APPENDIX C

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION WITH U.S. FISH AND WILDLIFE SERVICE AND NATIONAL MARINE FISHERIES SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/AES/DCHRS/027171

SEP 1 2006

Memorandum

To: Assistant Director - Renewable Resources and Planning
Bureau of Land Management

From: Chief - Branch of Consultation and HCPs

Subject: Draft Vegetation Treatments Using Herbicides on BLM lands in 17 Western State Programmatic EIS

In a letter sent April 24, 2006, you clarified the Draft Vegetation Treatments Using Herbicides on Bureau of Land Management lands in 17 Western State Programmatic Environmental Impact Statement (PEIS), including the Draft Vegetation Treatments Using Herbicides on BLM lands in 17 Western State Programmatic Environmental Report (PER) and the Vegetation Treatments on BLM lands in 17 Western States Programmatic Biological Assessment (BA). With consideration of that clarification, you requested concurrence that the Vegetation Treatments on BLM lands in 17 Western states is not likely to adversely affect proposed or listed endangered or threatened species or proposed or designated critical habitat.

In general, we would prefer to follow an alternative consultation process for evaluating a program such as the Vegetation Treatments Using Herbicides on BLM lands in 17 Western States. However, given the available specificity for the nature of the subsequent projects to be implemented under this program and, more importantly, the nature of the conservation measures to be incorporated, we will respond to your request herein. As clarified in your April 24, 2006, memorandum, any proposed actions carried out under this PEIS will follow all Standard Operating Procedures (SOPs) and conservation measures contained within the PEIS, PER, BA, the Ecological Risk Assessments and additional conservation measures may be developed as a result of site-level consultation. Under this circumstance, we concur that the proposed action would not likely adversely affect any threatened or endangered species under the jurisdiction of the Service. In addition, all specific actions carried out under this PEIS would also undergo consultation. Thus, if any subsequent action does not conform to these standards, it may be necessary to conduct formal consultation on that particular action.

In this particular consultation, we were able to obtain a level of detail and incorporation of conservation measures, such that we are able to make a determination as to the likely effects that would result from implementation of the Draft Vegetation Treatments Using Herbicides on BLM lands in 17 Western State Programmatic EIS. However in future, the Service believes a different

approach for program-level consultations, as described below, would be more efficient and more meaningful.

The ESA states that "each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the adverse modification of critical habitat." The ESA does not define "consultation". Although, "consultation" is typically used to describe the section 7(a)(2) process by which federal agencies ensure their actions do not jeopardize listed species, the term consultation is used in both section 7(a)(1) and 7(a)(2). Consultation under section 7(a)(1) would entail federal agencies designing and implementing programs within their authorities that promote the conservation of listed species. This consultation would ensure that overarching federal programs incorporate conservation actions appropriate for listed species. The federal agency would then subsequently consult under 7(a)(2) to insure its actions conducted under the program do not jeopardize listed species.

In general, programs such as the vegetation management PEIS, are better described as a "strategy" for completing specific projects. A fundamental component of this type of strategy is the identification of conservation elements (supporting ecosystem restoration and function) of the subsequent specific actions and by itself has no effect on listed species or designated critical habitat that can be meaningfully identified and evaluated. Since ultimately there would be specific actions that may affect listed species, those individual projects would be subject to section 7(a)(2) consultation. However, any review of the strategy itself under section 7(a)(2) would be meaningless given the multiple layers of assumptions that would need to be made about implementation of the strategy and the potential affects to listed species and designated critical habitat.

The specific review of actions that follow the strategy will be evaluated against the jeopardy and adverse modification/destruction standards. At this smaller scale, a more focused review of impacts and potential effects to species is possible because it takes into consideration relevant information at the local level.

The conservation elements identified as part of the strategy would be subsequently incorporated at the project-level as Best Management Practices (BMPs) or Project Design Criteria (PDCs). The action agency would then consult with the Service to seek advice on crafting BMPS or PDCs that best contribute to the conservation of listed species. Thus, the resulting 7(a)(1) consultation would entail recommendations to the action agency on how to contribute to 7(a)(1) responsibilities. This information would frame the subsequent project-level consultations. The project-level consultation would need to contain all relevant information in a BA including species lists, incorporation of BMPs, and information on conditions within the action area--this would help provide sufficient information for the Services to conduct an evaluation of jeopardy and adverse modification/destruction of critical habitat at that scale.

This concludes informal consultation under section 7 of the Endangered Species Act on BLM's vegetation management plan for BLM lands in 17 western States PEIS. If any further material change is made in the PEIS or associated documents that would alter its effects on listed species, you should request reinitiation of consultation. If you have questions about this consultation, please feel free to contact Ms. Marjorie Nelson; Chief, Branch of Consultation and Habitat Conservation Plans (703/358-2106).

Attachment

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

Bud Cribley
Acting Deputy Assistant Director,
Renewable Resources and Planning
1849 C Street, NW
Washington DC 20240

JUN 26 2007

Dear Mr. Cribley:

Enclosed is NOAA's National Marine Fisheries Service (NMFS) biological opinion, issued under the authority of section 7(a)(2) of the Endangered Species Act, on the effects of the Bureau of Land Management's (BLM's) Vegetation Treatment Program. Based on the proposed action as described in BLM's Draft Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement, Draft Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report and Final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States and other information, we conclude that the proposed action is not likely to jeopardize the continued existence of endangered and threatened salmon and trout, threatened green sturgeon and threatened southern resident killer whales as described in the attached biological opinion. We also conclude that the proposed action is not likely to destroy or adversely modify designated critical habitat for threatened and endangered salmonids and southern resident killer whales.

This programmatic vegetation treatment program requires subsequent section 7 review on site-specific vegetation treatments and does not authorize the take of listed species unless that take has been exempted from the section 9 prohibitions by a biological opinion on a site-specific action where a vegetation treatment is anticipated to take listed species. There is no incidental take identified or exempted in this programmatic biological opinion. If take is anticipated for site-specific treatments then the amount or extent of take will be identified during those consultations.

This biological opinion does not cover any new active ingredients that may become available for use in the future. We understand that you intend to conduct a supplemental EIS to support the use of new active ingredients. Additional section 7 review will be required at that time. We also understand that you also will not use diflufenzopyr as a stand-alone active ingredient until it becomes registered by the Environmental Protection Agency for herbicidal use. Appropriate regulatory approvals and the applicable environmental reviews will also be obtained before release of biocontrol agents onto your lands.

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. NMFS believes the conservation recommendation listed below is consistent with these obligations and, therefore, should be implemented.

> We recommend that BLM make efforts to establish or join regional monitoring programs. Such an effort is underway for Oregon and Washington lead by the United States Forest Service. These efforts will relieve the burden of duplicative monitoring, make more efficient use of increasingly scarce funds and possibly monitor more sites for trends in water quality due to vegetation management activities.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request that BLM notify NMFS' Office of Protected Resources if this conservation recommendation is implemented in the final action.

This concludes formal consultation for the proposed vegetation treatment program. Reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of this action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this biological opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce, through NMFS, with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat (EFH) identified under this Act" (16 U.S.C. §1855(b)(2)). When a federal action agency determines that an action may adversely affect EFH, the federal action agency must initiate consultation with NMFS. In order to carry out this EFH consultation, NMFS' regulations at 50 CFR §600.920(e)(3) call for the federal action agency to submit to NMFS an EFH assessment containing "a description of the action; an analysis of the potential adverse effects of the action on EFH and the managed species; the federal agency's conclusions regarding the effects of the action on EFH; and proposed mitigation, if applicable."

In a June 26, 2006 letter, we requested additional information from you to better understand your not likely to adversely affect EFH determination provided on April 24, 2006. We appreciate the additional analysis you provided and after reviewing the revised EFH assessment (dated January 2007), we believe that on a programmatic level the assessment adequately evaluates potential impacts on EFH. As explained in the EFH assessment, you determined that it is not possible to forecast site-specific vegetation management needs below the programmatic level and, therefore, additional evaluations of site-specific effects will be the subject of subsequent "step-down" EFH evaluations. While we believe that an adequate evaluation has been conducted at the programmatic level, we support your proposal to conduct additional, site-specific evaluations of proposed actions to determine if adverse impacts on EFH may occur. Consistent with your rationale for adopting a "step-down" approach, we believe it would be appropriate pursuant to 50 CFR §600.920(j)(3) to defer all EFH Conservation Recommendations to site-specific consultations. If, after conducting such site-specific analyses, you determine a proposed action may adversely affect EFH, we recommend you contact the appropriate NMFS regional office to ensure any EFH consultation requirements are satisfied.

If you have questions regarding the biological opinion, please contact me or Kellie Foster at (301) 713-1401 x131. If you have questions regarding the EFH assessment, please contact David MacDuffee at 301-713-4300 x155.

Sincerely,

James H. Lecky
Director, Office of Protected Resources

cc: Steve Hodapp
1849 C Street, NW
Washington, DC 20240

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

Action Agency:	Bureau of Land Management
Activity:	Proposed Vegetation Treatment Program for 17 Western States
Consulting Agency:	National Marine Fisheries Service Office of Protected Resources
Approved By:	
Date Issued:	JUN 26 2007

Section 7(a)(2) of the Endangered Species Act (ESA) (16 U.S.C. §1531 *et seq.*) requires that each federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When the action of a federal agency may affect a protected species, that agency is required to consult with either the National Marine Fisheries Service (NMFS) or the United States Fish and Wildlife Service (USFWS), depending on the protected resources (species and/or critical habitat) that may be affected (50 CFR 402.14(a)). Federal agencies are exempt from this requirement to consult formally if they have concluded that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat and NMFS or USFWS concur with that conclusion (50 CFR 402.14(b)).

The Bureau of Land Management (BLM) has initiated formal consultation with the NMFS Office of Protected Resources (OPR) on BLM's national vegetation treatment program. This biological opinion (Opinion) represents OPR's assessment of the national program within which vegetation treatments will be conducted. This consultation does not address the effects of individual, site-specific vegetation treatments conducted by BLM field offices. Site-specific treatments will be addressed in subsequent section 7 consultations conducted by NMFS regions.

This Opinion considers information provided in BLM's Draft Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement, Draft Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report (PER) and Final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States, status reviews and listing documents and other published and unpublished literature. This Opinion was prepared in accordance with section 7 of the ESA and associated implementing regulations.

1.0 CONSULTATION HISTORY

In November 2001, OPR received a request from BLM for technical assistance with their efforts to develop an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) and the subsequent section 7 consultation pursuant to the ESA on their proposed vegetation treatment program. On November 16, 2001, BLM along with USFWS and OPR (Services) met to discus agency points of contact for the technical assistance, procedures for initiating consultation, information necessary to initiate consultation and timelines for completion of the EIS. Those meetings culminated in a letter from BLM on June 12, 2002, containing the results of those discussions.

In May 2002, the Services and a representative from the Environmental Protection Agency began assisting BLM in the development of the protocols to conduct ecological risk assessments (ERAs) to support the selection of a preferred alternative for the EIS. In October 2002, BLM requested comments on the draft ERA protocols pursuant to NEPA and section 7 of the ESA. On February 28, 2003, OPR submitted comments on the ERA protocols to BLM.

On October 2, 2003, BLM requested a meeting with the Services to discuss developing a consultation agreement to govern early coordination for the consultation, establish a dispute resolution process and procedures to evaluate and refine the consultation process. OPR declined to enter into an agreement because: (1) the published regulations, policy and guidance provides sufficient details about the consultation process that an agreement would be redundant; and (2) the consultation process was flexible enough to accommodate the NEPA process. OPR stated this position in writing on October 20, 2003 in response to a draft consultation agreement from BLM.

On November 8, 2005, BLM concluded that their proposed use of herbicides may affect and was likely to adversely affect listed species and designated critical habitat and requested initiation of formal consultation. The request for consultation was accompanied by a Draft Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (EIS), a Draft Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report (PER) and a Draft Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States (BA).

On December 19, 2005, OPR requested a meeting with BLM to clarify the proposed action for consultation (use of herbicides only or the vegetation treatment program) and to discuss the spatial scale and the key assumptions that would guide the section 7 analyses. On January 18, 2006, the Services met with BLM. BLM questioned whether the proposed action described in the draft EIS authorized, funded or carried out any action and opined whether the activities described in the draft EIS was an action subject to section 7 consultation. The Services advised BLM to notify the Services as to whether they would withdraw their request for consultation or proceed with consultation and, if consultation were to proceed, to clarify the proposed action.

BLM requested a conference call with the Services on February 27, 2006, to discuss a draft reply to OPR's December 19, 2005, letter in light of the January 18, 2006, meeting. Based on that meeting and subsequent discussions BLM further clarified in a letter dated April 24, 2006, their intent to engage in consultation with the Services and expanded the scope of the consultation to encompass the vegetation treatment program. The proposed treatment program would include all measures currently in use (prescribed fire, mechanical, manual, biological control methods and herbicide use) but would increase the number of active ingredients that could be used during vegetation. BLM also reached a "may affect, not likely to adversely affect" listed species and their critical habitat conclusion on their vegetation treatment program based on conservation measures included in the draft biological assessment, standard operating procedures included in the draft EIS and the use of additional conservation measures developed by local field offices upon proposing site-specific treatments. In response to BLM's conclusion, OPR transmitted a letter of non-concurrence on June 26, 2006, to BLM based on the evidence provided and the reliance on future conservation measures to prevent or mitigate adverse effects to listed species at the site-specific level. This letter also informed BLM that formal consultation was required and identified additional information that was necessary to initiate formal consultation.

BLM requested a meeting with OPR to discuss the non-concurrence letter on November 14, 2006. At the meeting, BLM requested clarification regarding the information requested in OPR's non-concurrence letter. On January 31, 2007, OPR received a final BA which included the requested information. Consultation was initiated on January 31, 2007.

BLM also reached a "may affect, but not likely to adversely affect" conclusion on listed species and critical habitat under USFWS jurisdiction. On September 1, 2006, USFWS issued a concurrence letter to BLM. On February 13, 2007, BLM transmitted the final BA to USFWS for reconsideration. On March 20, 2007, USFWS revalidated their September 1, 2006, concurrence letter.

BIOLOGICAL OPINION

Scope of this Biological Opinion

This biological opinion is specific to the activities assessed in the draft EIS and PER and the final BA; therefore, this opinion only addresses vegetation treatment methods that are directly related to reducing hazardous fuels and/or modifying the vegetation community to improve rangeland and forestland health; therefore, vegetation management primarily focused on commercial timber or salvage activities are not evaluated in this biological opinion.

This biological opinion addresses only the active ingredients and formulations containing those active ingredients listed in Table 1 and the adjuvants listed in Table 2. BLM is

discontinuing the use of 2,4-DP, asulam, atrazine, fosamine, mefluidide and simazine; therefore, those active ingredients are not addressed in this Opinion. Any vegetation treatments involving active ingredients or adjuvants not listed in Tables 1 or 2 will require review pursuant to section 7 of the ESA.

2.0 Description of the Proposed Action

The following describes BLM's national vegetation treatment program. This program includes the process used to determine site- and area-specific vegetation treatments, the methods used for vegetation treatments, standard operating procedures and other protective measures as well as considerations for listed, proposed or future proposed species or critical habitat.

BLM proposes to implement its national vegetation treatment program to reduce hazardous fuels, control unwanted vegetation and improve habitat and resource conditions. Vegetation would be managed on approximately 6 million acres annually in 17 western states using five primary treatment methods: prescribed fire will be used on approximately 2.1 million acres, mechanical methods on approximately 2.2 million acres, manual methods on approximately 271,000 acres, herbicides on approximately 932,000 acres and biological control agents will be used on the remaining 454,000 acres. The 17 states which contain lands that will be managed by this treatment program are: Alaska, Arizona, California, Colorado, Idaho, Montana, North Dakota, South Dakota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington and Wyoming. BLM proposes to use these treatment methods anywhere on the 262 million acres of public lands that it manages in the above listed states, although actual treatment methods, acres treated, and treatment locations would be determined at the local field level and by congressional funding. BLM expects to implement its vegetation treatment program over the next 15 years under the authority of the Federal Land Policy and Management Act of 1976 (FLPMA, 43 U.S.C. 1740 *et seq*.) and Congressional direction as specified in *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan* (U.S. Department of Interior and U.S. Department of Agriculture Forest Service 2002) as well as several other statutes, policies and manuals as specified below.

