

Aquatic Species Biological Assessment for Livestock Grazing on the Little Morgan Creek Allotment

**CHILLIS-YANKEE FORK RANGER DISTRICT
SALMON-CHALLIS NATIONAL FOREST
CUSTER COUNTY, IDAHO**

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1 INTRODUCTION

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

2 BACKGROUND INFORMATION

The Little Morgan Creek Allotment is located on the Challis/Yankee Fork District in the Lower Pahsimeroi HUC 5 watershed. This allotment covers the Forest Service portion of the Little Morgan Creek drainage from the private/BLM boundary upstream and excluding the East Fork of Little Morgan Creek.

3 PROPOSED ACTION

3.1 PROJECT AREA

The allotment includes 7,404 acres and is authorized for grazing up to 115 cow/calf pairs under a rotation grazing system with grazing occurring anytime between June 16 and September 9. The allotment consists of the Fred and Mary and the Poison Basin units (Figures 1 and 2). The allotment is entirely within the Lower Pahsimeroi 5th Field HUC (5th Field HUC: 1704021703) (Figure 3).

3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The grazing permit for this allotment is permit #20004 which expires on December 31, 2010.

3.2.2 GRAZING SYSTEM

There is one general rotation that will typically be used on this allotment (Table 1). A deferred rotation system cannot be used on this allotment because the Poison Basin Unit contains high amounts of larkspur and must be grazed late to prevent livestock mortality. Livestock will not graze within the Fred and Mary Unit or in the Poison Basin Unit after August 15. Livestock will not trail from the Poison Basin Unit through the Fred and Mary Unit after August 15. Livestock access to that portion of North Fork Morgan Creek within the Fred and Mary Unit, including access during trailing, is not being authorized after August 15 to prevent livestock from trampling bull trout redds.

TABLE 1 – GENERAL ROTATION SCHEDULE

All Years
Fred and Mary ^A
Poison Basin

Fred and Mary (trailing only)^B

^A Livestock will not graze within this unit during this rotation after August 15

^B Livestock will not be trailed through this unit after August 15.

Entry: Livestock enter the allotment from an adjacent BLM allotment.

Exit: Livestock exit the allotment to an adjacent BLM allotment.

3.2.3 RESOURCE OBJECTIVES

Resource Objectives and Effectiveness Monitoring: The allotment is being managed to achieve specific resource conditions in riparian areas. Resource objectives are the Forest's description of the desired land, plant, and water resources condition within riparian areas in the allotment. Some resource objectives are Riparian Management Objectives (RMOs) that were implemented as part of the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) and the consultation associated with that strategy (USDA Forest Service and USDI Bureau of Land Management 1995). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon and Challis Forest Plans in 1995 and applies to national forest lands in the Salmon River basin. PACFISH established riparian management objectives, standards and guidelines, and monitoring direction that the forest is required to follow.

The allotment is being managed to achieve the following resource conditions in riparian areas:

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: Sufficient woody recruitment to develop and maintain healthy woody plant populations (Winward 2000, Burton et al. 2008)

Bank Stability RMO (PACFISH)¹: Within priority watersheds, a bank stability of at least 90% or the current value, whichever is greatest. Outside of priority watersheds, a bank stability of at least 80% or the current value, whichever is greatest.

Water Temperature RMO (PACFISH): No measureable increase in maximum temperature.² For steelhead and Chinook salmon, <64°F in migration and rearing areas and <60°F in spawning areas except in steelhead spawning areas within steelhead priority watersheds during the spawning and incubation period where the RMO is <45°F.³ For bull trout, maximum water temperatures below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats.⁴

Width:Depth Ratio RMO (PACFISH): <10 or by channel type as follows⁵:

- A Channel: 21
- B Channel: 27
- C Channel: 28

¹ The PACFISH environmental assessment established a riparian management objective for bank stability of 80%. However, during consultation this standard was increased to 90% within priority watersheds.

² In this case, maximum water temperature is expressed as the 7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.

³ The PACFISH environmental assessment established a riparian management objective for water temperature of <64°F in migration and rearing areas and <60°F in spawning areas. However, during consultation this standard was changed to <45°F in steelhead spawning areas within steelhead priority watersheds during the spawning and incubation period.

