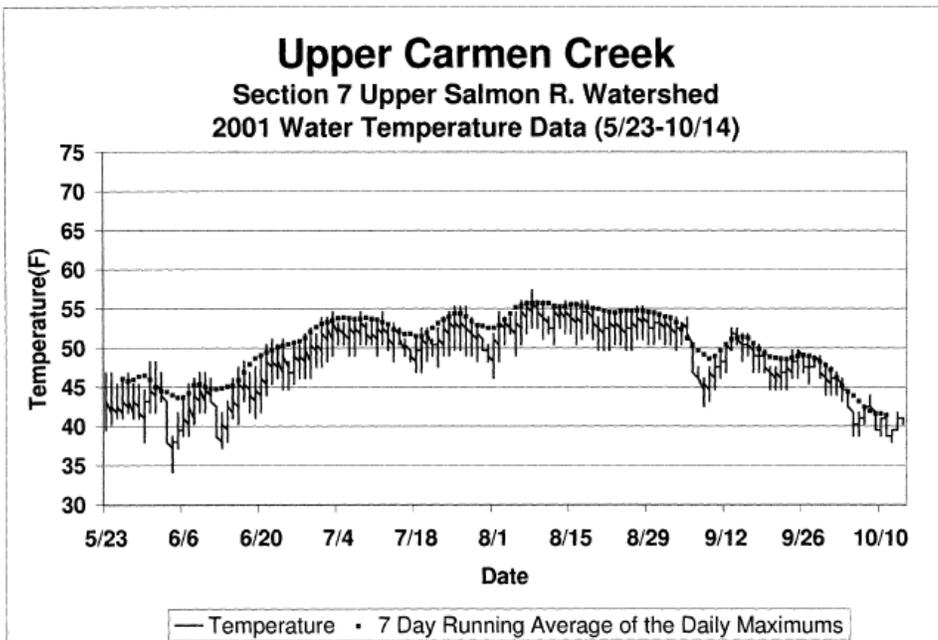
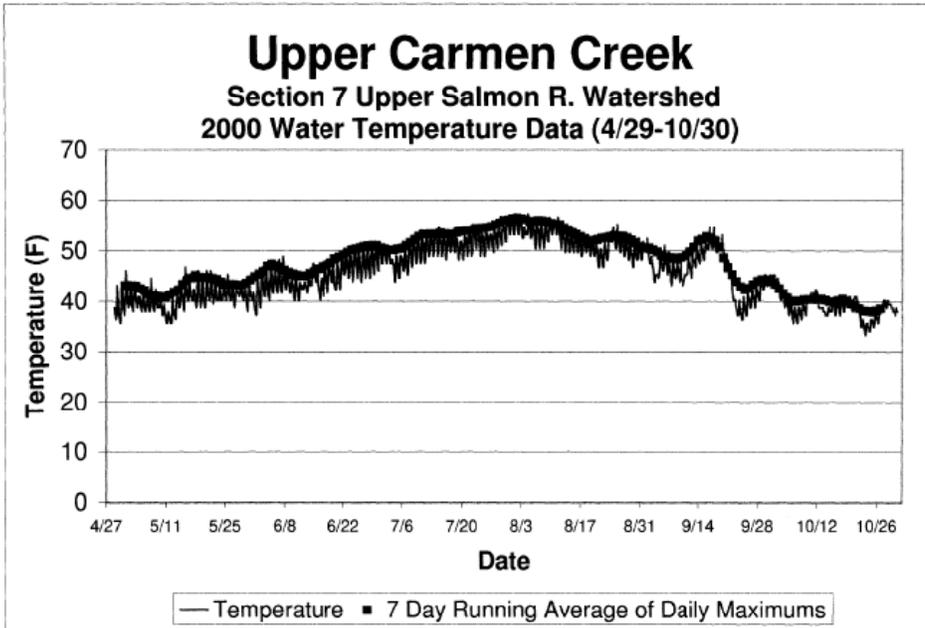
UPPER CARMEN CREEK

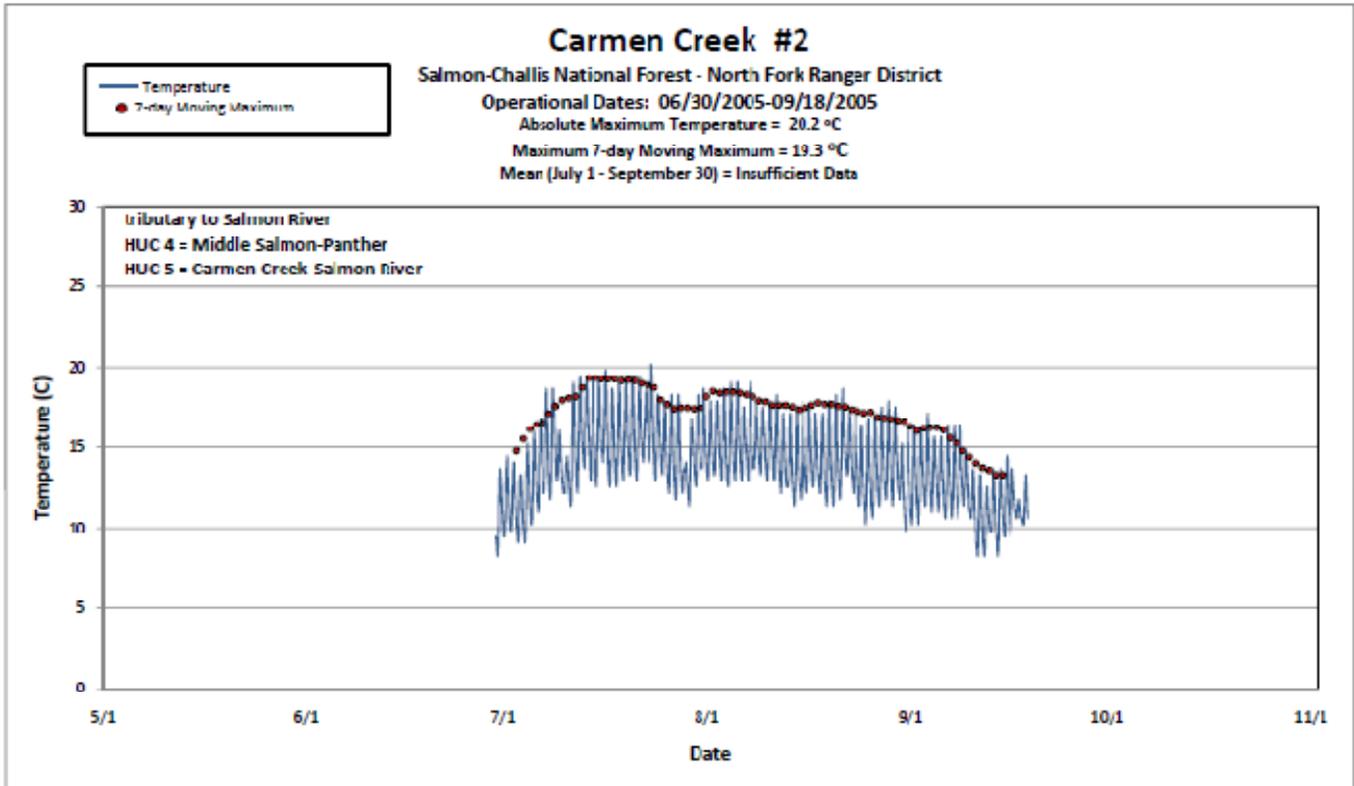
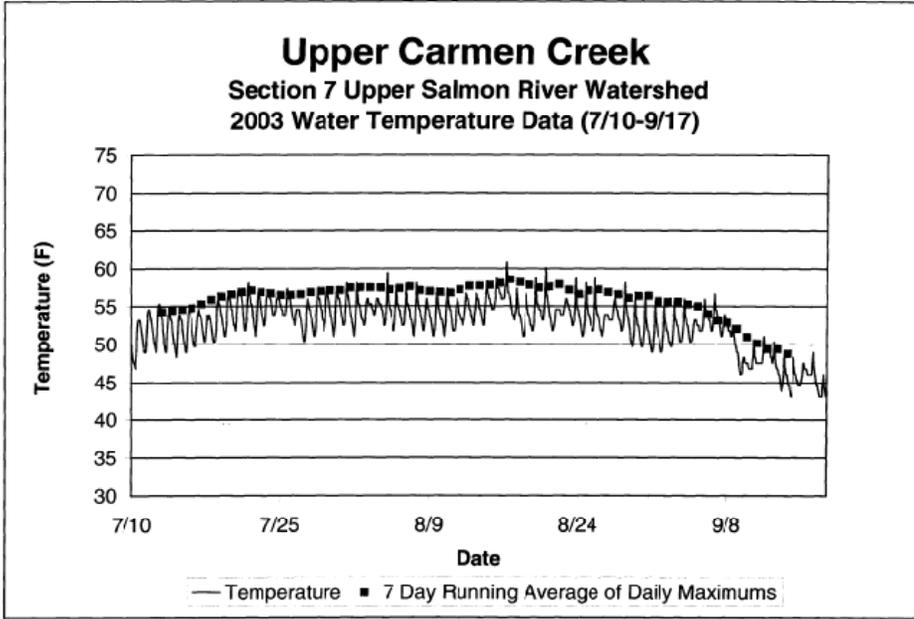
Section 7 Upper Main Salmon Watershed

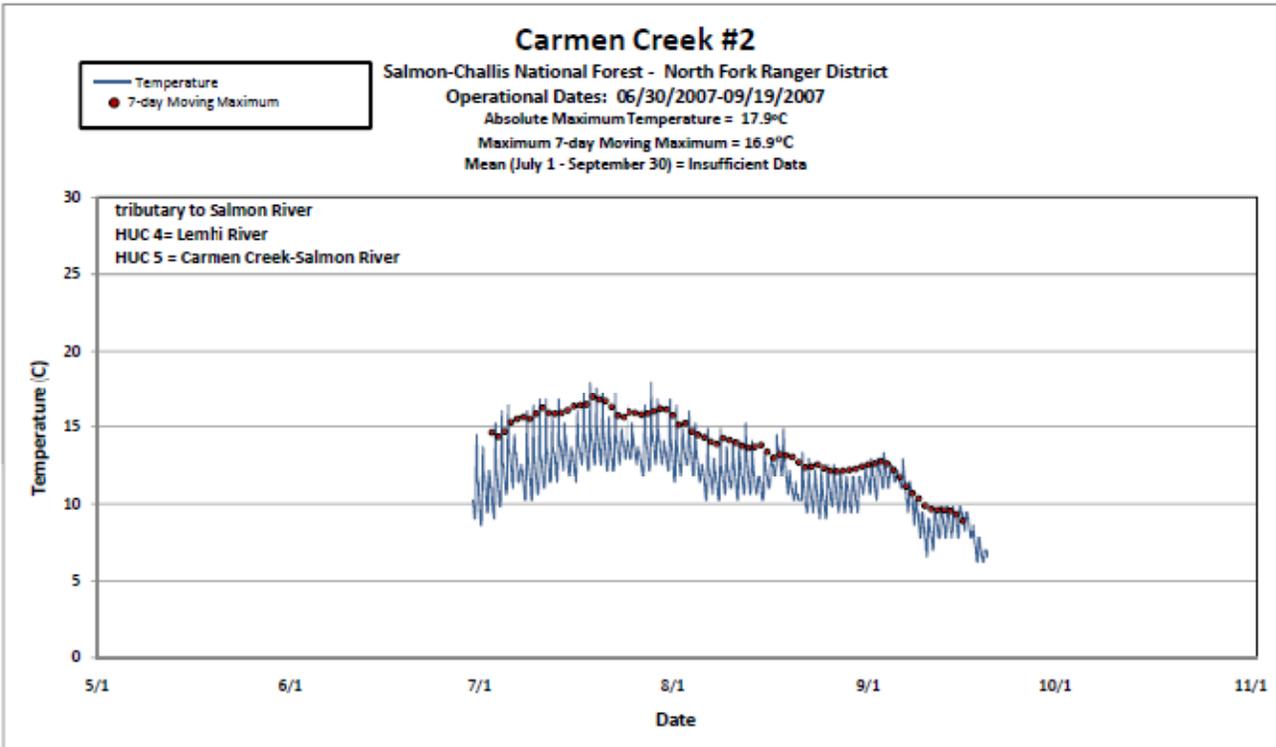