BLM Decision Process for Vegetation Treatments

BLM developed manuals and policies at the national level to comply with the relevant statutes and other mandates that determine how BLM is to conduct its vegetation treatment program to restore and protect public lands. These manuals and policies are implemented at the field level in the form of Land Use Plans (LUPs) which outline the general resource goals and objectives based on desired future conditions for the land, land use allocations (e.g., timber harvest, grazing allotments) and, land health standards and associated guidelines on how to meet those standards. Activity Level Plans design and select the vegetation treatment methods consistent with the national treatment program to achieve the objectives of the LUPs. Activity Level Plans require inventories of the land

including sensitive habitat and listed or otherwise sensitive species. NEPA review is required at all levels of planning from the LUPs to the Activity Level Plans to the site-specific treatment activities. The vegetation treatment program described in this Opinion provides the framework by which site-specific treatments are designed to meet LUP goals and objectives. The vegetation treatment methods including SOPs and protective measures are selected and designed at the Activity-Level planning stage and carried out during the actual site- and area-specific treatments (Project-Level activities). All decisions to treat vegetation require the consideration of protected species, sensitive areas and the principles of integrated pest management (IPM).

Explicit in BLM's approach to its vegetation treatment program are the principles of IPM (See *Protected Species Considerations* section below). The IPM approach specifies that all alternatives available through integrated pest management (including but not limited to prevention, education, biological, cultural, mechanical and chemical methods) are to be explored. BLM may decide to not treat the vegetation in a particular area and instead rely on natural ecological process to return the land to a more natural state although this rarely happens. If there are a variety of viable treatment alternatives for an area, the most cost effective methods shall be chosen. All proposed uses of chemical pest control methods are to be reviewed and studied thoroughly to evaluate the need for such uses and to determine the possible impacts each may have on the environment.

Below are descriptions of the vegetation treatment methods included in BLM's vegetation treatment program.

Description of Treatment Methods

Fire Treatments

Fire treatment methods will be used on approximately 2.1 million acres of BLM-administered lands. Fire is a treatment method that is used to reduce the buildup of hazardous fuels (dry, dead parts of trees, shrubs and other vegetation that can burn easily), control weeds and maintain fire dependent species and ecosystems. A prescribed fire is the intentional application of fire to fuels under specified conditions of fuels, weather, and other variables. The intent is for the fire to stay within a predetermined area to achieve site-specific resource management objectives. Prescribed burns are utilized only in pre-planned areas and when there are adequate fire management personnel and equipment available to achieve defined resource objectives.

The BLM conducts prescribed fire treatments in accordance with its Prescribed Fire Management Policy, which requires the preparation of a prescribed burning plan prior to every burn. Fuel models are used to set standards for an area to be treated, and the burn is delayed until the natural conditions of the site approach this standard. This method involves preparing the site for the burn, igniting the burn and post-fire activities which include extinguishing any remaining hot spots.

Site Preparation

Prescribed fire projects typically consist of numerous pre- and post-fire activities in addition to the actual prescribed burn. The required activities are dependent upon the local conditions and the individual project to be carried out. The range of possible activities follows:

Road construction and maintenance may be required to provide access to treatment sites. The extent of work related to this activity is dictated by the condition of the roads leading to the site and the site itself. Remote locations may require temporary camps for personnel and equipment. Depending on the size of the project, camps may be large and require daily shuttles of supplies.

Fuel breaklines are constructed prior to a prescribed burn to control and prevent the fire from spreading. Different types of breaklines are constructed depending on the width needed to contain the fire and the types of fuels needing removal. Descriptions of breaklines follow.

> Firelines are constructed by removing all fuels down to the bare soil. Firelines are commonly constructed using hand tools similar to that used during manual control treatment methods. This type of fireline is often used in conjunction with other activities, such as black lining and wet lining (described below), and brush beating. Machine-built firelines are created using bulldozers, tractors with plows, et cetera. This type of fireline is utilized when a fuel break must be wide and/or lengthy, or when smaller fires have the potential to grow rapidly.
>
> Wet lines are created using water (with or without surfactants) which is sprayed on vegetation to increase moisture content or limit fire spread. Wet lines are most commonly used in short vegetation or fuel (e.g., grass, pine needles). Because wet lines require large amounts of water, a reliable water source (ponds or streams) must be near the area. Portable water pumps or pumps mounted on fire engines and in some cases, buckets suspended beneath helicopters may be used to strengthen a fireline or to quickly treat a hot spot. A helibase or helispot must also be located close to the project, and refueling of the helicopter is typically done on-site.
>
> A black line is a pre-burned area that is used as a fireline, often in conjunction with other types of firelines. Vegetation is ignited on the inside of another type of fireline to create a wide fireline.
>
> An explosive built fireline is created using explosives, though this activity is used only under special circumstances and is uncommon. A long-linear explosive device is laid across the ground, and quickly removes burnable fuel and exposes soil to stop the spread of a fire.

Natural breaks in vegetation and fuel, such as rocky ridges, riparian areas, wetlands, or pre-existing breaks such as roads, can also be utilized to help contain prescribed fire.

Methods of Ignition

Prescribed fires are ignited using a number of different techniques. Hand-held ignition sources include pressurized kerosene drip torches, propane torches, diesel flame-throwers, flares, and ignition grenades. Hand ignition entails fire personnel walking through the burn area igniting the area in a set pattern. Prescribed burns on large, accessible areas may be started through mechanized methods including truck- or tractor-mounted flame-throwers. Helicopters may be used to aerially release an ignition fuel onto the area to be treated. Aerial ignition allows large, inaccessible areas to be treated in a relatively short amount of time using large drip torches (helitorches) or a "ping-pong" ball dispenser, which releases ping-pong ball sized spheres filled with potassium permanganate onto the area to be treated.

Post-fire Activities

After the prescribed burn hot spots are extinguished mostly by dousing any remaining burning spots with water and/or soil. Fire engines are used on flat terrain to bring water to the hot spots, and hose is placed along the ground in areas where vehicles cannot travel. Hoses are supplied with water from portable pumps, fire engines, or water tenders. Hand tools (e.g., shovels, backpack pumps, the Pulaski) are used to cool hotspots in areas that are inaccessible to vehicles and hoses. Firefighters will make sure the fire is extinguished before the site is abandoned.

Mechanical and Manual Treatments

Mechanical and manual treatment methods will be used annually on approximately 2.2 million and 271,000 acres, respectively. Mechanical treatments are generally used to remove thick stands of vegetation, often to prepare the site for replanting a desired species. This method involves the use of tractors or other types of vehicles with attached equipment (e.g., chains, plows, harrows, rangeland drills, and mowers). These vehicles tend to remove all vegetation in the path of travel, and often uproot vegetation and disturb the soil. The type of mechanical method used on a particular site is based on characteristics of the undesired species present, seedbed preparation and revegetation needs, topography and terrain, soil characteristics and climatic conditions. Mechanical treatment activities commonly occur in old agricultural areas, industrial sites, and roadsides. Common types of equipment used in mechanical treatments include chaining, tilling and drilling seed, mowing, roller chopping and cutting, blading, grubbing, and feller-bunching.

Chaining entails pulling heavy chains behind two tractors in a "U" or "J" shaped pattern. Chaining works well for crushing brittle brush and uprooting woody plants. This practice can be done on irregular, moderately rocky terrain, on slopes of up to 20%.

Tilling involves the use of angled disks (disk tilling) or pointed, metal-toothed implements (chisel plowing) to uproot, chop, and mulch vegetation. This technique is commonly used on sites where complete removal of vegetation or thinning is desired, often in conjunction with seeding operations. Tilling equipment is pulled by either a crawler-type tractor or a large four-wheel-drive farm tractor. Tilling works best on areas with smooth terrain, with deep, rock-free soils, and is often used for removal of sagebrush and similar shrubs.

Seed drilling is often used in conjunction with tilling. The drills for seeding are either towed by or mounted on a tractor. The seed drill opens a furrow in the seedbed, deposits a measured amount of seed into the furrow, and then closes the furrow to cover the seed.

Mowing tools, such as rotary mowers or straight-edged cutter bar mowers, can be used to cut herbaceous and woody vegetation above the ground surface. This technique is often implemented along highway rights-of-way (ROW) to reduce fire hazards, improve visibility, prevent snow buildup, or improve the appearance of the area.

Roller chopping tools are heavy bladed drums that cut and crush vegetation up to five inches in diameter using a rolling action. The drums are pulled by crawler-type tractors, farm tractors, or special vehicles designed for forested areas or range improvement projects.

Blading, which also utilizes crawler-type tractors, shears small brush at ground level. Blading use is limited to relatively-level areas and can only be used for certain undesirable plant species.

Grubbing utilizes a brush rake or root rake attached to a crawler-type tractor. This method snares brush and roots below the soil surface and combs it from the soil. Typically, grubbed areas are reseeded to prevent extensive runoff and erosion.

Feller-bunchers are machines that grab trees, cut them at the base, pick them up, and move them into a pile or onto the bed of a truck. They are used in forest thinning to remove potentially hazardous fuels.

Techniques for reseeding an area, commonly used in conjunction with mechanical control methods, include drill seeding and aerial application of seed. Drill seeding is commonly used on areas with moderate slopes, and entails the use of rangeland drills attached to tractors. Aerial seeding is the application of seed using fixed wing aircraft or helicopters.

Manual treatment methods involve the use of hand-operated power tools and hand tools to cut, clear, or prune herbaceous and woody species. A number of hand tools may be used during manual treatments: hand saws, axes, shovels, rakes, machetes, grubbing

hoes, mattocks (a combination of axe and grubbing hoe), brush hooks, and hand clippers. Power tools such as chainsaws and power brush saws may also be used.

Manual treatments are most suitable for areas in which the weed infestation is limited and soil types allow for complete removal of the plant material. Pulling also works well on certain plant species. Manual techniques are used in sensitive areas, where other treatment methods would not be appropriate, and in areas that are inaccessible to ground vehicles.

Biological Control Treatments

Biological control (biocontrol) agents will be used on approximately 454,000 acres of BLM-administered lands. Biocontrol methods involve the use of living organisms to selectively suppress, inhibit, or control herbaceous and woody vegetation. The most common biological control agents are domestic animals and parasitic insects although mites, nematodes, and pathogens are also used occasionally. Domestic animals, such as sheep and goats will not be used in erosion hazard areas, sites with compactable soils, riparian areas, or steep, erodible slopes. Insects, mites, nematodes, and pathogens are commonly used on sites where the population of target plants is large enough to support a viable population of the control agent, and when adequate numbers of the agents can be obtained. In many cases, three to five biocontrol agents are required to control a single plant species. Activities associated with insects, mites, nematodes, and pathogens as biocontrols include their collection and release, transport by vehicle, inventory and monitoring to determine treatment success and competitive seeding to establish native/desirable plants. Insects, pathogens, and other biological control agents will be tested to ensure that they are host specific, and they will feed only on the target plant, and not on crops, native flora, or endangered or otherwise sensitive plant species. BLM will obtain the appropriate regulatory approvals and conduct the applicable environmental reviews before release of biocontrol agents onto their lands.

Herbicide Treatments

Herbicide treatment methods include the application of formulations containing 18 active ingredients (AIs) to treat vegetation on approximately 932,000 acres of BLM-administered lands in the western U.S. and Alaska, annually. Of the 18 AIs BLM proposes to continue to use formulations containing 14 active ingredients (2,4-D, bromacil, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, tebuthiuron, and triclopyr) but is also proposing to add four new active ingredients (diflufenzopyr [as a formulation with dicamba], diquat, fluridone, and imazapic) to their treatment program. BLM will not use diflufenzopyr as a stand-alone active ingredient until it becomes registered by the Environmental Protection Agency for herbicidal use.

BLM generally uses several formulations of each active ingredient. Table 1 shows the AIs (alone and in combination with other AIs as tank mixtures) and the formulations containing those AIs that BLM proposes for use, the states where the AIs will be applied, the projected number of acres that will be treated and the types of areas (i.e., Rights of Way, rangeland, etc.) where herbicides will be applied. BLM also proposes to add

adjuvants as tank mixtures to increase the efficiency of the herbicides (see Table 2). These active ingredients and formulations could only be applied for uses, and at application rates, specified on the label directions according to the Federal Insecticide Fungicide and Rodenticide Act (FIFRA).

The appropriate method for applying herbicides is dictated by: pesticide labeling restrictions; the treatment objective (i.e., removal or reduction); the accessibility, topography, and size of the treatment area; the characteristics of the target species and the desired vegetation; the location of sensitive areas and potential environmental impacts in the immediate vicinity; the anticipated costs; equipment limitations; and the meteorological and vegetative conditions of the site. Application rates depend on the requirements printed on the herbicide label; the presence of the target species; the condition of the non-target vegetation; soil type; depth to the water table, distance to open water sources, riparian areas and/or protected resources. Herbicides may be applied aerially by helicopter or fixed-wing aircraft when very large areas require treatment. Manual applications are used to treat small areas or sites inaccessible by vehicle. Manual spot treatments target individual plants through herbicide injections, applications on cut surfaces, or granular application to the surrounding soil (hand crank granular spreader). Backpack sprayers are used as a means of spot treatment, in which the herbicide applicator directs a spray hose at target plants. Mechanical equipment (a spray boom or wand attached to a truck, all terrain vehicle (ATV), or other type of vehicle is used to cover a larger number of plants. Mechanical application using truck-mounted spraying is primarily limited to roadsides and flat areas that are accessible. ATVs can treat weeds in areas that are not easily accessible by road, such as hillsides.

Table 1: Active Ingredients and Formulations Containing Those Ingredients Proposed for the Vegetation Treatment Program

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
Bromacil	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Hyvar X	Y	3,000	D,E,F
		Hyvar XL	N		
Bromacil + Diuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Kroval I DF	Y		
		Weed Blast Res. Weed Cont.	N		
		DiBro 2+2	Y		

1. Approximate acres treated was calculated from the percentage of all acres treated as given in BLM's Biological Assessment and reflects total acres using all formulations containing that AI.

2. A=rangeland, B=forestland, C=riparian and aquatic, D=oil, gas and minerals, E=right of way, F=recreational and cultural resources.

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		DiBro 4+4	N		
		DiBro 4+2	N		
		Weed Blast 4G	N		
Chlorsulfuron	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Telar DF	Y	9,320	A,D,E,F
Clopyralid	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY		N	65,240	A,B,D,E,F
		Stinger	Y		
		Transline	Y		
		Spur	N		
		Pyramid R&P	N		
Clopyralid + 2,4-D	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Curtail	N		
		Commando	N		
2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Agrisolution 2,4-D LV6	N	167,760	A,B,C,D,E,F
		Agrisolution 2,4-D	N		
		Amine 4	N		
		Agrisolution 2,4-D LV4	N		
		2,4-D Amine 4	Y		
		2,4-D LV 4	Y		
		Solve 2,4-D	Y		
		2,4-D LV 6	N		
		Five Star	N		
		D-638	N		
		Aqua-Kleen	Y		
		2,4-D LV6	N		
		2,4-D Amine	N		
		Opti-Amine	N		
		Barrage HF	-		
		HardBall	-		
		Unison	-		
		Clean Amine	N		

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Low Vol 4 Ester Weed Killer	N		
		Low Vol 6 Ester Weed Killer	N		
		LV-6 Ester Weed Killer	Y		
		Saber	N		
		Saber CA	Y		
		Salvo	N		
		Savage DF	Y		
		Aqua-Kleen	N		
		Esteron 99C	N		
		Weedar 64	Y		
		Weedone LV-4	Y		
		Weedone LV-4 Solventless	Y		
		Weedone LV-6	Y		
		Formula 40	Y		
		2,4-D LV 6 Ester	Y		
		Platoon	N		
		WEEDstroy AM-40	Y		
		Hi-Dep	N		
		2,4-D Amine	N		
		Barrage LV Ester	N		
		2,4-D LV4	N		
		2,4-D LV6	N		
		Clean Crop Amine 4	Y		
		Clean Crop Low Vol 6 Ester	N		
		Salvo LV Ester	N		
		2,4-D 4# Amine Weed Killer	N		
		Clean Crop LV-4 ES	N		
		Savage DF	Y		
		Cornbelt 4 lb. Amine	N		
		Cornbelt 4# LoVol Ester	N		
		Cornbelt 6# LoVol Ester	N		
		Amine 4	N		
		Lo Vol-4	N		
		Lo Vol-6 Ester	N		
Dicamba	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Dicamba DMA	N	3000	A,D,D,F

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Vision Clarity	N		
		Rifle	Y		
		Banvel	Y		
		Diablo	Y		
		Vanquish	Y		
Dicamba + 2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Outlaw	N		
		Range Star	N		
		Weedmaster	Y		
		Rifle-D	N		
		KambaMaster	N		
		Veteran 720	Y		
Dicamba + Difluenzopyr	AZ, CO, ID, MT, ME, NV, NM, ND, OK, OR, SD, TX, UT, WA, WY	Overdrive		18,640	A,D,E,F
Diquat	AK, AZ, CA, CO, ID, MT, NE, NV, NM, ND, OK, OR, SD, TX, UT, WA, WY	Reward		3000	C
Diuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Diuron 80DF	N	3000	D,E,F
		Karmex DF	Y		
		Direx 80DF	Y		
		Direx 4L	Y		
		Direx 4L-CA	Y		
		Diuron 4L	Y		
		Diuron 80 WDG	N		
		Diuron 80WDG	N		
		Diuron-DF	N		
Fluridone	AK, AZ, CA, CO, ID, MT, NE, NV, NM, ND, OK, OR, SD, TX, UT, WA, WY	Sonar		3000	C
Glyphosate	AZ, CA, CO, ID, MT, ND, NM, NV, OK, OR, SD, UT, WA, WY	Aqua Star	Y	93,200	A,B,C,D,E,F
		Forest Star	Y		