⁴ This standard was established by INFISH and is being applied to areas occupied by bull trout within the area covered by PACFISH.

⁵ These values are based on the mean values observed for streams in natural condition within the Salmon River (Overton et al. 1995)

Sediment RMO (PACFISH)⁶: Areas where Chinook salmon, steelhead, and bull trout spawn within priority watersheds, <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. All other areas, no more than a two percent increase over existing levels and where existing levels are at 30% or above new activities that would create additional stream sedimentation would not be allowed (Land Resource Management Plan for the Challis National Forest).

3.2.4 MANGEMENT STANDARDS AND GUIDELINES

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

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.

The PACFISH environmental assessment defines “Adverse Effects” to include “...short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature, such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproduction success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage.”

- 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.

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

- Protect anadromous fish spawning areas from disturbance by livestock and other activities.
- Utilize grazing systems on allotments which provide for deferment or rest whenever possible. Season-long grazing or common use will be allowed only where resources can sustain such use.
- Range improvements will be maintained annually by permittees to standards adequate for public safety and established use, and control and proper distribution of livestock. Maintenance will be completed before livestock are allowed on the allotment.
- Rehabilitate existing stock driveways where damage is occurring. Relocate them outside riparian areas if possible.
- Browse utilization within the riparian ecosystem will not exceed 50 percent of new leader production.
- Ensure that all management-induced activities meet State water quality standards, and Forest water quality goals, including sediment constraints.
- Impacts of activities may not increase fine sediment by depth (within critical reaches) of perennial streams by more than 2 percent over existing levels. Where existing levels are at 30% or above

⁶ The PACFISH environmental assessment did not include a riparian management objective for sediment. However, during consultation a riparian management objective for sediment was established within Chinook salmon, steelhead, and bull trout spawning areas within priority watersheds. In all other areas, the objective established by the Land Resource Management Plan for the Challis National Forest applies.

new activities that would create additional stream sedimentation would not be allowed. If these levels are reached or exceeded, activities that are contributing sediment will be evaluated and appropriate action will be taken to bring fine sediment within threshold levels.

- Retain at a minimum, 75 percent of natural stream shade provided by woody vegetation.
- Establish forage utilization at levels which will yield 90% inherent bank stability or trends toward 90% where streams or other water bodies are involved.
- Discourage livestock concentrations in riparian areas and within 100 feet of lakes and perennial streams. Restrict livestock grazing in identified problem areas where necessary.
- Livestock driveways and trailing areas will be located away from riparian or streamside areas.

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

- None

3.2.5 USE INDICATORS

Annual use indicators are used to ensure that grazing does not prevent the attainment of the 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.

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 – THE ANNUAL USE INDICATORS

Unit	End of Season Indicators			
	Median Greenline Stubble Height	Bank Alteration	Woody Browse	Upland Utilization
Fred and Mary Unit	6" Stubble Height	20%	30%	50%
Poison Basin Unit	6" Stubble Height	20%	30%	50%

3.3 IMPROVEMENTS

New Improvements: There are no new improvements being proposed as part of this consultation

Existing Improvements: The allotment contains several existing improvements (Figure 2) which will be maintained in accordance with the term grazing permit.

Potential Future Improvements: There are no potential new improvements that were identified as part of this consultation.

3.4 CHANGES FROM EXISTING MANAGEMENT

The proposed action includes the following changes from existing management:

- Livestock will be out of this allotment by August 15th.
- A bank alteration of 20% has been added to the Fred and Mary and the Poison Basin Units.
- Stubble heights have been changed from 4" to 6" in both units.
- A woody browse of 30% has been added to both units.

A 20% bank alteration has been added to both units.

3.5 CONSERVATION MEASURES

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

Livestock will be off this allotment by August 15.

3.6 MONITORING

Implementation and effectiveness monitoring will be conducted at designated monitoring areas (DMA's) that will be established in 2010. Each DMA will be located in an area that is representative of grazing use and reflect what is happening in the overall riparian area as a result of grazing activity. The DMA should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream. Monitoring at the DMA will be completed using the MIM Interagency Technical Bulletin (Burton et al. 2008) or other best available science. Results from monitoring will be available at (<http://www.fs.fed.us/r4/sc/projects/range/index.shtml>).