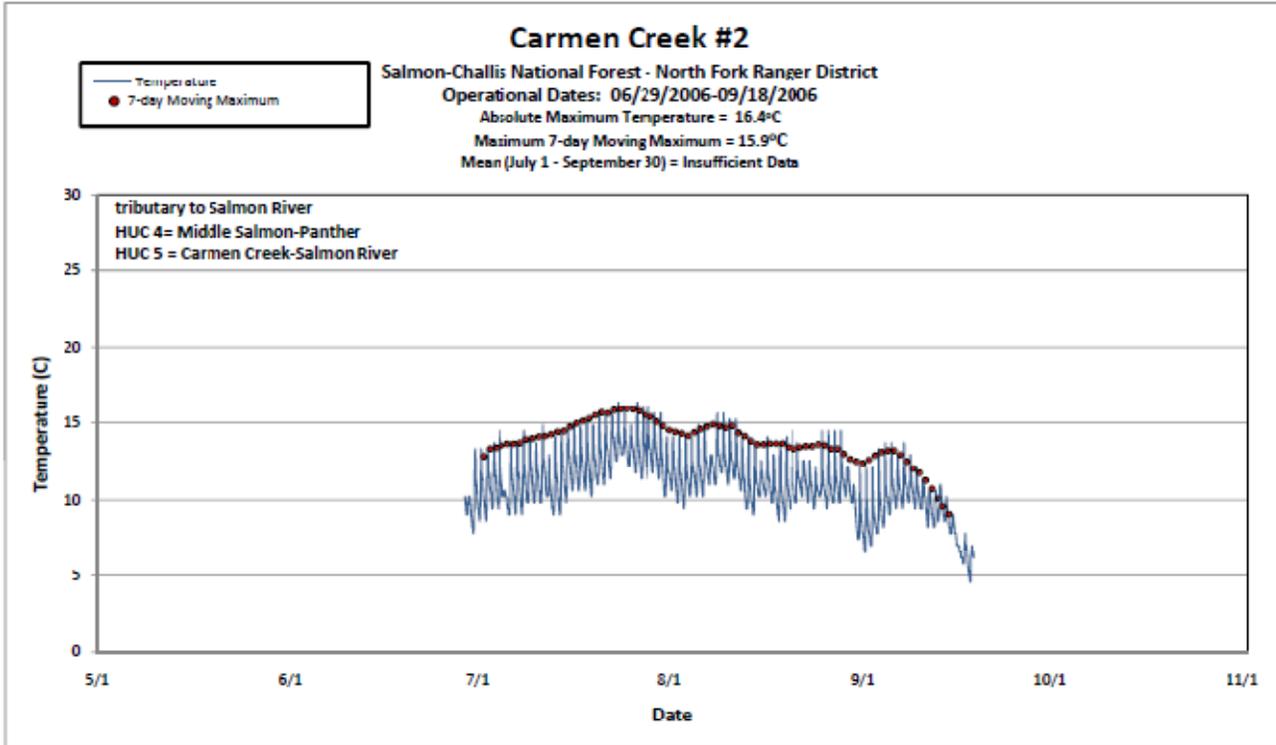
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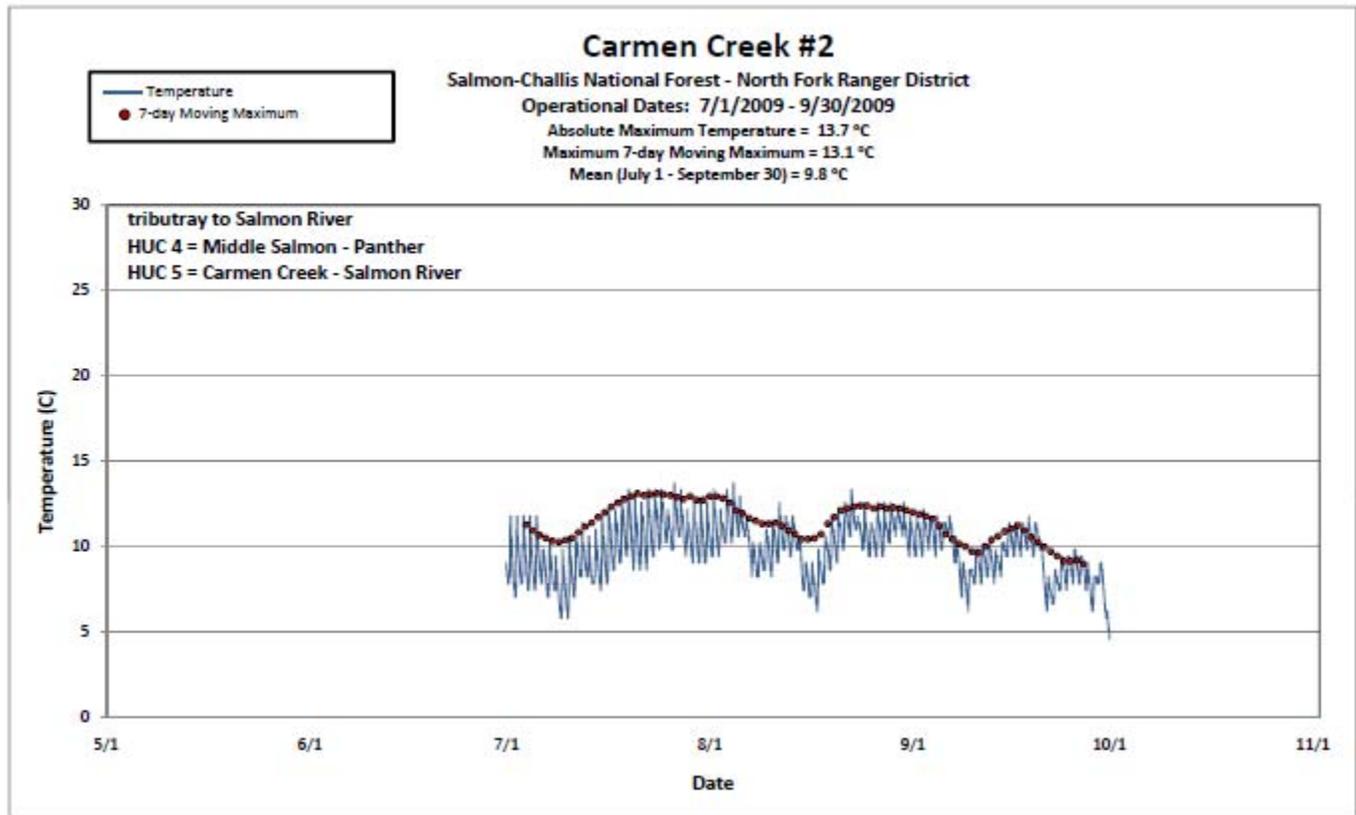
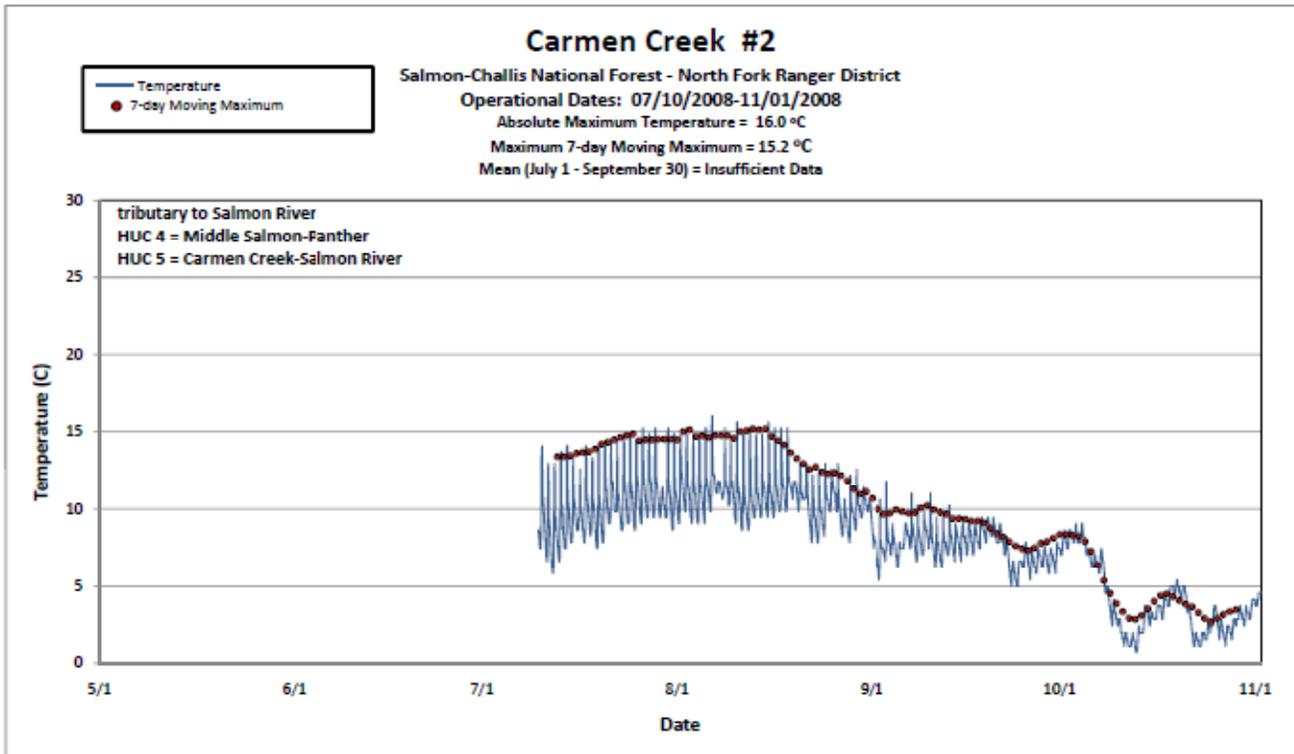












APPENDIX H – ELECTROFISHING STREAM SUMMARY WITHIN ESA ACTION AREA

Fish/100m² population density is calculated using fish 70mm or greater in length.

Stream Name	Year								
Carmen Creek 11.59	2009			2009			2009		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	64	16	13
	2007			2007			2007		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	44	20	20
	2004			2004			2004		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	20	13/5	9
	1999			1999			1999		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	24	8	19
	1997			1997			1997		
	Chinook salmon			steelhead			bull trout		
1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	
0	0	NA	0	0	NA	14	4	7	
Carmen Creek 12.7	2005			2005			2005		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	26	6	6
	1997			1997			1997		
	Chinook salmon			steelhead			bull trout		
	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²	1st pass	2nd/3rd pass	fish/100m ²
	0	0	NA	0	0	NA	18	7	10

APPENDIX I – STREAM PICTURES WITHIN THE ESA ACTION AREA

Carmen Creek