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Gly Star Original	Y		
		Gly Star Plus	Y		
		Gly Star Pro	Y		
		Glyfos	Y		
		Glyfos PRO	Y		
		Glyfos Aquatic	Y		
		ClearOut 41	N		
		ClearOut 41 Plus	N		
		Accord SP	Y		
		Glypro	Y		
		Glypro Plus	Y		
		Rodeo	Y		
		DuPont Glyphosate	Y		
		DuPont Glyphosate	Y		
		VMF			
		Mirage	Y		
		Mirage Plus	Y		
		Aquamaster	Y		
		Roundup Original	Y		
		Roundup Original II	Y		
		Roundup Original II CA	Y		
		Honcho	Y		
		Honcho Plus	Y		
		Roundup PRO	Y		
		Roundup PRO Concentrate	Y		
		Roundup PRO Dry	Y		
		Roundup RT	N		
		GlyphoMate 41	Y		
		Aqua Neat	Y		
		Foresters	Y		
		Razor	Y		
		Razor Pro	Y		
		Rattler	Y		

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Buccaneer	Y		
		Buccaneer Plus	Y		
		Mirage	Y		
		Mirage Plus	Y		
Glyphosate + 2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Landmaster BW	N		
		Campaign	N		
		Landmaster BW	N		
Glyphosate + Dicamba	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Fallowmaster	N		
Hexazinone	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Velpar ULW	N	3000	A,B, D,E,F
		Velpar L	Y		
		Velpar DF	Y		
		Pronone MG	Y		
		Pronone 10G	Y		
		Pronone 25G	Y		
		Pronone Power Pellet	Y		
Hexazinone + Sulfometuron	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Westar	Y		
Imazapyr	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Arsenal Railroad Herbicide	N	18,640	A,B,C,D,E,F
		Chopper	-		
		Arsenal Applicators Conc.	Y		
		Arsenal	Y		
		Arsenal Technical	N		
		Stalker	Y		
		Habitat	Y		
		Polaris RR	N		
		Polaris SP	Y		
		Polaris AC	Y		

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Polaris AQ	Y		
		Polaris Herbicide	N		
		SSI Maxim Arsenal 0.5G	N		
		Ecomazapyr 2 SL	N		
		Imazapyr 2 SL	N		
Imazapyr + Diuron	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	TopSite	N		
		Sahara DG	N		
		SSI Maxim Topsite 2.5G	N		
Imazapic**3**	AZ, CO, ID, MT, NE, NV, NM, ND, OK, OR, SD, TX, UT, WA, WY	Plateau	N	74,560	A,B, D,E,F
Metsulfuron methyl	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Escort	N	46,600	A,B,D,E,F
		Escort XP	N		
		Cimarron	N		
		Metsulfuron Methyl DF	N		
		Patriot	N		
		PureStand	N		
Picloram	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Triumph K	N	139,800	A,B,D,E,F
		Triumph 22K	N		
		Grazon PC	N		
		Tordon K	N		
		Tordon 22K	N		
Picloram + 2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Tordon 101M	N		
		Grazon P+D	N		

3. Field stations may not treat more than 15 acres using imazapic and treatments must be in cooperation with a university or agency weed scientist, or chemical technical representative, until site-specific NEPA analysis is completed.

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
		Tordon 101 R Forestry	N		
		Tordon RTU	N		
		Pathway	N		
		GunSlinger	N		
Sulfometuron methyl	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Oust	y	3000	B,D,E,F
		Oust XP	Y		
		SFM 75	Y		
		Spyder	Y		
Tebuthiuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Spike 20P	Y	233,300	A,D,E,F
		Spike 80W	Y		
		Spike 1G	N		
		Spike 40P	Y		
		Spike 80DF	Y		
		SpraKil S-5 Granules	Y		
Tebuthiuron+Diuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	SpraKil SK-13 Granular	Y		
		SpraKil SK-26 Granular	Y		
Triclopyr	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY		N	46,600	
		Garlon 3A	Y		
		Garlon 4	Y		
		Remedy	Y		
		Pathfinder II	Y		
		Tahoe 3A	Y		
		Tahoe 4E	Y		
		Ecotriclopyr 3SL	N		
		Triclopyr 3 SL	N		
Triclopyr + 2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Crossbow	Y		

Active Ingredient(s)	States Where Herbicides Will Be Applied	Formulation Trade Name	Formulation Used in California?	Approximate Number of Acres Treated[1]	Land Type Subject to Herbicide Application[2]
Triclopyr + Clopyralid	AZ, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Redeem	Y		

Table 2: Adjuvants Proposed for the Vegetation Treatment Program

Adjuvant Class	Adjuvant Type	Trade Name
Surfactant		
	Non-ionic	Spec 90/10
		Optima
		Induce
		Actamaster Spray Adjuvant
		Actamaster Soluble Spray Adjuvant
		Activator 90
		LI-700
		Spreader 90
		UAP Surfactant 80/20
		X-77
		Cornbelt Premier 90
		Spray Activator 85
		R-11
		R-900
		Super Spread 90
		Super Spread 7000
	Spreader/Sticker	Cohere
		R-56
		Attach
		Bond
		Tactic
		Lastick
	Silicone-based	Aero Dyne-Amic
		Dyne-Amic
		Kinetic
		Freeway
		Phase
		Phase II
		Silwet L-77
		Sylgard 309
		Syl-Tac
Oil-based		
		Crop Oil Concentrate

		Crop Oil Concentrate
		Herbimax
		Agri-Dex
		R.O.C. Rigo Oil Conc.
		Mor-Act
	Methalated Seed Oil	Methylated Spray Oil Conc.
		MSO Concentrate
		Hasten
		Super Spread MSO
	Vegetable Oil	Amigo
		Competitor
Fertilizer-based	Nitrogen-based	Quest
		Dispatch
		Dispatch 111
		Dispatch 2N
		Dispatch AMS
		Flame
		Bronc
		Bronc Max
		Bronc Max EDT
		Bronc Plus Dry EDT Bronc Total
		Cayuse Plus
Special Purpose or Utility		
		Tri-Fol
	Colorants	Hi-Light
		Hi-Light WSP
		Marker Dye
		Signal
	Compatibility/Suspension Agent	EZ MIX
		Support
		Blendex VHC
	Deposition Aid	ProMate Impel
		Pointblank
		Strike Zone DF
		Intac Plus
		Liberate
		Reign
		Weather Gard
		Bivert
		EDT Concentrate
		Sta Put
	Defoaming Agent	Fighter-F 10
		Fighter-F Dry
		Foam Buster
		Cornbelt Defoamer
		No Foam

	Diluent/Deposition Agent	Improved JLB Oil Plus
	Foam Marker	Align
		R-160
	Invert Emulsion Agent	Redi-vert II
	Tank Cleaner	Wipe Out
		All Clear
		Tank and Equipment Cleaner
		Kutter
		Neutral-Clean
		Cornbelt Tank-Aid
	Water Conditioning	Blendmaster
		Choice
		Choice Xtra
		Choice Weather Master
		Cut-Rate

Standard Operating Procedures and Protective Measures for Vegetation Treatments

This section identifies the standard operating procedures (SOPs) and protective measures that BLM would follow to minimize risks from vegetation treatment methods to the environment including threatened and endangered species and their habitats.

Table 3: Standard Operating Procedures and Guidelines for All Treatment Methods

Resource Category	Standard Operating Procedures
General	Prepare spill contingency plan in advance of treatment. Conduct pretreatment survey before applying herbicides. Select chemical that is least damaging to environment while providing the desired results. Review, understand, and conform to the "Environmental Hazards" section on the herbicide label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. Consider surrounding land use before assigning aerial spraying as a method and avoid aerial spraying near agricultural or densely populated areas. Use the proper amount of chemical needed to achieve results and follow product label for use and storage. Have licensed applicator apply herbicides. Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. Keep copy of Material Safety Data Sheets (MSDSs) at work sites. Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). Helicopter applications should be made at airspeeds of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground.
Land Use	Consider surrounding land uses before aerial spraying. Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners.

	Post treated areas and specify reentry or rest times, if appropriate.
Air Quality	Consider effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks.
Soil, Water, and Air Management (See Manual 7000)	Use drift reduction agents, as appropriate, to reduce the drift hazard. Select proper application equipment and apply herbicides in favorable weather conditions to minimize drift.
Soil Soil, Water, and Air Management (See Manual 7000)	Minimize treating areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. Minimize use of herbicides with high soil mobility, such as in areas where soil type would contribute to soil mobility. Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources (See Manual 7000, *Soil, Waterand Air Management*)	Consider climate, soil type, slope, and vegetation type in determining contamination risk. Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. Minimize treating areas with high risk for groundwater contamination. Maintain buffers between treatment area and water bodies.
Streams and Wetlands	Use appropriate herbicide-free buffer zone for herbicides not labeled for aquatic use based on risk assessment guidance with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
Vegetation (See Handbook H-4410-1 *National Range Handbook*), and manuals 5000 *Forest Management* and 9015 *Integrated Weed Management*)	Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. Aerially applied treatments must be turned off at the completion of spray runs and during turns to start another spray run.
Fish (See manuals 6500`*Wildlife and Fisheries Management*) and 6780 *Habitat Management Plans*)	Use appropriate buffer zones based on label and risk assessment guidance. Minimize treatments near fish bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. Use herbicides least toxic to fish, yet still effective Treat only that portion of the aquatic system necessary to achieve acceptable vegetation management. Select appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms. Follow water use restrictions presented on the herbicide label.
Threatened and Endangered Species (See Manual 6840 *Special Status Species*)	Survey for endangered, threatened, and sensitive species if project could impact these species. Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration) for species of concern in area to be treated.

Proposed Protective Measures

BLM proposes to implement the following measures to minimize adverse effects to listed species and their habitat as a result of vegetation treatments. BLM field offices would tailor these national protective measures based on local conditions and the habitat needs of the particular threatened and endangered species that could be affected by the treatments.

Measures for Site Access and Fueling/Equipment Maintenance
For treatments occurring in watersheds with listed species and/or designated critical habitat:

- Where feasible, access work site only on existing roads, and limit all travel on roads when damage to the road surface will result or is occurring.

- Where listed species occur, consider ground-disturbing activities on a case by case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat.

- Within riparian areas, use vehicle equipment only on established roads.

- Outside of riparian areas, driving off established roads is allowed only on slopes of 20% or less.

- Except in emergencies, land helicopters outside of riparian areas.

- Within 150 feet of wetlands or riparian areas, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside of protected riparian areas).

- Prior to helicopter fueling operations prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons. Prepare spill containment and cleanup provisions for maintenance operations.

- Do not conduct biomass removal (harvest) activities that will alter the timing, magnitude, duration, and spatial distribution of peak, high, and low flows outside the range of natural variability

Measures Related to Revegetation Treatments

- Outside riparian areas, avoid hydro-mulching within buffer zones established at the field level. This precaution will limit adding sediments and nutrients which increase water turbidity.

Measures Related to Herbicide Treatments

- Maintain equipment used for transportation, storage, or application of chemicals in a leak proof condition.

• Do not store or mix herbicides, or conduct post-application cleaning within riparian areas.

• Ensure that trained personnel monitor weather conditions at spray times during application.

• Strictly enforce all herbicide labels.

• Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph.

• Do not broadcast spray when wind velocity exceeds 10 mph.

• Do not spray if precipitation is occurring or is imminent (within 24 hours).

• Do not spray if air turbulence is sufficient to affect the normal spray pattern.

• Do not broadcast spray herbicides in riparian areas that provide habitat for listed species.

• Do not use diquat, fluridone, terrestrial formulations of glyphosate, or triclopyr BEE, to treat aquatic vegetation in habitats where listed species occur or may potentially occur.

• Avoid using glyphosate formulations that include R-11, and either avoid using any formulations with POEA, or seek to use the formulation with the lowest amount of POEA available, to reduce risks to aquatic organisms.

• Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats. Special care should be followed when transporting and applying 2,4-D, bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.

• Do not broadcast spray diuron, glyphosate, picloram, or triclopyr BEE in upland habitats adjacent to aquatic habitats that support (or may potentially support) listed species under conditions that would likely result in off-site drift.

• In watersheds that support listed species or their habitat, do not apply bromacil, diuron, tebuthiuron, or triclopyr BEE in upland habitats within ½ mile upslope of aquatic habitats that support aquatic listed species under conditions that would likely result in surface runoff.

• Avoid accidental direct spray and spill conditions to reduce the largest potential impacts. Use the typical application rate, rather than the maximum application rate, to reduce risk for most herbicides, where practical.

• Reduce the size of the application area, when possible.

• Establish appropriate (herbicide specific) buffer zones to downstream waterbodies, habitats, or species/populations of interest. Buffer distances presented in Table 4 below should be consulted as guidance for all site-specific treatments. Local BLM field offices will have to determine buffer zones for active ingredients not listed below in Table 4 (2,4-D, clopyralid, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram and triclopyr) on a site-specific basis.

Table 4: Buffer Distances to Minimize Risks to listed and proposed species from Off-site Drift of Certain Herbicides from Broadcast and Aerial Treatments.

Application Method	BROM	CHLR	DICA	DIFLU	DIQT	DIUR	FLUR	IMAZ	OVER	SULFM	TEBU
Minimum Buffer Distance (feet) from Listed Species											
Typical Application Rate											
Aerial	NA	0	NA	NA	NA	NA	NA	0	NA	0	NA
Low boom	0	0	0	0	NA	0	NA	0	0	0	0
High boom	0	0	0	0	NA	100	NA	0	0	0	0
Maximum Application Rate											
Aerial	NA	0	NA	NA	NA	NA	NA	0	NA	0	NA
Low boom	0	0	0	0	NA	100	NA	0	0	0	0
High boom	0	0	0	0	NA	900	NA	0	0	0	0

BROM = Bromacil; CHLR = Chlorsulfuron; DICA = Dicamba; DIFLU = Diflufenzopyr; DIQT = Diquat; DIUR - Diuron; FLUR = Fluridone; IMAZ = Imazapic; OVER = Overdrive®; SULFM = Sulfometuron methyl; and TEBU = Tebuthiuron.

Boom height = The Tier I ground application model allows selection of a low (20 inches) or a high (50 inches) boom height.
NA = Not applicable. Sources: See BLM 2006.

Wetland and Riparian Areas

• Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuron methyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants exist.

Fish and Other Aquatic Organisms

• Regulate the use of diquat in waterbodies that have native fish and aquatic resources.

• Regulate the use of terrestrial herbicides in watersheds, which have characteristics suitable for potential surface runoff, with fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) use.

• Establish appropriate herbicide-specific buffer zones to waterbodies, habitats, or fish or other aquatic species of interest.

• At the field level, consider effects to listed species, otherwise special status fish and other aquatic organisms when designing treatment programs.

Measures Related to Prescribed Fire
Within riparian areas, in watersheds with listed species or their habitats:
• Conduct prescribed burning only when long-term maintenance of the riparian area is the primary objective, and where low intensity fires can be maintained.

• Do not construct black lines, except by non-mechanized methods.

• Utilize/create only the following firelines: natural barriers; hand-built lines parallel to the stream channel and outside of buffer zones established at the field level; or hand built lines perpendicular to the stream channel with waterbars and the same distance requirement.

• Do not ignite fires using aerial methods.

• In forested riparian areas, keep fires to low severity levels to ensure that excessive vegetation removal does not occur.

• Do not camp, unless allowed by ESA section 7 consultations at the field level.

• Have a fisheries biologist determine whether pumping activity can occur in streams with listed species.

• During water drafting/pumping, maintain a continuous surface flow of the stream that does not alter original wetted stream width.

• Do not alter dams or channels in order to pump in streams occupied by listed species.

• Do not allow helicopter dipping from waters occupied by endangered and threatened species, except in lakes outside of the spawning period.

• Consult with a local fisheries biologist prior to helicopter dipping in order to avoid entrainment and harassment of listed species.

Measures Related to Mechanical Treatments
These measures apply only to treatments occurring in watersheds that support listed species or their habitats.

Outside riparian areas in watersheds with listed species or their habitats:
• Conduct soil-disturbing treatments only on slopes of 20% or less, where feasible.

• Do not conduct log hauling activities on native surface roads prone to erosion, where feasible.

Within riparian areas in these with listed species or their habitat:

- Do not use vehicles or heavy equipment, except when crossing at established crossings.