Implementation Monitoring: The only implementation monitoring on this allotment required by this biological assessment will consist of at least an annual inspection to ensure that livestock are not grazing within the Badger Creek Unit.

Effectiveness Monitoring: The condition of the resource objectives will be evaluated in the following manner. Within the Badger Creek Unit, greenline successional status, bank stability, and woody recruitment will be monitored at the DMA's every five to ten years to evaluate changes in resource conditions associated with the elimination of livestock grazing in that unit. Sediment and temperature may also be monitored at established long-term monitoring sites within the Badger Creek Unit every five to ten years. These sites are established long-term monitoring sites are not necessarily located at the DMA's.

3.7 INTERDEPENDENT ACTIONS

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

3.8 INTERRELATED ACTIONS

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

4 ESA ACTION AREA DESCRIPTION

The ESA action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR§402.02). This is the area where the action and any interdependent and interrelated actions will result in direct or indirect affects to listed species or designated critical habitat. Our analysis indicates that the proposed action has the potential to generate direct or indirect affects to aquatic species and aquatic habitats in that portion of the allotment within the Horse Creek Unit (Figure 2). Therefore, the action area is the area covered by the Little Morgan Creek Allotment.

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. The action area is not within a priority watershed (Figure 3).

5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

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

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

Bull Trout are present in North Fork Creek within the Fred and Mary and Poison Basin Units (Figure 4).

5.2 CRITICAL HABITAT

5.2.1 SOCKEYE SALMON

Critical habitat has been designated for Snake River sockeye salmon (Federal Register 58FR68543). There is not sockeye salmon designated critical habitat within the action area.

5.2.2 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 delineated Chinook salmon critical habitat within streams on national forest lands following the process identified in Appendix B. There are no streams within the action area that are presently or historically accessible to Chinook salmon. Therefore, there is no Chinook salmon designated critical habitat within the action area.

5.2.3 SNAKE RIVER BASIN STEELHEAD

Critical habitat has been designated for Snake River Basin steelhead (Federal Register 70FR52630). There is no steelhead designated critical habitat within the action area.

5.2.4 COLUMBIA RIVER BULL TROUT

The current semi-annual Species List issued by the U.S. Fish and Wildlife Service (List #14420-2010-SL-0089, issued December 30, 2009) indicates that one ESA listed fish species occurs on the Lost River Ranger District. This is:

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

Bull Trout are present in North Fork Creek within the Fred and Mary and Poison Basin Units (Figure 4).

6 EFFECTS DETERMINATION

6.1 SNAKE RIVER SOCKEYE SALMON

The lack of sockeye salmon and sockeye salmon designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on sockeye salmon and sockeye salmon designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for sockeye salmon and a “NO EFFECT” determination for sockeye salmon designated critical habitat (Table 2).

6.2 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

The lack of Chinook salmon and Chinook salmon designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on Chinook salmon and Chinook salmon designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for Chinook salmon and a “NO EFFECT” determination for Chinook salmon designated critical habitat (Table 2).

6.3 SNAKE RIVER STEELHEAD

The lack of steelhead and steelhead designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on steelhead and steelhead designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for steelhead and a “NO EFFECT” determination for steelhead designated critical habitat (Table 2).

6.4 COLUMBIA RIVER BULL TROUT

Livestock will be off the allotment by August 15. Therefore there is no potential for livestock to step on redds. The North Fork is well armored within the Units and livestock have very little access to the stream. Year end indicators have been raised to be more restrictive within both units. Therefore, the proposed action results in a “NO EFFECT” determination for bull trout and a “NO EFFECT” determine for proposed bull trout critical habitat (Table 3).

6.5 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. The lack of Chinook salmon and Chinook salmon designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on Chinook salmon Essential Fish Habitat. Therefore, the proposed action results in a “NO EFFECT” determination for Chinook salmon Essential Fish Habitat.