- Do not remove large woody debris or snags during mechanical treatment activities.

- Do not conduct ground disturbing activities (e.g., disking, drilling, chaining, and plowing).

- Ensure that all mowing follows guidance to avoid negative effects to streambanks and riparian vegetation and major effects to streamside shade.

- Do not use equipment in perennial channels or in intermittent channels with water, except at crossings that already exist.

- Leave suitable quantities (to be determined at the local level) of excess vegetation and slash on site.

- Do not apply fertilizers or seed mixtures that contain chemicals by aerial methods.

- Do not apply fertilizer within 25 feet of streams and supersaturated soils; apply fertilizer following labeling instructions.

- Do not apply fertilizer in desert habitats.

- Do not completely remove trees and shrubs.

Measures Related to Biological Control Treatments using Livestock

For treatments occurring in watersheds that support listed species or their habitats:

- Where terrain permits, locate stock handling facilities, camp facilities, and improvements at least 300 feet from lakes, streams, and springs.

- Educate stock handlers about at-risk fish species and how to minimize negative effects to the species and their associated habitat.

- Employ appropriate dispersion techniques to range management, including judicious placement of saltblocks, troughs, and fencing, to prevent damage to riparian areas but increase weed control.

- Equip each watering trough with a float valve.

• Do not conduct weed treatments involving domestic animals, except where it is determined that these treatments will not damage the riparian system, or will provide long-term benefits to riparian and adjacent aquatic habitats.

• Do not locate troughs, storage tanks, or guzzlers near streams with listed species, unless their placement will enhance weed-control effectiveness without damaging the riparian system.

Protected Species Considerations

BLM's treatment program is managed under the authority of and in compliance with multiple statutes, executive orders, regulations and policies that either directly or indirectly mandate protections for endangered species and their habitat. These statutes, regulations and policies provide the standards (i.e., anti-degradation or conservation) by which endangered species and their habitat are protected generally during BLM's management of the public lands and specifically during prosecution of the vegetation treatment program.

The Federal Land Policy and Management Act of 1976 (FLPMA, 43 U.S.C. 1740 *et seq*.) requires that public lands under BLM's jurisdiction are managed for a variety of uses, including recreation, grazing, timber harvesting, and energy and mineral development, while at the same time ensuring that important environmental, historic, cultural, and scenic values (including threatened and endangered species and their habitats) are protected. FLPMA also provides BLM's statutory duty to prevent unnecessary degradation of the public lands.

BLM conducts its use of herbicides in accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA, 7 U.S.C. §136 *et seq.*) which regulates the registration, sale and use of pesticides. FIFRA's purpose is to protect against any unreasonable risks to man or the environment by taking into account the economic, social and environmental costs and benefits of the use of any pesticide. All AIs proposed for use and diflufenzopyr as a mixture with dicamba are registered with EPA. Labeling instructions which specify proper uses of herbicides to protect the environment will be followed in accord with FIFRA. Also BLM will follow all requirements for the proper storage, transport and disposal of the herbicides used.

Federal agencies are directed by FIFRA to implement an integrated pest management (IPM) approach in the design of pest management strategies. Pest management is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. BLM Manual 9011 and Handbook H-9011-1 provide policy for conducting the vegetation management program in accordance with IPM. There are several requirements that pertain to the protection of the environment. The IPM approach specifies that all vegetation management methods including but not limited to prevention, education, biological, cultural, mechanical and chemical methods are to be explored. If there are a variety of viable alternatives, the most cost effective methods shall be chosen. All

proposed uses of chemical pest control methods are to be reviewed and studied thoroughly to evaluate the need for such uses and to determine the possible impacts each may have on the ecosystem and total environment. Definite boundaries for the treatment area and buffer strips along streams and other sensitive areas are to be established. Treated areas are to be monitored for changes over a period of time from the introduced chemicals in various parts of the environment.

Monitoring should measure the impact of chemical applications on the quality of the environment and the effectiveness of the vegetation method. Monitoring is also to be considered regardless of the vegetation method used during the post-treatment evaluation process. The purpose of the post-treatment evaluation is to build a record that demonstrates the effects of pest control and the cost effectiveness of various methods or combinations of methods. These evaluations are generally made within 2 years after treatment although any significant environmental impacts anticipated prior to the treatment will be evaluated at the time of impact. Water monitoring programs, if judged worthwhile should be conducted by each BLM field office to determine the effectiveness of buffer strips and other management practices at minimizing impacts to water quality and the aquatic environment.

The Clean Water Act (CWA, 33 U.S.C. 1251 *et. seq.*) requires the restoration and maintenance of the chemical, physical, and biological integrity of the waters of the U.S. CWA regulates discharges into the waters of the U.S. (including wetlands) while considering the improvements necessary to provide waters of sufficient quality for public water supplies, propagation of fish and aquatic life, recreational purposes, and agricultural and industrial uses. The CWA requires that all of BLM's Land Use Plans be consistent with state water quality standards and that the BLM provide for state review of their Plans and activities.

Executive Order 11990 (42 FR 26961, May 24, 1977) requires federal agencies to minimize the destruction, loss, or degradation of wetlands while preserving and enhancing their natural and beneficial values on federal property.

Executive Order 13112 (64 FR 6183, February 8, 1999) requires federal agencies whose actions may affect the status of invasive species to use their programs and authorities: to prevent the introduction of invasive species; to detect and provide for their control in a cost-effective and environmentally friendly manner; to provide for restoration of native species and habitat conditions; to minimize the economic, ecological, and human health impacts that invasive species cause; to not authorize, fund, or carry out actions that are likely to introduce or spread invasive species unless, the agency has determined that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm to the environment will be taken in conjunction with those actions.

BLM delineates its national guidance in the protection and management of threatened and endangered species and their habitat and other species of concern in Manual 6840-Special Status Species Management. Manual 6840 reflects the purpose, policy and mandates of

the ESA to use BLM's existing authority in furtherance of the purposes of the ESA to conserve listed species and the ecosystems upon which those species depend (Manual 6840.06(A)(1)). Further, actions authorized by BLM shall further the conservation of federally listed and other special status species and shall not contribute to the need to list any special status species under the provisions of the ESA, or designate additional sensitive species[4] (Manual 6840.12).

BLM must also ensure that all action authorized, funded, or carried out by BLM are in compliance with the ESA by:

- evaluating all proposed actions to determine if individuals or populations of listed species or their habitat, including designated critical habitat, may be affected;

- initiating consultation with FSW and/or NMFS, including preparation of biological assessments, as appropriate, for those actions that may affect listed species or their habitats;

- Until the consultation proceedings are completed and a final biological opinion has been issued, ensuring that BLM not carry out any action that would cause an irreversible or irretrievable commitment of resources such that it would foreclose the formulation or implementation of any reasonable and prudent alternative measure that might avoid jeopardy to listed species and/or prevent the adverse modification of critical habitat

- ensuring that BLM actions will not reduce the likelihood of survival and recovery of any listed species or destroy or adversely modify their designated critical habitat.

- implementing mandatory terms and conditions and reasonable and prudent alternatives as outlined in final biological opinions.

- implementing conservation recommendations included in biological opinions if they are consistent with BLM land use planning and policy and they are technologically and economically feasible.

- conferring with FWS and/or NMFS on any action that is likely to adversely affect a proposed species or proposed critical habitat.

4 BLM defines sensitive species as those species that: are candidates for listing, proposed for listing or listed under the ESA; are listed by a State in a category such as threatened or endangered implying potential endangerment or extinction; are designated sensitive by a BLM State Director (i.e., are experiencing or are predicted to experience significant downward trends in habitat capability that results in reductions in a species' distribution; typically having small and widely dispersed population; inhabit ecological refugia or other specialized or unique habitats; or are State listed but which may be better conserved through application of BLM sensitive species status).

3.0 Approach to the Assessment Contained in this Bological Opinion

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. §1536), requires federal agencies to insure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat that has been designated for those species. Regulations that implement section 7(a)(2) of the ESA define *jeopardize the continued existence of* as engaging in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). With respect to threatened and endangered species, then, federal agencies are required to insure that their actions would not be reasonably expected to appreciably reduce the species' likelihood of both surviving and recovering in the wild, by reducing the species' reproduction, numbers, or distribution.

Because of recent litigation (see *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service, No. 03-35279* (9th Circuit, 2004), *Sierra Club v. U.S. Fish and Wildlife Service and National Marine Fisheries Service* (Fifth Circuit Court of Appeals; CA No. 98-3788-K-2 E.D. La) and others), this biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat (50 CFR 402.02). Instead, we have relied upon the statutory provisions of the ESA to complete the analysis with respect to critical habitat.

By law, NMFS issues Opinions to help federal agencies comply with the requirements of section 7 of the ESA. This Opinion is designed to help BLM insure that the proposed vegetation treatment program is not likely to jeopardize the continued existence of threatened or endangered species nor result in the destruction or adverse modification of habitat designated as critical for those species.

General Assessment Method

NMFS approaches its section 7 analyses of proposed federal actions through a series of steps. The first step identifies those aspects of proposed actions that are likely to have direct and indirect physical, chemical, or biotic effects on listed species or on the physical, chemical, and biotic environment of an action area. As part of this step, we identify the spatial extent of these direct and indirect effects, including changes in that spatial extent over time. The result of this step defines the A*ction Area* for the consultation. The second step of our analyses identifies the listed resources that are likely to co-occur with these effects in space and time and the nature of that co-occurrence (these represent our *exposure analyses*). In this step of our analyses, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent. Once we identify which listed resources are likely to be exposed to an action's effects and the nature of that exposure, we examine the scientific and commercial data

available to determine whether and how those listed resources are likely to respond given their exposure (these represent our *response analyses*).

The final steps of our analyses — establishing the risks those responses pose to listed resources — are different for listed species and designated critical habitat (these represent our *risk analyses*). Our jeopardy determinations must be based on an action's effects on the continued existence of threatened or endangered species as those "species" have been listed, which can include true biological species, subspecies, or distinct population segments of vertebrate species. Because the continued existence of listed species depends on the fate of the populations that comprise them, the viability (probability of extinction or probability of persistence) of listed species depends on the viability of the populations that comprise the species. Similarly, the continued existence of populations are determined by the fate of the individuals that comprise them; populations grow or decline as the individuals that comprise the population live, die, grow, mature, migrate, and reproduce (or fail to do so).

Our risk analyses reflect these relationships between listed species and the populations that comprise them, and the individuals that comprise those populations. Our risk analyses begin by identifying the probable risks actions pose to listed individuals that are likely to be exposed to an action's effects. Our analyses then integrate those individual risks to identify consequences to the populations those individuals represent. Our analyses conclude by determining the consequences of those population-level risks to the species those populations comprise.

We measure risks to listed individuals using changes in the individuals' "fitness" or the individual's growth, survival, annual reproductive success, and lifetime reproductive success. In particular, we examine the scientific and commercial data available to determine if an individual's probable lethal, sub-lethal, or behavioral responses to an action's effects (which we identify during our response analyses) are likely to have consequences for the individual's fitness.

When individual, listed plants or animals are likely to experience reductions in fitness in response to an action, those fitness reductions are likely to reduce the abundance, reproduction, or growth rates (or increase the variance in these measures) of the populations those individuals represent (see Stearns 1992). Reductions in at least one of these variables (or one of the variables we derive from them) is a *necessary* condition for reductions in a population's viability, which is itself a *necessary* condition for reductions in a species' viability. On the other hand, when listed plants or animals exposed to an action's effects are *not* expected to experience reductions in fitness, we would not expect the action to have adverse consequences on the viability of the populations those individuals represent or the species those populations comprise (for example, see Anderson 2000, Mills and Beatty 1979, Stearns 1992). If we conclude that listed plants or animals are *not* likely to experience reductions in their fitness, we would conclude our assessment.

If, however, we conclude that listed plants or animals are likely to experience reductions in their fitness, our assessment tries to determine if those fitness reductions are likely to be sufficient to reduce the viability of the populations those individuals represent (measured using changes in the populations' abundance, reproduction, spatial structure and connectivity, growth rates, or variance in these measures to make inferences about the population's extinction risks). In this step of our analyses, we use the population's base condition (established in the *Environmental Baseline* and *Status of Listed Resources* sections of this opinion) as our point of reference. Finally, our assessment tries to determine if changes in population viability are likely to be sufficient to reduce the viability of the species those populations comprise. In this step of our analyses, we use the species' status (established in the *Status of the Species* section of this opinion) as our point of reference.

Application of Assessment Method in this Consultation

The proposed action for this consultation is BLM's vegetation treatment program which includes the use of prescribed fire, mechanical, manual and biological control methods as well as the use of herbicides to treat 6 million acres of land in 17 states. The purpose of the treatment program is to reduce hazardous fuels, control unwanted vegetation and improve habitat and resource conditions. This Opinion represents NMFS' evaluation of whether the treatment program satisfies BLM's obligations pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended.

The typical site-specific assessment is impossible for this consultation because the actual treatment methods used, acres treated, timing and locations will be determined by local BLM field offices; therefore, this consultation will assess BLM's treatment program focusing on how BLM protects threatened and endangered species and their designated critical habitat (hereafter, listed resources) to avoid the likelihood of adversely affecting listed resources and how BLM ensures that its vegetation treatment program is not likely to jeopardize the continued existence of threatened and endangered species nor likely to adversely modify their critical habitat. If the process BLM employs to implement its vegetation treatment program to protect listed resources is effective, then listed resources should not be exposed to any potential adverse effects from vegetation treatments unless and until BLM engages in section 7 consultations on those activities. If there are subsequent section 7 consultations and those consultations satisfy all applicable legal standards, listed resources should not be exposed to aspects of the treatment program that are likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Regardless of the conclusion of this consultation, subsequent NMFS Regional section 7 consultations with BLM would ask if the conclusions of this national consultation are true for specific vegetation management decisions by BLM. That is, Regional consultations would ask if the conclusion this consultation reaches about the BLM's decision-making process is true for a specific vegetation management activity that BLM proposes given the specific circumstances associated with that activity. The presence or absence of site-specific consultations when they are warranted and the results of those consultations would constitute evidence that would allow us to evaluate the validity of

this national consultation. If those site-specific consultations form a pattern that demonstrates that our general consultation was generally false (rather than false in a handful of specific cases), that pattern would constitute new information that reveals effects of the vegetation treatment program that would have to be considered in a subsequent programmatic consultation.

Evidence Available for the Consultation

To conduct these analyses, we rely on all of the evidence available to us. This evidence might consist of program reviews conducted by the BLM, reports prepared by natural resource agencies, reports from foreign and domestic non-governmental organizations, the information provided by the action agency when it initiates formal consultation, and the general scientific literature. We supplement this evidence with reports and other documents — environmental assessments, environmental impact statements and biological opinions on vegetation management activities.

During each consultation, we conduct electronic searches of the general scientific literature using *Biosis*, *Article First*, and *Aquatic Sciences* search engines as well as ECOTOX, AGRICOLA, EXTOXNET. For this consultation we supplemented these searches with searches of the gray literature regarding vegetation management program reviews. These searches specifically try to identify data or other information that supports a particular conclusion (for example, whether vegetation management activities are sufficiently protective of imperiled species) as well as data that does not support that conclusion. Our decisions are designed to avoid the risks of incorrectly concluding that an action would not have an adverse effect on listed species when, in fact, such adverse effects are likely when data are equivocal or in the face of substantial uncertainty.

4.0 DESCRIPTION OF THE ACTION AREA

The 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). For the purposes of this consultation the action area includes all BLM lands where the vegetation program will be administered in the states of Alaska, Arizona, California, Colorado, Idaho, Montana, Nebraska, North Dakota, Nevada, New Mexico, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington and Wyoming. The action area also includes those areas downstream of BLM lands (banklines, riparian zones and aquatic areas) that may contain more than negligible concentrations of herbicides (the confluence of the coastline or the estuary and the Pacific Ocean) as a result of the proposed action.

Because NMFS only has jurisdiction over anadromous and estuarine fish species and marine mammals and their critical habitat in those ecosystems, this consultation addresses the potential effects of the proposed vegetation treatment program in a portion of this Action Area. Specifically we focus on the effects of the proposed treatment program in the boundaries of the following states out to the Pacific Ocean: Idaho, Washington, Oregon and California. These states encompass the geographic area in

which endangered and threatened species and their designated critical habitat under NMFS' jurisdiction occur.

5.0 Status of Listed Resources

NMFS has determined that the actions being considered in this biological opinion "may affect" the following species and critical habitat that have been provided protection under the ESA of 1973 (16 U.S.C. 1531 *et seq*.):

Commom Name	Scientific Name	Status
Green Sturgeon (southern DPS)	*Acipenser medirostris*	Threatened
Sockeye salmon (Snake River)	*Oncorhynchus nerka*	Endangered
Chinook salmon (Central Valley spring-run)	*Oncorhynchus tshawytscha*	Threatened
Chinook salmon (California Coastal)		Threatened
Chinook salmon (Upper Willamette River)		Threatened
Chinook salmon (Lower Columbia River)		Threatened
Chinook salmon (Puget Sound)		Threatened
Chinook salmon (Snake River fall-run)		Threatened
Chinook salmon (Snake River spring/summer-run)		Threatened
Chinook salmon (Sacramento River winter-run)		Endangered
Chinook salmon (Upper Columbia spring-run)		Endangered
Coho salmon (Southern Oregon/Northern California Coast)	*Oncorhynchus kisutch*	Threatened
Coho salmon (Lower Columbia River)		Threatened
Coho salmon (Central California Coast)		Endangered
Chum salmon (Columbia River)	*Oncorhynchus keta*	Threatened
Chum salmon (Hood Canal summer-run)		Threatened
Steelhead salmon (South-Central California Coast)	*Oncorhynchus mykiss*	Threatened
Steelhead (Central California Coast)		Threatened
Steelhead (California Central Valley)		Threatened
Steelhead (Northern California)		Threatened
Steelhead (Upper Willamette River)		Threatened
Steelhead (Lower Columbia River)		Threatened
Steelhead (Middle Columbia River)		Threatened
Steelhead (Snake River Basin)		Threatened
Steelhead (Southern California)		Endangered
Steelhead (Upper Columbia River)		Endangered
Steelhead (Puget Sound)		Threatened
Killer whale (Southern Resident)	*Orcinus orca*	Threatened

Designated Critical Habitat
Critical habitat has been designated for all salmonids and the southern resident killer whale. Descriptions of critical habitat are presented in the *Status of Listed Resources* sections that follow.

This section focuses on the status of the threatened and endangered species and designated critical habitat that are likely to occur in the Action Area and that may be adversely affected by the proposed action. The information below only summarizes information necessary to understand information presented in *Effects of the Action* section of this Opinion. Because this is a programmatic consultation which does not

consider site or area-specific data or other information, we only summarize information on the geographic distribution, listing status and trends. Additional information on the biology and ecology of listed resources can be found in a number of unpublished and published documents including status reviews for green sturgeon (Adams *et al*. 2002), updated in 2005 (BRT 2005), status review for Pacific salmon (Good *et al.* 2005), status review for Southern Resident killer whales (Krahn *et al.* 2002), updated in December 2004 (Krahn *et al.* 2004) and the proposed *Conservation Plan for Southern Residents* (NMFS 2005a) and listing documents published in the *Federal Register*.

Status of Species and Critical Habitat

Green Sturgeon

Distribution

The southern population of green sturgeon includes all populations of green sturgeon south of the Eel River, California and presently occur in the Sacramento and Feather Rivers in California.

Green sturgeon spawn in deep pools or holes in large turbulent river mainstreams from March to July, with a peak in mid-April to mid-June (Moyle *et al.* 1992). Spawning substrate can range from clean sand to bedrock but sturgeon probably prefer large cobbles (Adams *et al*. 2002). Sturgeon spawn in cool water in temperatures ranging from 8-14^{o} C. Juveniles spend 1 to 4 years in freshwater when they enter the ocean and move north along the coast at least as far as the Columbia River.

Listing Status and Trends

Green sturgeon were listed as threatened under the ESA in 2006 (71 FR 17757, April 7, 2006). The listing of green sturgeon occurred primarily because of the curtailment of the only remaining spawning population into a few miles in the Sacramento River. This curtailment has resulted from the loss of historical spawning habitat due to blockage by dams and/or habitat degradation. There are no abundance estimates for green sturgeon but limited evidence suggests declining trends in abundance. Habitat conditions such as basic water quality have generally improved since the 1950s and 1960s in the Sacramento Bay-Delta. Increases in pesticide use in the mid-1970s; however, has increased concentrations of mercury, PCBs, dioxins, and organochlorine pesticides which are widespread in the estuary, making it rare to find water or sediment that is uncontaminated (Viani 2006). Green sturgeon, like other sturgeon species spawn and rear in the freshwater reaches of the Sacramento Bay-Delta ecosystem. Habitat loss, including spawning habitat and the loss of spawning populations from dams and water transport, past fishing practices, water pollution, toxics including new pesticides and herbicides, coupled with low population sizes, slow growth rates and a restricted range will place this population at risk of further declines.

Critical habitat has not been designated for green sturgeon.

Sockeye Salmon

The vast majority of sockeye salmon spawn in inlet or outlet streams of lakes or in lakes themselves. The juveniles of these "lake-type" sockeye salmon rear in lake environments for 1 to 3 years, migrate to sea, and return to natal lake systems to spawn after 1 to 4 years in the ocean. However, some sockeye salmon populations spawn in rivers without juvenile lake-rearing habitat. Their juveniles rear in slow velocity sections of rivers for 1 or 2 years (river-type) or migrate to sea as underyearlings and, thus, rear primarily in salt water (sea-type) (Wood 1995). As with lake-type sockeye salmon, river- and sea-type sockeye salmon return to natal spawning habitat after 1 to 4 years in the ocean. On the other hand, resident fish appear to be much more closely integrated into some sockeye populations. For example, in some situations, anadromous fish may give rise to progeny that mature in freshwater (as is the case with residual sockeye), and some resident fish may have anadromous offspring.

Snake River Sockeye Salmon

Distribution
Snake River sockeye salmon includes populations of sockeye salmon from the Snake River Basin, Idaho, although the only remaining populations of this species occur in Redfish Lake in the Stanley River Basin of Idaho.

Listing Status and Trends
Snake River sockeye salmon were originally listed as endangered in 1991 and retained that classification when their status was reviewed on June 28, 2005 (70 *Federal Register* 37160). These salmon were listed because of the extremely low returns of adults to the only remaining spawning habitat in 1991. Snake River sockeye historically were distributed in four lakes within the Stanley Basin, but the only remaining population resides in Redfish Lake. Only 16 naturally produced adults have returned to Redfish Lake since the Snake River sockeye ESU was listed as an endangered species in 1991. All 16 fish were taken into the Redfish Lake Captive Propagation Program, which was initiated as an emergency measure in 1991. The return of over 250 adults in 2000 was encouraging; however, subsequent returns from the captive program in 2001and 2002 have been fewer than 30 fish. Since 1999 no naturally produced adults have returned.

Critical habitat for these salmon was designated on December 28, 1993, and encompasses the waters, waterway bottoms, and adjacent riparian zones of specified lakes and river reaches in the Columbia River that are or were accessible to listed Snake River salmon (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams).

Chinook Salmon

Gilbert (1912) initially described two generalized freshwater life history types: "stream-type" Chinook salmon reside in freshwater for a year or more following emergence, whereas "oceantype" Chinook salmon migrate to the ocean predominantly within their first year. Of the two life history types, ocean-type Chinook salmon exhibit the most

varied and plastic life history trajectories. Ocean-type Chinook salmon juveniles emigrate to the ocean as fry, subyearling juveniles (during their first spring or fall), or as yearling juveniles (during their second spring), depending on environmental conditions. Ocean-type Chinook salmon also undertake distinct, coastally oriented, ocean migrations. The timing of the return to freshwater and spawning is closely related to the ecological characteristics of a population's spawning habitat. Five different run times are expressed by different ocean-type Chinook salmon populations: spring, summer, fall, late-fall, and winter. In general, early run times (spring and summer) are exhibited by populations that use high spring flows to access headwater or interior regions. Ocean-type populations within a basin that express different run times appear to have evolved from a common source population. Stream-type populations appear to be nearly obligate yearling outmigrants (some 2-year-old smolts have been identified); they undertake extensive offshore ocean migrations and generally return to freshwater as spring- or summer-run fish. Stream-type populations are found in northern British Columbia, Alaska, and the headwater regions of the Fraser River and Columbia River interior tributaries.

Distribution

Chinook salmon are the largest of the Pacific salmon and historically ranged from the Ventura River in California to Point Hope, Alaska in North America, and in northeastern Asia from Hokkaido, Japan to the Anadyr River in Russia (Healey 1991). In addition, chinook salmon have been reported in the Canadian Beaufort Sea (McPhail and Lindsey 1970). Below is a discussion of the trend for chinook salmon as a group followed by a discussion of the distribution and listing status and more specific trend information for individual chinook salmon.

Trends for All Chinook Salmon

Over the past few decades, the size and distribution of chinook salmon populations have declined because of natural phenomena and human activity, including the operation of hydropower systems, over-harvest, hatcheries, and habitat degradation. Natural variations in freshwater and marine environments have substantial effects on the abundance of salmon populations. Of the various natural phenomena that affect most populations of Pacific salmon, changes in ocean productivity are generally considered most important.

Chinook salmon, like the other salmon NMFS has listed, have declined under the combined effects of: overharvests in fisheries; competition from hatchery chinook and native and non-native exotic species; dams that block their migrations and alter river hydrology; gravel mining that impedes their migration and alters the dynamics (hydrogeomorphology) of the rivers and streams that support juveniles; water diversions that deplete water levels in rivers and streams; destruction or degradation of riparian habitat that increases water temperatures in rivers and streams sufficient to reduce the survival of juvenile chinook salmon; and land use practices (logging, agriculture, urbanization, grazing) that destroy wetland and riparian ecosystems while introducing sediment, nutrients, biocides, metals, and other pollutants into surface and ground water and degrade water quality in the freshwater, estuarine, and coastal ecosystems throughout the Pacific Northwest.

Puget Sound Chinook Salmon

Distribution
Puget Sound chinook salmon include all runs of chinook salmon in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula. Thirty-six hatchery populations were included as part of the ESU and five were considered essential for recovery and listed. These hatchery populations include spring chinook from Kendall Creek, the North Fork Stillaguamish River, White River, and Dungeness River, and fall-run fish from the Elwha River.

Listing Status and Trends
Puget Sound chinook salmon were listed as threatened in 1999; that status was re-affirmed on June 28, 2005 (70 Federal Register 37160). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52630). Of 31 historical populations (Ruckelshaus *et al.*, 2002), nine are believed to be extinct, most of which were ‘‘early run’’ or ‘‘spring’’ populations. Nine of the thirteen populations that comprise Puget Sound Chinook have shown modest increases in escapement in recent years, however, recent productivity trends remain below replacement for the majority of the 22 extant populations of Puget Sound Chinook.

Lower Columbia River Chinook Salmon

Distribution
Lower Columbia River chinook salmon includes all native populations from the mouth of the Columbia River to the crest of the Cascade Range, excluding populations above Willamette Falls. The Cowlitz, Kalama, Lewis, White Salmon, and Klickitat Rivers are the major river systems on the Washington side, and the lower Willamette and Sandy Rivers are foremost on the Oregon side. The eastern boundary for this species occurs at Celilo Falls, which corresponds to the edge of the drier Columbia Basin Ecosystem and historically may have been a barrier to salmon migration at certain times of the year.

Listing Status and Trends
Lower Columbia River chinook salmon were listed as threatened on June 28, 2005 (70 *Federal Register* 37160). Despite recent improvements, long-term trends in productivity are below replacement for the majority of populations in the ESU. It is estimated that 8 to 10 of approximately 31 historical populations in the ESU have been extirpated or nearly extirpated. Although approximately 35% of historical habitat has been lost due to the construction of dams and other impassable barriers Lower Columbia River Chinook exhibit a broad spatial distribution in a variety of watersheds and habitat types. The disproportionate loss of the spring-run life history, however, represents risk for their continued existence.

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52630).

Upper Columbia River Spring-run Chinook Salmon

Distribution
Endangered Upper Columbia River spring-run chinook salmon includes stream-type chinook salmon that inhabit tributaries upstream from the Yakima River to Chief Joseph Dam. They currently spawn in only three river basins above Rock Island Dam: the Wenatchee, Entiat, and Methow Rivers. Several hatchery populations are also listed including those from the Chiwawa, Methow, Twisp, Chewuch, and White rivers, and Nason Creek.

Listing Status and Trends
Upper Columbia River spring-run chinook salmon were listed as endangered on June 28, 2005 (70 *Federal Register* 37160), because they had been reduced to small populations in three watersheds. Population viability analyses for this species (using the Dennis Model) suggest that these chinook salmon face a significant risk of extinction: a 75% to 100% probability of extinction within 100 years (given return rates for 1980 to present). It is estimated that approximately 58% of historical habitat has been lost due to the construction of dams.

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52630).

Upper Willamette River Chinook Salmon

Distribution
Upper Willamette River chinook salmon occupy the Willamette River and tributaries upstream of Willamette Falls. Historically, access above Willamette Falls was restricted to the spring when flows were high. In autumn, low flows prevented fish from ascending past the falls. The Upper Willamette spring-run chinook are one of the most genetically distinct chinook groups in the Columbia River Basin. Fall-run chinook salmon spawn in the Upper Willamette but are not considered part of the species because they are not native. There are five spring-run hatchery stocks but none are listed.

Listing Status
Upper Willamette River chinook salmon were listed as threatened in 1999, and their status was reaffirmed on June 28, 2005, (70 *Federal Register* 37160).

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52630).

Snake River Spring/Summer-run Chinook Salmon

Distribution
Snake River spring/summer-run chinook salmon are primarily limited to the Salmon, Grande Ronde, Imnaha, and Tucannon Rivers in the Snake River basin.

Listing Status and Trends
Snake River spring/summer-run chinook salmon were originally listed as endangered in 1992, but were reclassified as threatened on June 28, 2005 (70 *Federal Register* 37160). Many, but not all, of the 29 natural production areas experienced large abundance increases in 2001, However, approximately 79% of the 2001 return of spring-run Chinook was of hatchery origin.

Critical habitat for these salmon was designated on October 25, 1999, and encompasses the waters, waterway bottoms, and adjacent riparian zones of specified lakes and river reaches in the Columbia River that are or were accessible to listed Snake River salmon (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams).

Snake River Fall-run Chinook Salmon

Distribution
The present range of spawning and rearing habitat for naturally-spawned Snake River fall chinook salmon is primarily limited to the Snake River below Hells Canyon Dam and the lower reaches of the Clearwater, Grand Ronde, Salmon, and Tucannon Rivers.

Listing Status and Trends
Snake River fall-run chinook salmon were originally listed as endangered in 1992 but were reclassified as threatened on June 28, 2005 (70 *Federal Register* 37160). Fall-run Chinook salmon returns to the Snake River generally declined through the first half of the 20th century (Irving and Bjornn 1981). In spite of the declines, the Snake River basin remained the largest single natural production area for fall-run Chinook salmon in the Columbia River drainage into the early 1960s (Fulton 1968). It is estimated that approximately 80% of historical spawning habitat was lost (including the most productive areas) with the construction of a series of Snake River mainstem dams. The loss of spawning habitats and the restriction of these fish to a single extant naturally spawning population increase the their vulnerability to environmental variability and catastrophic events.

Critical habitat for these salmon was designated on December 28, 1993. This critical habitat encompasses the waters, waterway bottoms, and adjacent riparian zones of specified lakes and river reaches in the Columbia River that are or were accessible to listed Snake River salmon (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams).

Sacramento River Winter-run Chinook Salmon

Distribution
Sacramento River winter-run chinook salmon consists of a single spawning population that enters the Sacramento River and its tributaries in California from November to June and spawns from late April to mid-August, with a peak from May to June.

Listing Status
Sacramento River winter-run chinook salmon were listed as endangered on January 4, 1994 (57 *Federal Register* 36626), because dams blocked all but a small fraction of their historic spawning habitat and their remaining habitat is degraded. Sacramento River winter-run chinook salmon consist of a single self-sustaining population which is entirely dependent upon the provision of suitably cool water from Shasta Reservoir during periods of spawning, incubation and rearing. Critical Habitat was designated for this species on June 16, 1993 (58 *Federal Register* 33212).

Central Valley Spring-run Chinook salmon

Distribution
The Central Valley Spring-run chinook salmon includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries in California. This species includes chinook salmon entering the Sacramento River from March to July and spawning from late August through early October, with a peak in September. Spring-run fish in the Sacramento River exhibit an ocean-type life history, emigrating as fry, subyearlings, and yearlings.

Listing Status and Trends
Central Valley spring-run chinook salmon were listed as threatened in 1999, a classification this species retained when the original listing was reviewed on June 28, 2005 (70 *Federal Register* 37160). This species was listed because dams block most of their historic spawning habitat and their remaining habitat is degraded. Central Valley spring-run chinook historically occupied the upper reaches of all major tributaries to the Sacramento and San Joaquin rivers. Of the 21 populations identified by the California Department of Fish and Game in their status review, only 3 self-sustaining populations now exist in the upper Sacramento in Deer, Mill and Butte Creeks. Although these streams have not been affected by large impassable dams, diversions and small dams have degraded the spawning habitat.