TABLE 3 – EFFECTS DETERMINATION SUMMARY

	Chinook Salmon		Steelhead		Bull Trout		Sockeye Salmon	
	Species	DCH ^A	Species	DCH ^A	Species	DCH ^A	Species	DCH ^A
Determination	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

^A Designated critical habitat

FIGURE 1 – LITTLE MORGAN CREEK ALLOTMENT VICINITY MAP

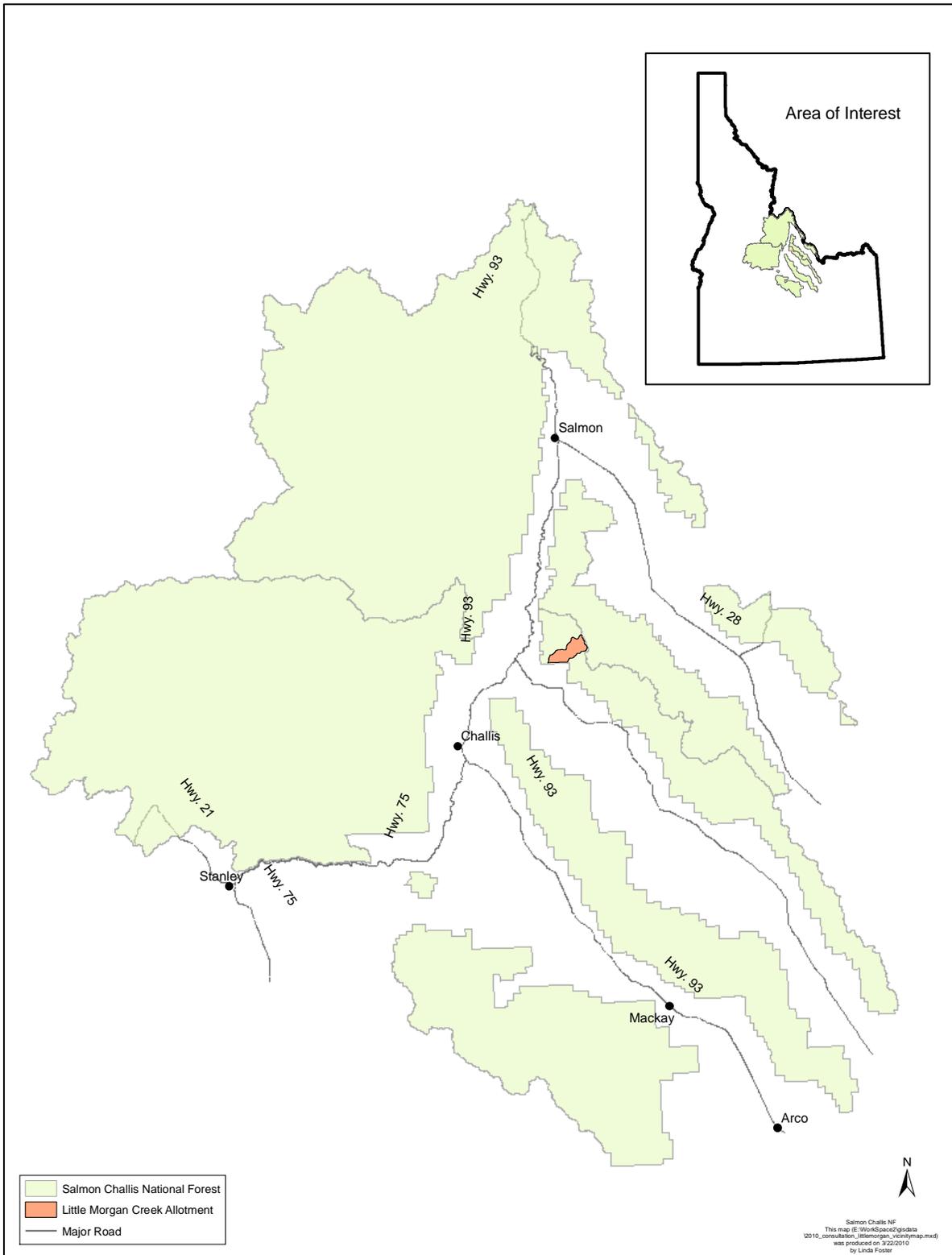


FIGURE 2 – LITTLE MORGAN CREEK ACTION AREA

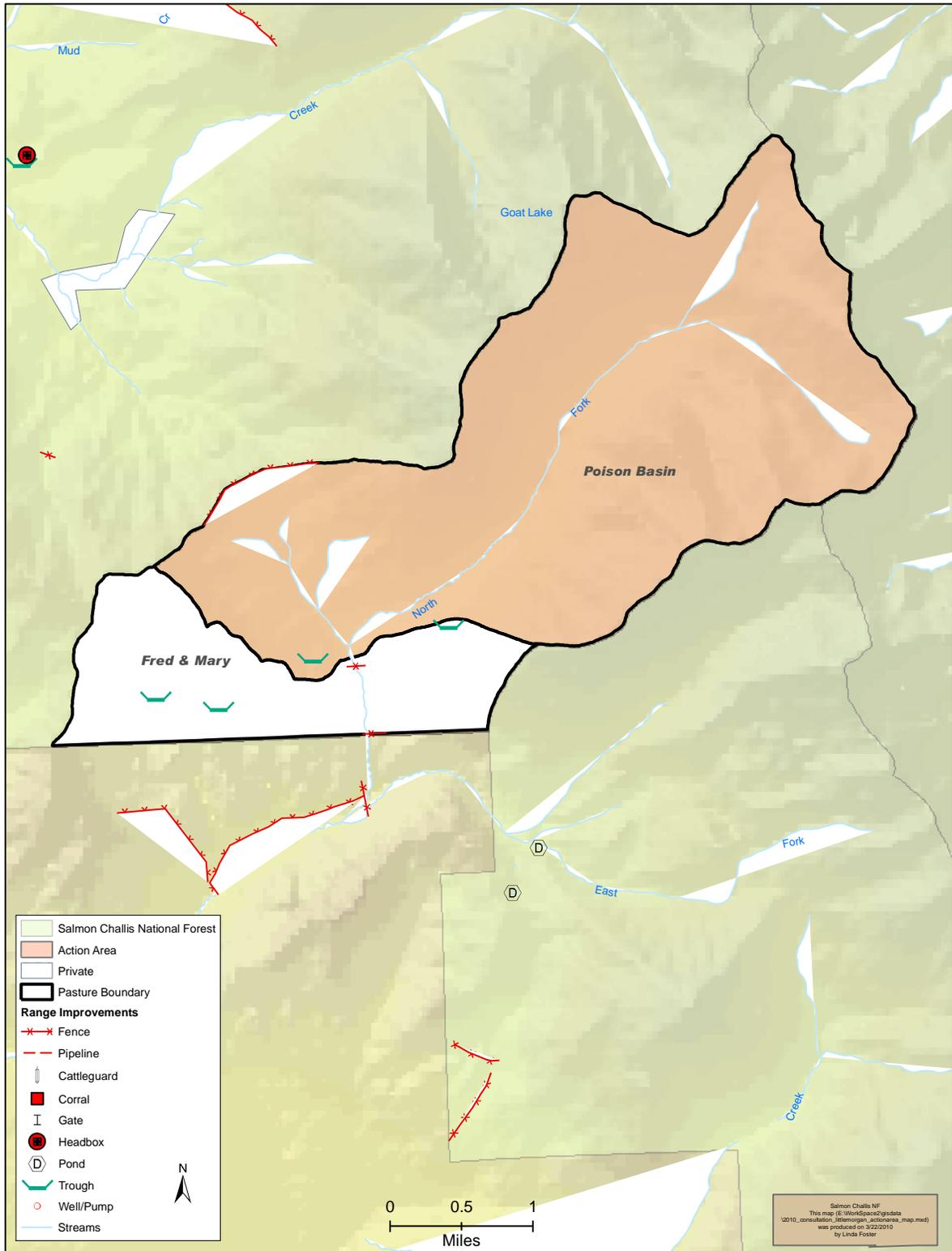