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

California Coastal Chinook Salmon

Distribution
California Coastal chinook salmon includes all naturally-spawned coastal chinook salmon spawning from Redwood Creek south through the Russian River, inclusive.

Listing Status and Trends
California Coastal chinook salmon were listed as threatened in 1999, and their status was reaffirmed on June 28, 2005 (70 *Federal Register* 37160). Listing was necessary because of the combined effect of dams that prevent them from reaching spawning habitat, logging, agricultural activities, urbanization, and water withdrawals in the river drainages that support them. The species exists as small populations with highly variable cohort sizes. The Russian River probably contains some natural production, but the origin of those fish is not clear because of a number of introductions of hatchery fish over the last century. The Eel River contains a substantial fraction of the remaining chinook salmon spawning habitat for this species.

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Coho Salmon

Coho salmon occur naturally in most major river basins around the North Pacific Ocean from central California to northern Japan (Laufle *et al.* 1986). After entering the ocean, immature coho salmon initially remain in near-shore waters close to the parent stream. Most coho salmon adults are 3-year-olds, having spent approximately 18 months in freshwater and 18 months in salt water. Wild female coho return to spawn almost exclusively at age 3. Spawning escapements of coho salmon are dominated by a single year class. The abundance of year classes can fluctuate dramatically with combinations of natural and human-caused environmental variation.

North American coho salmon will migrate north along the coast in a narrow coastal band that broadens in southeastern Alaska. During this migration, juvenile coho salmon tend to occur in both coastal and offshore waters. During spring and summer, coho salmon will forage in waters between 46^{o} N, the Gulf of Alaska, and along Alaska's Aleutian Islands.

Status and Trends for All Coho Salmon
Coho salmon survive only in aquatic ecosystems and, therefore, depend on the quantity and quality of those aquatic systems. Coho salmon, like the other salmon NMFS has listed, have declined under the combined effects of overharvests in fisheries; competition from fish raised in hatcheries and native and non-native exotic species, dams that block their migrations and alter river hydrology; gravel mining that impedes their migration and alters the dynamics (hydrogeomorphology) of the rivers and streams that support juveniles, water diversions that deplete water levels in rivers and streams, destruction or degradation of riparian habitat that increase water temperatures in rivers and streams sufficient to reduce the survival of juvenile coho salmon, and land use practices (logging, agriculture, urbanization) that destroy wetland and riparian ecosystems while introducing sediment, nutrients, biocides, metals, and other pollutants into surface and ground water and degrade water quality in the freshwater, estuarine, and coastal ecosystems throughout the Pacific Northwest.

Central California Coast Coho Salmon

Distribution
Central California coho salmon consist of all coho salmon that reproduce in streams between Punta Gorda and the San Lorenzo River, including hatchery stocks (except for the Warm Springs Hatchery on the Russian River), although hatchery populations are not listed.

Listing Status and Trends
Central California coho salmon were listed as endangered on June 28, 2005 (70 *Federal Register* 37160). Of 186 streams in the range of central California coho salmon identified as having historic accounts of adult coho salmon, recent data exist for 133 (72%). Of these 133 streams, 62 (47%) have recent records of occurrence of adult coho salmon and 71 (53%) no longer maintain coho salmon spawning runs (Brown *et al.* 1994).

Critical habitat for central California coho salmon was designated on May 5, 1999 (64 *Federal Register* 24049). The designation encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between Punta Gorda and the San Lorenzo River, and Mill Valley and Corte Madera Creek which enter the San Francisco Bay.

Lower Columbia River Coho Salmon

Distribution
Lower Columbia River coho salmon include all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, Oregon, as well as twenty-five artificial propagation programs: the Grays River, Sea Resources Hatchery, Peterson Coho Project, Big Creek Hatchery, Astoria High School Coho Program, Warrenton High School Coho Program, Elochoman Type-S Coho Program, Elochoman Type-N Coho Program, Cathlamet High School FFA Type-N Coho Program, Cowlitz Type-N Coho Program in the Upper and Lower Cowlitz Rivers, Cowlitz Game and Anglers Coho Program, Friends of the Cowlitz Coho Program, North Fork Toutle River Hatchery, Kalama River Type-N Coho Program, Kalama River Type-S Coho Program, Washougal Hatchery Type-N Coho Program, Lewis River Type-N Coho Program, Lewis River Type-S Coho Program, Fish First Wild Coho Program, Fish First Type-N Coho Program, Syverson Project Type-N Coho Program, Eagle Creek National Fish Hatchery, Sandy Hatchery, and the Bonneville/Cascade/Oxbow complex coho hatchery programs.

Listing Status and Trends
Lower Columbia River coho salmon were listed as endangered on June 28, 2005 (70 Federal Register 37160). There are only two extant populations with appreciable natural production (the Clackamas and Sandy River populations), from an estimated 23 historical populations. Although adult returns in 2000 and 2001 for the Clackamas and Sandy River populations exhibited moderate increases, the recent 5-year mean of natural-origin

spawners for both populations represents less than 1,500 adults. The Sandy River population has exhibited recruitment failure in 5 of the last 10 years, and has exhibited a poor response to reductions in harvest. Approximately 40% of historical habitat is currently inaccessible, which restricts the number of areas that might support natural production. The extreme loss of naturally spawning populations, the low abundance of extant populations, diminished diversity, and fragmentation and isolation of the remaining naturally produced fish confer considerable risks to the persistence of these salmon.

Critical habitat has not been designated for this species.

Southern Oregon/Northern California Coast Coho Salmon

Distribution
Southern Oregon/Northern California coast coho salmon consists of all naturally spawning populations of coho salmon that reside below long-term, naturally impassible barriers in streams between Punta Gorda, California and Cape Blanco, Oregon. The geographic area of the listed species encompasses five of the seven hatchery stocks reared and released within the species' range although none of the hatchery populations are listed. The three major river systems supporting Southern Oregon – Northern Coastal California coast coho are the Rogue, Klamath (including the Trinity), and Eel rivers.

Listing Status and Trends
Southern Oregon/Northern California coast coho salmon were listed as threatened in 1997, and they retained that classification when their status was reviewed on June 28, 2005 (70 *Federal Register* 37160). Although the abundance of spawners in the Rogue River indicates that this population is self-sustaining the relatively low levels of coho in historically occupied streams in California indicate continued low abundance in the California habitats.

Critical habitat for this species encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and the Elk River in Oregon, inclusive (62 *Federal Register* 62741, November 25, 1997). That critical habitat was re-designated on May 5, 1999 (64 *Federal Register* 24049).

Coho salmon, like the other salmon NMFS has listed, have declined under the combined effects of overharvests in fisheries; competition from fish raised in hatcheries and native and non-native exotic species, dams that block their migrations and alter river hydrology; gravel mining that impedes their migration and alters the dynamics (hydrogeo-morphology) of the rivers and streams that support juveniles, water diversions that deplete water levels in rivers and streams, destruction or degradation of riparian habitat that increase water temperatures in rivers and streams sufficient to reduce the survival of juvenile coho salmon, and land use practices (logging, agriculture, urbanization) that destroy wetland and riparian ecosystems while introducing sediment, nutrients, biocides, metals, and other pollutants into surface and ground water and degrade water quality in the freshwater, estuarine, and coastal ecosystems throughout the Pacific Northwest.

Chum Salmon

Historically, chum salmon were distributed throughout the coastal regions of western Canada and the U.S., as far south as Monterey Bay, California. Presently, major spawning populations are found only as far south as Tillamook Bay on the northern Oregon coast. Chum salmon are semelparous, spawn primarily in freshwater and, apparently, exhibit obligatory anadromy (there are no recorded landlocked or naturalized freshwater populations) (Randall *et al.* 1987).

Chum salmon spend two to five years in feeding areas in the northeast Pacific Ocean, which is a greater proportion of their life history than other Pacific salmonids. Chum salmon distribute throughout the North Pacific Ocean and Bering Sea, although North American chum salmon (as opposed to chum salmon originating in Asia), rarely occur west of 175° E longitude (Johnson *et al.* 1997).

North American chum salmon migrate north along the coast in a narrow coastal band that broadens in southeastern Alaska, although some data suggest that Puget Sound chum, including Hood Canal summer run chum, may not make extended migrations into northern British Columbian and Alaskan waters, but instead may travel directly offshore into the north Pacific Ocean (Johnson *et al.* 1997).

Chum salmon usually spawn in the lower reaches of rivers, with redds usually dug in the mainstem or in side channels of rivers from just above tidal influence to nearly 100 km from the sea. Juveniles outmigrate to seawater almost immediately after emerging from the gravel that covers their redds (Salo 1991). This ocean-type migratory behavior contrasts with the stream-type behavior of some other species in the genus *Oncorhynchus* (e.g., coastal cutthroat trout, steelhead, coho salmon, and most types of chinook and sockeye salmon), which usually migrate to sea at a larger size, after months or years of freshwater rearing. This means that survival and growth in juvenile chum salmon depend less on freshwater conditions (unlike stream-type salmonids which depend heavily on freshwater habitats) than on favorable estuarine conditions.

Chum salmon, like the other salmon NMFS has listed, have declined under the combined effects of overharvests in commercial and recreational fisheries; competition from fish raised in hatcheries and native and non-native exotic species; shifts in climatic conditions that changed patterns and intensity of precipitation; dams that block spawning and smolt migrations and alter river hydrology; gravel mining that impedes their migration and alters the dynamics (hydrogeomorphology) of the rivers and streams that support juveniles, water diversions that deplete water levels in rivers and streams, destruction or degradation of riparian habitat that increase water temperatures in rivers and streams sufficient to reduce the survival of juvenile chum salmon. Land development for agricultural purposes has also altered the historical land cover, and as much of this development has occurred in river floodplains, there has been a direct impact on river flow levels and morphology. Agriculture also introduces nutrients, biocides, metals, and other pollutants into surface and ground water and degrade water quality in the

freshwater, estuarine, and coastal ecosystems throughout the Pacific Northwest and California.

Columbia River Chum Salmon

Distribution
Columbia River chum salmon includes all natural-origin chum salmon in the Columbia River and its tributaries in Washington and Oregon. The species consists of three populations: Grays River, Hardy, and Hamilton Creek in Washington State.

Listing Status and Trends
Columbia River chum salmon were listed as threatened in 1999, and their status was reaffirmed on June 28, 2005 (70 *Federal Register* 37160). Approximately 90% of the historical populations in the Columbia River chum ESU are extirpated or nearly so. Although there have been recent increases in abundance the loss of off-channel habitats and the extirpation of approximately 17 historical populations increases the risks to the long-term persistence of these salmon.

Critical habitat was originally designated for this on February 16, 2000 (65 *Federal Register* 7764) and was re-designated on September 2, 2005 (70 *Federal Register* 52630).

Hood Canal Summer-run Chum Salmon

Distribution
Hood Canal summer-run chum salmon includes summer-run chum salmon populations in Hood Canal in Puget Sound and in Discovery and Sequim Bays on the Strait of Juan de Fuca. It may also include summer-run fish in the Dungeness River, but the existence of that run is uncertain. Of the sixteen populations of summer chum that are included in this species, seven are considered to be "functionally extinct" (Skokomish, Finch Creek, Anderson Creek, Dewatto, Tahuya, Big Beef Creek, and Chimicum). The remaining nine populations are well distributed throughout the range of the species except for the eastern side of Hood Canal (Johnson *et al.* 1997).

Five hatchery populations are considered part of the species including those from the Quilcene National Fish Hatchery, Long Live the Kings Enhancement Project (Lilliwaup Creek), Hamma Hamma River Supplementation Project, Big Beef Creek reintroduction Project, and the Salmon Creek supplementation project in Discovery Bay. Although included as part of the species, none of the hatchery populations were listed.

Listing Status and Trends
Hood Canal summer-run chum salmon were listed as endangered on March 25, 1999. Critical habitat for this species was designated on September 2, 2005 (70 *Federal Register* 52630). Of an estimated 16 historical populations, seven are believed to have been extirpated or nearly extirpated. Most of these extirpations have occurred in populations on the eastern side of Hood Canal. The widespread loss of estuary and lower

floodplain habitat is a continuing threat to spatial structure and connectivity. Although there have been recent increases in abundance recent abundance estimates vary among populations, ranging from one fish to nearly 4,500 fish.

Steelhead

Steelhead are distributed from Alaska south to southern California. They can be divided into two basic run-types: the stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in freshwater to mature and spawn and the ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns shortly after river entry.

Summer steelhead enter freshwater between May and October in the Pacific Northwest (Busby *et al*. 1996). Winter steelhead enter freshwater between November and April in the Pacific Northwest (Busby *et al*. 1996). Steelhead spawn in cool, clear streams featuring suitable gravel size, depth, and current velocity. Intermittent streams may also be used for spawning (Barnhart 1986, Everest 1973). Depending on water temperature, steelhead eggs may incubate for 1.5 to 4 months (61 *Federal Register* 41542) before hatching. Juveniles rear in fresh water from one to four years, then migrate to the ocean as smolts (61 *Federal Register* 41542). Winter steelhead populations generally smolt after two years in fresh water (Busby *et al*. 1996).

Listing Status and Trends for All Steelhead
West Coast steelhead have experienced declines in abundance over the past several decades as a result of loss, damage, or change to their natural environment. Sedimentation and degraded water quality from extensive and intensive land use activities (e.g., timber harvests, road building, livestock grazing, and urbanization) are recognized as primary causes of habitat degradation throughout the range of West Coast steelhead. Water diversions for agriculture, flood control, domestic, and hydropower purposes have greatly reduced or eliminated historically accessible habitat and degraded remaining habitat. In addition to limiting habitat accessibility, dams (whether located above or below historically impassable barriers) affect habitat quality through changes in river hydrology, altered temperature profiles, reduced downstream gravel recruitment, and the reduced recruitment of large woody debris. Forestry, agriculture, mining, and urbanization have degraded, simplified, and fragmented habitat. The destruction or modification of estuarine areas has resulted in the loss of important rearing and migration habitats. Land development for agricultural purposes has also altered the historical land cover, and as much of this development has occurred in river floodplains, there has been a direct impact on river flow levels and morphology. Agriculture also introduces nutrients, biocides, metals, and other pollutants into surface and ground water and degrade water quality in the freshwater, estuarine, and coastal ecosystems throughout the Pacific Northwest and California.

Puget Sound Steelhead

Distribution
Puget Sound steelhead inhabitat streams in the Strait of Juan de Fuca, Puget Sound and Hood Canal river basins in Washington, bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive) as well as the Green River natural and Hamma Hamma winter-run steelhead hatchery stocks. This species is primarily composed of winter steelhead stocks, but also includes several small stocks of summer steelhead.

Listing Status and Trends
Puget Sound steelhead were listed as threatened on May 11, 2007, (72 *Federal Register* 26722). From 1992-2002 there has been a declining trend in the proportion of self-sustaining populations of this species and increases in the proportion of populations with depressed or unknown status. Declining abundance was particularly evident in southern Puget Sound populations but was also exhibited in northern Puget Sound, Hood Canal and Strait of Juan de Fuca populations.

Critical habitat has not been designated for these steelhead.

Upper Columbia River Steelhead

Distribution
Upper Columbia River steelhead inhabit the Columbia River Basin upstream from the Yakima River, Washington, to the border between the U.S. and Canada. This area includes the Wenatchee, Entiat, and Okanogan Rivers. All upper Columbia River steelhead are summer steelhead. Steelhead primarily use streams of this region that drain the northern Cascade Mountains of Washington State. This species includes hatchery populations of summer steelhead from the Wells Hatchery because it probably retains the genetic resources of steelhead populations that once occurred above the Grand Coulee Dam. This species does not include the Skamania Hatchery stock because of its non-native genetic heritage.

Listing Status
Upper Columbia River steelhead were originally listed as endangered in 1997. Their status was reviewed and reclassified to threatened on January 5, 2006 (71 *Federal Register* 834. This reclassification was overturned on June 13, 2007, and the original listing of endangered was reinstated and remains in effect (Western District of Washington Case 2:06-cv-00483-JCC, Document 74).

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Middle Columbia River Steelhead

Distribution
Middle Columbia steelhead occupy the Columbia River Basin from Mosier Creek, Oregon, upstream to the Yakima River, Washington, inclusive (61 *Federal Register* 41541). Steelhead from the Snake River Basin (described below) are excluded. This species includes the only populations of inland winter steelhead in the U.S. in the Klickitat River and Fifteen mile Creek (Busby *et al*. 1996). Two hatchery populations are considered part of this species but were not listed: the Deschutes River stock and the Umatilla River stock.

Listing Status and Trends
Middle Columbia River steelhead were listed as endangered in 1999, after their status was reviewed, they were reclassified to threatened on January 5, 2006 (71 *Federal Register* 834. Factors contributing to the decline include agricultural practices, especially grazing, and water diversions and withdrawals. In addition, hydropower development has impacted the species by preventing these steelhead from migrating to habitat above dams, and by killing them in large numbers when they try to migrate through the Columbia River hydroelectric system.

Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Lower Columbia River Steelhead

Distribution
Lower Columbia River steelhead include naturally-produced steelhead returning to Columbia River tributaries on the Washington side between the Cowlitz and Wind rivers in Washington and on the Oregon side between the Willamette and Hood rivers, inclusive. In the Willamette River, the upstream boundary of this species is at Willamette Falls. This species includes both winter and summer steelhead. Two hatchery populations are included in this species, the Cowlitz Trout Hatchery winter-run stock and the Clackamas River stock but neither was listed.

Listing Status
Lower Columbia River steelhead were listed as threatened in 1998 (63 *Federal Register* 13347, March 19, 1998). When their status was reviewed on January 5, 2006, they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Upper Willamette River Steelhead

Distribution
Upper Willamette River steelhead occupy the Willamette River and its tributaries upstream of Willamette Falls. This is a late-migrating winter group that enters fresh water in March and April (Howell *et al*. 1985). Only the late run was included is the

listing of this species, which is the largest remaining population in the Santiam River system.

Listing Status and Trends
Upper Willamette River steelhead were listed as threatened in 1999, when their status was reviewed on January 5, 2006 they retained that classification (71 *Federal Register* 834. Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

A major threat to Willamette River steelhead results from artificial production practices. Fishways built at Willamette Falls in 1885 have allowed Skamania-stock summer steelhead and early-migrating winter steelhead of Big Creek stock to enter the range of Upper Willamette River steelhead. The population of summer steelhead is almost entirely maintained by hatchery salmon, although natural-origin, Big Creek-stock winter steelhead occur in the basin (Howell *et al*. 1985). In recent years, releases of winter steelhead are primarily of native stock from the Santiam River system.

Snake River Steelhead

Distribution
Snake River basin steelhead are an inland species that occupy the Snake River basin of southeast Washington, northeast Oregon, and Idaho. The historic spawning range of this species included the Salmon, Pahsimeroi, Lemhi, Selway, Clearwater, Wallowa, Grande Ronde, Imnaha, and Tucannon Rivers.

Listing Status
*S*nake River steelhead were listed as threatened in 1997, when their status was reviewed on January 5, 2006, they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Northern California Steelhead

Distribution
Northern California steelhead includes steelhead in California coastal river basins from Redwood Creek south to the Gualala River, inclusive.

Listing Status
Northern California steelhead were listed as threatened in 2000, when their status was reviewed on January 5, 2006; they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Central California Coast Steelhead

Distribution
The Central California Coast steelhead includes steelhead in river basins from the Russian River to Soquel Creek, Santa Cruz County (inclusive) and the drainages of San Francisco and San Pablo bays excluding the Sacramento-San Joaquin River Basin of the Central Valley of California.

Listing Status
Northern California steelhead were listed as threatened in 2000, when their status was reviewed on January 5, 2006, they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

South-Central California Coast Steelhead

Distribution
The South-Central California steelhead ESU includes all naturally spawned populations of steelhead (and their progeny) in streams from the Pajaro River (inclusive) to, but not including, the Santa Maria River, California.

Listing Status
South-Central California Coast steelhead were listed as threatened in 1997, when their status was reviewed on January 5, 2006 they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Southern California Steelhead

Distribution
Southern California steelhead occupy rivers from the Santa Maria River to the southern extent of the species range.

Listing Status
Southern California steelhead were listed as endangered in 1997, when their status was reviewed on January 5, 2006; they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

California Central Valley Steelhead

Distribution
California Central Valley steelhead occupy the Sacramento and San Joaquin Rivers and their tributaries.

Listing Status
California Central valley steelhead were listed as threatened in 1998, when their status was reviewed on January 5, 2006; they retained that classification (71 *Federal Register* 834). Critical habitat was designated for this species on September 2, 2005 (70 *Federal Register* 52488).

Southern Resident Killer Whales

Distribution

Southern Resident killer whales occur in the inland waterways of Puget Sound, Strait of Juan de Fuca, and Southern Georgia Strait during the spring, summer, and fall although they will seasonally migration to coastal waters as far north as Queen Charlotte Islands and Vancouver Island in Canada and Washington, Oregon, and California.

Listing Status and Trends

Southern resident killer whales were listed as endangered on November 18, 2005 (70 *Federal Register* 69903), because the ongoing and potentially changing nature of pervasive threats: disturbance from vessels; the persistence of legacy toxins and the addition of new ones into the whale's environment; and, the potential limits on prey availability (primarily salmon) given uncertain future ocean conditions and loss and degradation of freshwater estuarine habitat, management of hydropower facilities, and hatchery practices. Chemical contaminants, nutrients, and sediment is transported from freshwater systems to Puget Sound and disrupt the prey base for these killer whales or expose them to pollution through their diets). The small number of reproductive age males and high mortality rates for this group are also a concern. Although the current population estimate for 2005 is approximately 90 animals (+ 3.5% rate of increase for the population per year since 2001) (CWR 2005), the recent decline, unstable population status, and population structure (e.g., few reproductive age males and non-calving adult females) continue to be causes for concern.

Critical habitat was designated for this species on November 29, 2006 (71 *Federal Register* 69054) and encompasses three specific areas in Puget Sound: (1) the Summer Core Area in Haro Strait and waters around the San Juan Islands; (2) Puget Sound; and (3) the Strait of Juan de Fuca. The designated area encompasses about 2,560 square miles (6,630 sq km) of marine habitat.

6.0 ENVIRONMENTAL BASELINE

By regulation, environmental baselines for biological opinions include the past and present impacts of all state, Federal or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or

private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The *Status of the Species* section of this Opinion presented the past and present conditions that resulted in the current status and trends of the species and their designated critical habitat found in the Action Area for this consultation. Environmental baselines normally require us to step down from the species level discussion in the *Status of the Species* section of this Opinion and establish the current viability or fitness of the populations or individuals respectively, of listed species occurring in the Action Area by discussing the impacts of past and ongoing natural factors, the impacts of past, present and continuing actions and the future effects of continuing action. Establishing the status of the populations or individuals in the Action Areas sets the point at which the effects of a given proposed action can be assessed or measured.

Because this is a programmatic consultation, however, on what is primarily a continuing action with a geographic scope that encompasses 17 states, this *Environmental Baseline* does not assess the consequences of the proposed action for specific sites or listed resources that occur at those sites. This *Environmental Baseline* first focuses on the status and trends of the aquatic ecosystems in those 17 states that encompass the Action Area for this consultation. The condition of the watersheds that make up forests and rangelands control the physical and chemical makeup of the streams that drain them and the lakes that lie within them. Activities that affect water quantity, quality or other natural processes also affect ecosystem functioning and the status and trends of listed resources; therefore, fish production is influenced by the management of adjacent lands as well as the streams themselves.

We present this information by reviewing the major watersheds (chosen because they represent the majority of the aquatic habitat in the Action Area), the impact that land use has had on the aquatic ecosystems of those watersheds and the future conditions of those ecosystems.

Second, we summarize the effects of BLM programs which regulate many of the activities that occur in the Action Area as well as the impacts of activities under BLM's current vegetation management program. At this point we conclude by integrating and synthesizing this information to assess the consequences of what we have discussed so far on threatened and endangered species and their designated critical habitat.

Land Use Practices and Condition of Watersheds

Alaska Pacific Coast Rivers and Yukon River Basin

Rivers in these two watersheds include the Kuskokwim, Susitna, Kenai, Stikine Skeena, Nushagak, Copper, Alsek, Taku, and Nass in the Pacific Coast Rivers watershed and the Yukon, Tanna, Koyukuk and other smaller rivers in the Yukon watershed. Historically the extent of land use in Alaska was by indigenous people hunting and fishing. Current land use throughout the region involves timber harvest, mining for minerals, oil and gas development and fisheries. Although most rivers have little human impact some rivers

have experienced filled wetlands and the construction of instream structures such as jetties that either increase or decrease instream velocities which negatively affect salmonids by hindering migration and a limited number of dams. Intense recreational use in some rivers in this watershed has damaged riparian habitat and spawning areas by increased bank erosion from trampling. Agriculture is precluded in most areas due to the cold climate. Oil and gas development began in the 1950s and today produces about 25% of the annual crude oil production of the U.S. (Richardson and Milner 2005). Mining, oil drilling, and waste disposal in small villages contributes to localized surface and groundwater pollution. As of 2001 Alaska accounted for 17% of the crude oil discovered in the U.S. Oil drilling adds petrochemicals to surface and groundwater. Major population centers occur along the coast with more sparsely populated areas in the interior. All rivers sustain important spawning and rearing areas for Pacific salmon. Studies indicate that less than 5% of salmon stocks in southeastern Alaska are in decline, with <1% rated at moderate to high risk of extinction (Baker *et al.* 1996) although abundance data is not available for most Alaskan stocks. With the exception of the salmon stocks mentioned few aquatic species in Alaska are considered at risk of extinction (Richardson and Milner 2005) and human impacts in Alaska are considered minimal especially when compared to the lower 48 states (Bailey 2005). The Pacific Coast watershed contains rivers designated wild and scenic rivers and World Heritage Sites. Most areas in Alaska are considered pristine or minimally impacted by humans. Water quality overall is considered high and lacking pollution in these two watersheds although there are turbidity problems, elevated natural and human produced levels of metals, and some water conductivity. River impoundments, fossil fuel development, forestry and pollution, however, is expected to increase in the future.

Puget Sound

Puget Sound is surrounded by 2,500 miles of shoreline, which is a mosaic of beaches, bluffs, deltas, mudflats and wetlands. While much of the Sound is healthy, recent growth and development in the region are degrading habitat at an alarming rate (Puget Sound Action Team 2007). For example, from 1991-2001 about 190 square miles of forest (about 2.3% of the total forested area of the Puget Sound basin) was converted to other uses. In areas below 1,000 feet elevation, the change was more dramatic: 3.9% of total forest area was converted to other uses. By 2004, about 1,474 fresh and marine waters in Puget Sound were listed as “impaired waters” in Puget Sound. Fifty-nine percent of these waters tested were impaired because of toxic contamination, pathogens, low dissolved oxygen or high temperatures. Less than one-third of these impaired waters have cleanup plans in place. Chinook salmon from Puget Sound have 2-to-6 times the concentrations of PCBs in their bodies as other chinook salmon populations on the Pacific Coast. Because of this contamination, the Washington State Department of Health has issued consumption advisories for Puget Sound chinook (Puget Sound Action Team 2007). Nevertheless, between 2000 and 2006, counties in Puget Sound counties increased by 315,965 people or by more than 50,000 people per year, with associated increases in impervious surfaces and population density per square mile of impervious surface (Puget Sound Action Team 2007).

Pollutants founds in Puget Sound chinook salmon have found their way into the food chain of the Sound. Harbor seals in south Puget Sound, which feed on chinook salmon, have PCB levels that are seven times greater than those found in harbor seals from the Georgia Basin. Concentrations of polybrominated diphenyl ether (also known as PBDE, a product of flame retardents that are used in household products like fabrics, furniture, and electronics) in seals have increased from less than 50 parts per billion in fatty tissue to more than 1,000 ppb over the past 20 years (Puget Sound Action Team 2007).

Columbia Basin

The Columbia River basin includes parts of Washington, Oregon, Nevada, Utah, Idaho, Wyoming, Montana and British Columbia. Major rivers include the Flathead, Snake/Salmon, Yakima, Willamette and the mainstem Columbia Rivers and smaller rivers include the Owyhee, Grande Ronde, Clearwater, Spokane, Methow, Cowlitz and the John Day Rivers.

The interior Columbia basin has been altered substantially by humans causing dramatic changes and declines in many native fish populations. Of 88 native fish found in the basin 45 are now listed as threatened, endangered, sensitive or otherwise of special concern (Lee *et al*. 1997, Cited in Rieman *et al.* 2001). Of the 400 distinct stocks of all salmon species and steelhead trout almost all have been extirpated (Stanford *et al*. 2005). Logging, agriculture and urbanization have cleared and altered much of the landscape especially the Willamette Valley. Placer and tunnel mining for gold, silver, copper and other metals also take place. Open-pit mining and aluminum production and other heavy industries came with hydropower development. Many of the steams and river reaches in the basin are impaired from mining and agriculture pollution, including superfund restoration areas (Stanford *et al*. 2005). Legacy pesticides such as DDT and PCB were also exceeded in 15% of the listed (303d) river reaches (Standford *et al*. 2005) where fish tissue concentrations are among the highest in the U.S. (Rinella *et al* 1993). More than 400 dams exist in the basin ranging from mega dams that store large amounts of water to small diversion dams for irrigation. Every major tributary of the Columbia except the Salmon River is totally or partially regulated by dams and diversions. The decline of salmon runs in the Columbia is attributed to loss of habitat, river corridor discontinuities, blockages to migration by dams and overharvest and competition from hatchery fish. Critical ecological connectivity (mainstem to tributaries and riparian floodplains) has been disconnected by dams and associated activities such as floodplain deforestation and urbanization. The most productive floodplains of the watershed are either flooded by hydropower dams or dewatered by irrigation diversions. Portions of this basin are also subject to impacts from cattle grazing and irrigation withdrawals. In the Yakima River 72 stream and river segments are listed as impaired by the Washington Department of Ecology and 83% exceed temperature standards. In the Willamette River riparian vegetation was greatly reduced by land conversion. By 1990 only 37% of the riparian area within 120 m was forested, 30% was agricultural fields and 16% was urban or suburban lands. In the Flathead River aquatic invasive plants such as pondweed, hornwort, watermilfoil, waterweed, cattail and duckweed grow in the floodplain wetlands and shallow lakes and in the Yakima River non-native grasses and other plant are commonly found along the lower reaches of the river (Stanford *et al*. 2005).

Pacific Coast Rivers of the Coterminous U.S.
Located from south of the Columbia River to southern California, the major rivers contained in this grouping of watersheds are the Sacramento, San Joaquin, Salinas and the Klamath that empty into the Pacific Ocean. Other rivers in this region include the Umpqua, Eel, Russian, Santa Ana and Santa Margarita.

Significant alteration of the landscape in this region of California began with hydraulic mining (banned in 1884) for gold which generated excessive sediments and introduced mercury into the tributaries of the Sacramento which eventually contaminated the delta and then, San Francisco Bay. Hydraulic mining released an estimated 42,500,000 m^3 of mining debris into the Central Valley. Health advisories continue to be issued for fish in the San Francisco Bay-Delta because of mercury contamination. Of the 1500 abandoned mines in California 150 continue to discharge waters containing copper, zinc, lead and cadmium (Mount 1995). Hydraulic mining in the Rogue basin had also affected channels and riparian habitats.

Today the most significant impacts in California are derived from alteration of natural water flows and sediment transport caused by impoundments and withdrawals of the water for agricultural irrigation. Agriculture has altered California's rivers more than any other industry (Mount 1995) by increasing erosion, degrading riparian corridors and increasing concentrations of pesticides. Approximately 80% of the water withdrawn for non-environmental purposes is used for agricultural irrigation (Carter and Resh 2005).

The rivers in the western drainages of the Klamath and Siskiyou mountains (e.g., Klamath, Rogue, Umpqua) have the highest sediment yields due not only to the high rainfall totals but also by logging and grazing practices that promote erosion. Sediment levels in Central Valley regions (e.g., Sacramento and San Joaquin) receive less sediment as a result of precipitation but logging, grazing and the lasting effects of hydraulic mining creates elevated sediment levels. For example, cattle in the Sacramento basin number around 656,000, and in summer, cattle retreat to riparian areas and degrade streamside habitat. Mount (1995) reports that the American Fisheries Society listed grazing as the most important cause of riparian degradation in western streams.

Shrub habitat in California was heavily affected by the introduction of non-native European grasses that out-competed native bunchgrasses. Non-native species in the San Joaquin River include the water hyacinth, yellow pond lily and Brazilian waterweed. The effects of these species on the native biota are unknown. The giant reed is widely dispersed within the Salinas basin and spreads after disturbances such as fires and floods. Introduced by European settlers and use partly for erosion control the giant reed has displaced native riparian plants that are important for nesting birds (Carter and Resh 2005).

Southern California lands continue to be lost due to agriculture and urbanization. Throughout California, shrublands are being destroyed by chemicals and physically removed to make way for more grazing lands (Carter and Resh 2005). In coastal areas

only 10% of the giant sequoias still exist, the rest occur inland in isolated areas in the central Sierra Nevada to the south. Although this area is still heavily forested, logging, road building, fire suppression, grazing, flow manipulation and loss of riparian habitat continue to be a threat to this ecosystem. The California Central Valley Grasslands were the areas of extensive freshwater marshes, vernal pools and the largest lake (Tulare Lake) west of the Mississippi prior to agricultural development and other land activities which have modified this entire ecosystem (Carter and Resh 2005). Extensive marshes once inhabited the upper Klamath basin; however, about 75% of the marshes have been drained and converted to agricultural and grazing lands. In the Rogue basin non-native Brazilian elodea and curly-leaved pondweed inhibit water flow and increase water temperatures, impairing water quality throughout most of the basin.