FIGURE 3 – LITTLE MORGAN CREEK HUCS AND PRIORITY WATERSHEDS

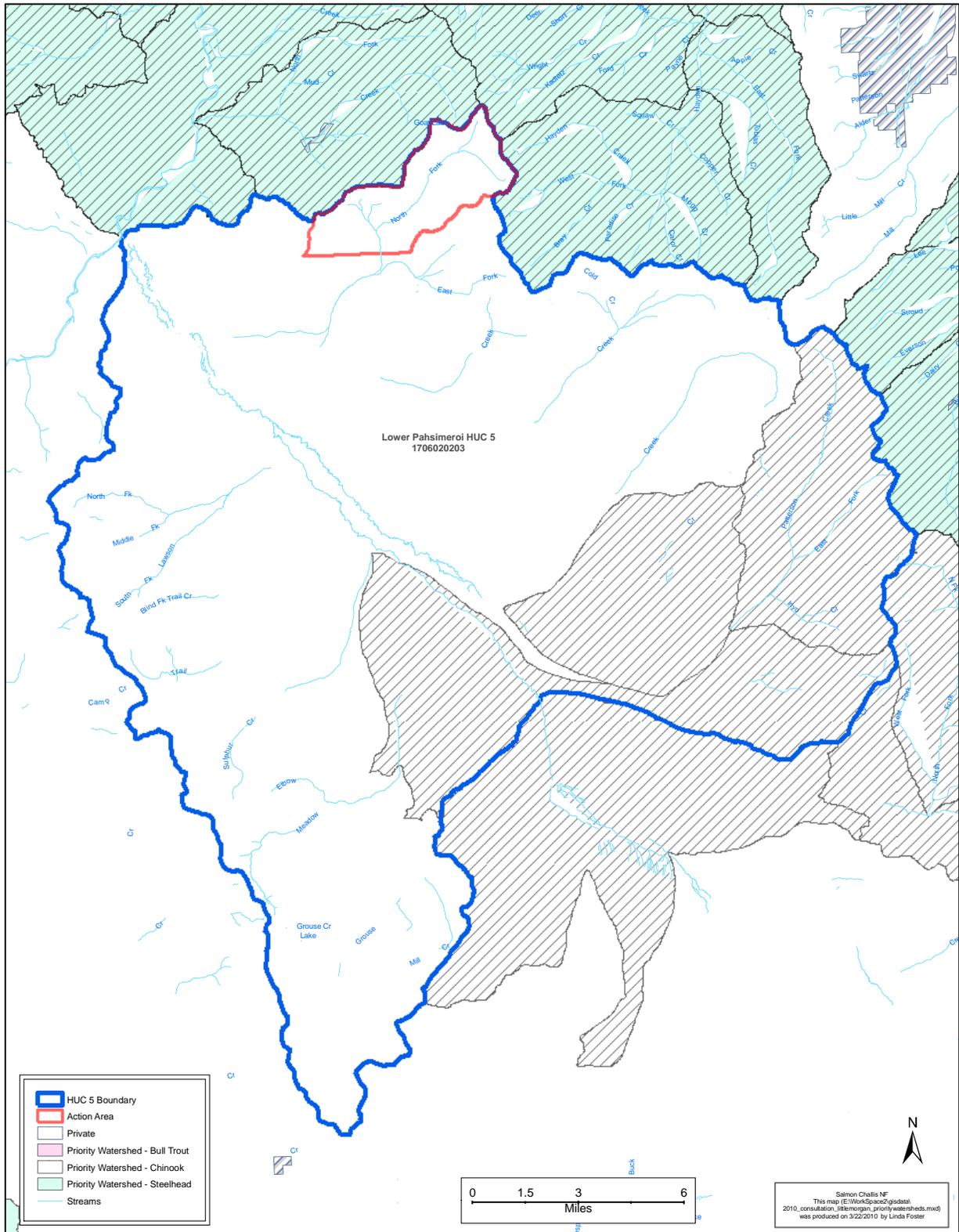
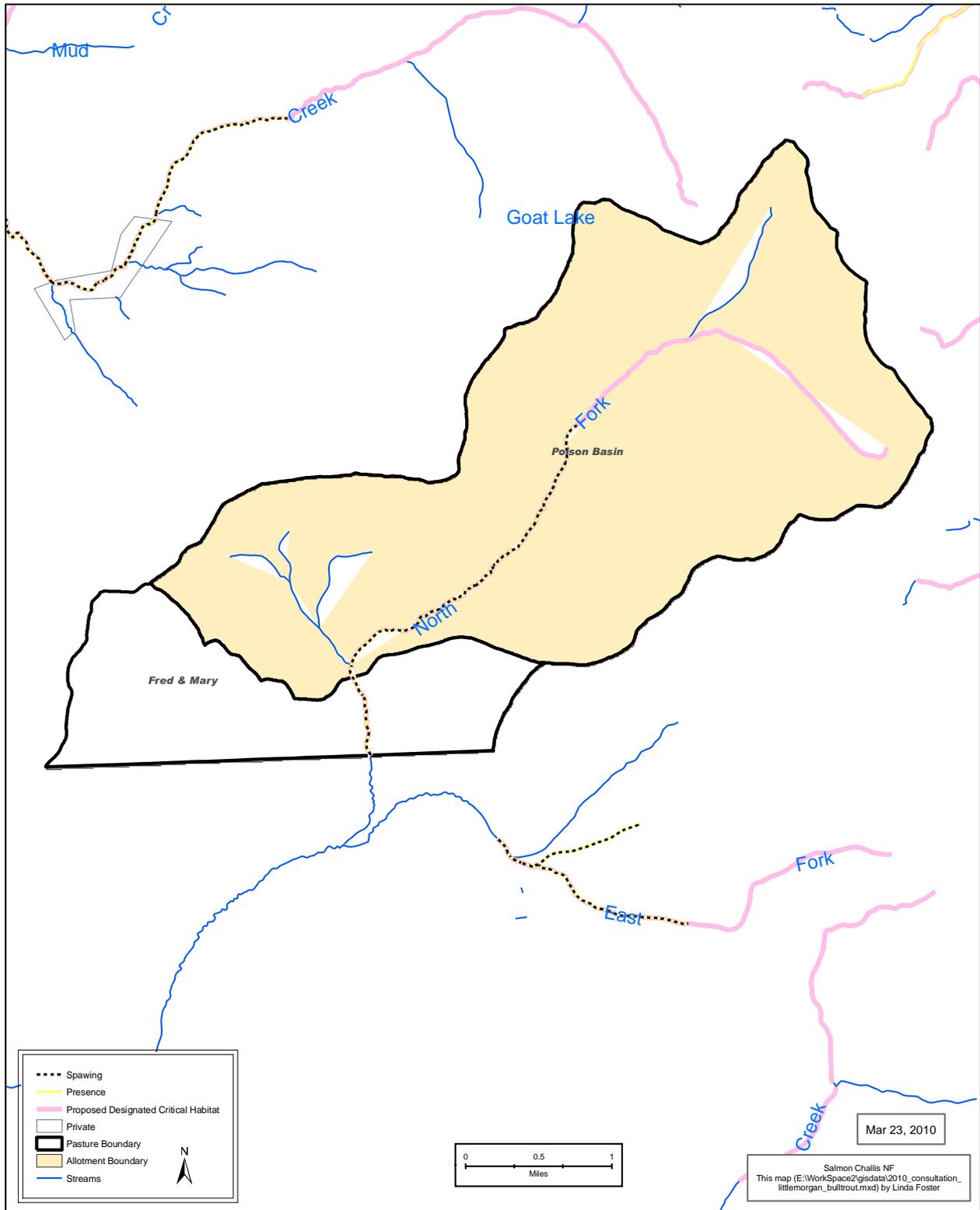


FIGURE 4 – BULL TROUT OCCURRENCE, SPAWNING, AND PROPOSED CRITICAL HABITAT



APPENDIX A - REFERENCES

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APPENDIX B

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

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

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

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

Step 1: Add reaches identified by the Intrinsic Potential Model

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

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

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

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

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

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

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

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

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

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

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

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

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

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