Pesticide use is also prevalent. In the San Joaquin River pesticides are found in concentrations exceeding aquatic life criteria. High concentrations of diazinon were responsible for 40% of the violations of the criteria (Dubrovsky *et al*. 1998).

Dams have been constructed for flood control, energy production and to supply one of the most intensively agricultural and densely settled areas in North America and rivers in this region have been captured and diverted more than anywhere else in North America. Dams cause alteration of the natural hydrograph, temperature regimes and coarse sediment transport all of which are a detriment to the ecosystem. The extensive nature of the dams and their subsequent effects has caused a greater than 90% loss of Chinook salmon spawning habitat in the Sacramento Basin. In the San Joaquin River historical chinook salmon runs were estimated at 300,000-500,000 salmon, but after the Friant Dam was built the spring run was extirpated due to inaccessibility of spawning habitat (Brown 1996 cited in Carter and Resh 2005).

Although this region has approximately 1400 dams, more than 8000 km of levees and more than 140 aqueducts the Sacramento, San Joaquin, Klamath and the Rogue Rivers contain areas worthy of Wild and Scenic Rivers designations. However, throughout all basins reviewed in this region salmon and trout are at fractions of their historical abundances.

The Great Basin

The Great Basin consists of the desert basins and mountain ranges that lie between the Sierra Nevada and southern Cascade Range to the west, the Wasatch Range to the east, the Snake River Plain of Idaho, the Blue Mountains and Highlava Plains of Oregon to the north and the Sonoran and Mohave deserts and the plateaus of southern Utah to the south. Rivers in this basin include the Bear, Sevier, Humboldt, Truckee, Provo, Weber and Walker rivers. The great basin comprises approximately 4% of the U.S. and includes Death Valley in California, the Malheur basin in Oregon, almost all of Nevada and the western half of Utah. Rivers in the Great Basin are small with low discharge because Nevada and Utah which encompass the bulk of the basin are the two driest states in the U.S.

The Great Basin contains about 4.16 million residents. About 33% of these residents live in Las Vegas, the fastest growing city in the U.S. Urbanization has increased in the eastern portion of the basin and to a lesser extent in the western portion of the basin. Rivers throughout the Great Basin are highly regulated to provide water for consumption in California, Nevada and Utah and agriculture. Water in the Sevier basin is over-allocated and the basin is short on water relative to demand. This water shortage results in dewatering of entire segments of the river. There are four dams located near the California/Nevada border and water diversions for these dams dewater and severely fragment the river. Surface water in the Walker is over-allocated. Heavy groundwater pumping in this river has caused a 77% decrease in volume of the river. Increased turbidity and siltation increases water temperatures in the lower Sevier basin such that cold water fishes are restricted to upstream areas. Water levels in the Bear River system are highly regulated even to the point of diverting the entire flow. Fluctuating daily water levels also enhance bank erosion in some parts of Bear River.

Nevada and Utah rank second and third among states with the largest amounts of Federally-owned lands with 87% and 67%, respectively. Cattle production is the primary agricultural activity throughout the Great Basin. Ninety percent of the Beaver River, seventy-five percent of the Sevier River basin and fifty-four percent of the Humboldt basin (all federal land in this basin) are grazed. Cattle grazing, agriculture and timber harvest also occur in the Weber and Walker Rivers. Agricultural lands in the eastern basin are mainly used for grazing and hay production. An elevated level of dissolved solids from leaching of irrigated lands occurs throughout the Bear River basin (Shiozawa and Rader 2005). However, the Utah Board of Water Resources (1992) reports that nonpoint sources of pollution from dairies, fertilizers on croplands, and land use practices in riparian zones create the high levels of orthophosphate, turbidity, fecal coliform and increased salinity in the lower Bear River and the high turbidity, phosphorus and increased sediments in the upper Bear River.

The Beaver River subbasin is subjected to mining which began in 1852 for ore. Silver and lead were also mined in the 1870s. Gold mining commenced in the early 1900s also continues today in the Humboldt River basin. Much of the gold is extracted from open-pit mines and groundwater is pumped to prevent flooding. Once mining is completed, the open pits are filled with water and become lakes. The impacts of this contaminated water on the surrounding ecosystem is unknown.

Great Basin native grasses were eliminated by intense grazing in the mid to late 1800s (Shiozawa and Rader 2005). This grazing promoted woody plants and non-native species. Species such as cheatgrass began in the eastern Great Basin in the 1800s and by 1930 was prevalent throughout the Basin (Grayson 1993 cited in Shiozawa and Rader 2005). Cheatgrass is a fire species and has increased the frequency of fires in the Basin. Non-native plants have also out-competed native species to become the most abundant species in riparian and other areas in the lower basin of the Humboldt. Other non-native species such as tamarisk are pervasive along the floodplains in the Sevier Basin. The headwaters of the Sevier River have riparian communities that likely are functioning

ecosystems, however, as the river enters the valley, riparian areas are so degraded by siltation, turbidity, bank erosion and replacement of natural vegetation by grasses and low shrubs that the communities that exist today have no resemblance to and do not function as they did 150 years ago (Shiozawa and Rader 2005).

Endangered species such as the June sucker in the Provo River and the mountain yellow-legged frog in the Truckee River basin are affected by nutrient enrichment and pesticides associated with agriculture, pollutants generated by recreation and nonpoint source pollutants associated with urban runoff (Shiozawa and Rader 2005). Regional assessments of the sagebrush ecosystem in the Great Basin and Wyoming basins were conducted over the past four years. Sagebrush habitats are declining rapidly across western North America, with populations of over 350 associated plant and animal species at risk of extirpation. Restoration potential appears limited for populations and habitats of the greater sage-grouse. In the coming decades, sagebrush could be displaced by nonnative species such as cheatgrass or replaced with pinyon-juniper woodlands across extensive areas of the Great Basin (Pacific Northwest Research Station 2007).

Camping, fishing, hunting and snowmobiling are exercised on forest and BLM lands throughout the Great Basin. The headwaters of the Bear River are a major recreational area. Roads vary from well developed to unimproved. Camping and hiking take place along with boating and hunting. Other areas within the Great Basin are major habitat areas for wildlife. The Bear River contains one of the largest wetlands in the U.S. which is a major stopover for migratory birds.

Southern Plains Rivers

The Southern Plains Region encompassed in the Action Area includes all of Oklahoma, parts of eastern New Mexico, Colorado, Kansas and north Texas. The largest rivers in this region (Arkansas, Canadian, Red, Washita, Cimmaron) all have upper mainstems that sometimes lack flow partly due to the lack of water in these desert areas (Matthews *et al.* 2005). Other rivers in this region include Neosho, Blue, Little, Kiamichi.

This region contains a wide range of physical, hydraulic and biotic characteristics which exist in some of the hottest and harshest aquatic habitats on Earth. Flora and fauna are exposed to rapidly changing environmental conditions (e.g., extreme and extended winter cold, unpredictable droughts and flooding). Water temperatures can reach up to 40^{o} C under low flow conditions. Severe droughts have occurred in this region in recent times with such frequency that temperature, oxygen stress and crowding into remaining aquatic habitat may be having significant impacts on stream fish and mollusks in the region (Matthews *et al.* 2005).

The landscape of this region was drastically altered by plowing prairies, timber harvesting, mining, stream flow manipulations and oil and gas extraction since the 1800s. These alterations began after bison herds were driven to extinction the areas in this region were replaced with cattle which grazed on hundreds of square kilometers of the open range. Fire suppression on formerly prairie land allowed encroachment of trees and the introduction of cattle caused changes in the land very different from the native bison that

once grazed the lands. The last virgin forest in the central U.S. (in the Ouachita Mountains) was harvested for timber before 1950 and replaced by pine monoculture cut mostly for wood products. Non-native species such as salt-cedar occurs in the upstream reaches of the Canadian River.

Native prairies degraded by plowing now contribute increased amounts of silt to nearby streams causing the loss of some native fish species. The introduction of irrigation while allowing more crops to be grown dried up aquifers which recharged many prairie streams. For example, in Oklahoma the development of high capacity irrigation wells coincided with the increase in the number of no-flow days per year from less than 20 before 1960 to over 100 from 1980 to the present.

Water resources have been contaminated by large scale swine and poultry farms which have been on the rise in the last few decades and by feedlots for cattle. In addition to existing large dams and reservoirs on all large rivers and most small rivers in this region, the construction of more locks and dams on various rivers for commerce has altered channel configuration and flow regimes. Water shortages, siltation from agriculture, local sewage or agricultural pollution, impoundments, and generally degraded water quality or physical conditions for biota in the western parts of this region remain the most serious challenges to streams in the region (Matthews *et al.* 2005).

Oil and gas development, mining for lead, zinc and other minerals contributed to contamination of streams and sometimes large terrestrial areas with salt and other drilling byproducts. Mining for gold and coal, however, has only contributed to low levels of localized contamination since they are limited in this region.

Rivers have also been cleared and snags removed for boat passage and contaminated by interbasin water transfer, but many of physical features of the mainstems of rivers in the central part of this region remain to comparable to historical reports. Several rivers in this region are rated among the best in North America for retaining much of their biodiversity and quality (e.g., Little, Kiamichi), however, other rivers such as the Blue are facing increased water use and quality issues (Matthews *et al.* 2005).

Missouri River Basin

The Missouri River Basin is the second largest in the U.S. and contains tributaries in the following states that encompass the Action Area: Idaho, Montana, Wyoming, Colorado, North and South Dakota and Nebraska. Major rivers in Montana include the Missouri, the Musselshell and the Yellowstone. Major rivers in North Dakota include the Cannonball while major rivers in South Dakota include the Grand, Moreau, Cheyenne, White, James and Big Sioux. Major rivers in Nebraska include the Niobrara and the Platte.

The basin is 37% cropland, 30% grassland, 13% shrub, 11% forested and 9% developed. Land use in the basin includes dry-land farming, irrigated agriculture, livestock and mining. This basin contributes about 55% of the U.S. recoverable coal reserves and 8% of the petroleum output during the early 1970s. Strip mining for coal occurs at about 30

active mines in the Powder River Basin. The discovery of gold near the Platte River was the impetus for extensive water diversions to support mining and the agricultural and municipal uses created by the gold miners. Drainage from abandoned mines in the Platte River raises metal concentrations high enough to become chronic stressors to river biota (Galat *et al*. 2005). Nonpoint sources of pesticides (atrazine, alacholr and cyanazine) spike in the Platte River during runoff events in the spring (Galat *et al*. 2005).

Non-native species such as Russian olive is a common plant in the Missouri river riparian areas. Channels in the Platte River have been narrowed from 40 to 60% of their historical widths and are now covered with trees instead of the historical herbaceous vegetation.

About 100 multipurpose and over 1200 single-purpose reservoirs were constructed in the basin. The Missouri is also one of the most regulated rivers in the U.S. with the largest series of impoundments. Snag removal to facilitate navigation and deforestation were the earliest human alterations in the Missouri River. Forests were largely eliminated along the riverbanks. Impoundment and flow regulation have also largely eliminated overbank flooding and sediment deposition on the floodplain in the middle and lower river. Over 1600 intakes withdraw water from the Missouri for irrigation, domestic, municipal and industrial uses. Human impacts to the Missouri River have been so severe that declines in populations of Missouri River fish and birds have been listed under the ESA and the American Rivers has designated the Missouri the nation's most endangered river in 1997 and 2001. Of the 35 bird species of special concern in the Yellowstone River, 31%, including the bald eagle and the piping plover are associated with riparian or wetland habitat (Galat *et al*. 2005).

The Colorado River Basin

The Colorado basin drains parts of Colorado, Wyoming, Utah, New Mexico, Nevada, California and Arizona. The Colorado basin is one of the driest in the world but it is subjected to heavy demands on its water resources due to urbanization and agriculture (Blinn and Poff 2005).

In the upper basin in the states of Wyoming, Colorado, Utah and New Mexico 90% of the water used is for irrigated crops and the 10% left is for urban and other uses (Blinn and Poff 2005). In the lower basin 85% of the water is used for irrigation. Feed for livestock is grown on 88% of the 1.6 million acres of irrigated land (Blinn and Poff 2005). Heavy grazing in the basin has caused soil erosion, the spread of non-native species and destroyed riparian habitats. In the lower basin over 85% of the native riparian species have been modified or lost and the <2% that remain are natural (Brown *et al*. 1994 cited in Blinn and Poff 2005). Non-native species such as salt-cedar are rapidly spreading though the Basin into disturbed areas or flow-regulated areas. Farmers originally use salt-cedar for erosion control, but how much salt-cedar will compete with native flora for water in a desert ecosystem where water is limited is unknown (Pomeroy *et al.* 2000).

The lower Colorado basin has been heavily used for agriculture, ranching and mining over the last century. High demands on a limited water supply for expanding agriculture, mining and population growth over the last century have reduced water flows, degraded water quality and reduced groundwater supplies especially where large supplies are pumped for human use (Blinn and Poff 2005). Dams and diversions in this basin are prevalent and supply the large metropolitan areas that continue to grow. These water demands along with the introduction of non-native fish has contributed to the endangered or threatened status of 24 fish, 4 of which are extinct (Blinn and Poff 2005).

Over 85% of the fish in Arizona are threatened. All of the native fish species in the Colorado ecoregion (encompassing southwestern Wyoming, western Colorado, eastern Utah, and northern Arizona) and the Vegas-Virgin ecoregion (encompassing southwestern Utah and northwestern Arizona) are considered imperiled. These fish have a high vulnerability to degraded water quality, nonpoint source pollution, groundwater pumping, mining, water shortages due to diversions for agriculture and ranching and fragmentation by dams (Blinn and Poff 2005). Unfortunately, these threats are expected to increase as populations in these areas continue to rise.

Bureau of Land Management Activities

BLM administers 41% of all Federal lands. Its 262 million acres represent nearly 12 percent of the area of the U.S. Concentrated largely in the Western U.S. (including Alaska), BLM lands vary between less than 1% to almost 70% of each State. Land management activities managed by BLM included mineral and oil extraction and other sources of energy, grazing, timber harvesting and tourism which have increased significantly at BLM sites. Past land management activities on public and other federally-administered lands in the western U.S. have contributed to the deterioration of wetlands and rangeland. These activities have had direct negative effects on the almost 205,498 miles of fishable streams and 2.2 million acres of natural lakes and reservoirs located on BLM lands as discussed in each of the watershed accounts above.

Vegetation Management Program

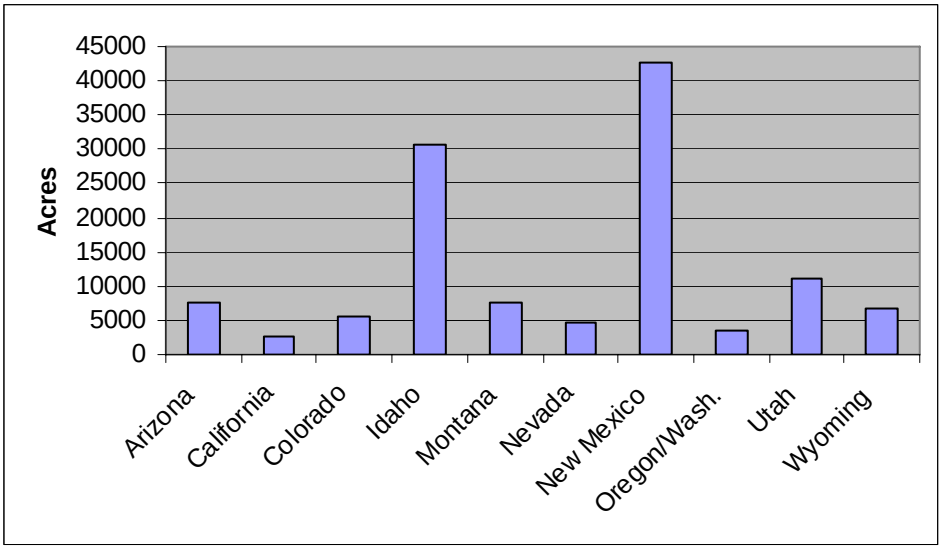
The purpose of BLM's vegetation treatment program is to reduce the risk of catastrophic wildfires by reducing hazardous fuels, to restore fire-damaged lands, and to improve ecosystem health by controlling weeds and non-native species, manipulating vegetation to benefit fish and wildlife habitat, improve riparian and wetland areas and improve water quality for priority watersheds.

BLM's current vegetation management program utilizes prescribed fire, manual, mechanical, cultural and biological control and chemical (herbicides) treatment methods in 14 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North and South Dakota, Oklahoma, Oregon, Utah, Washington and Wyoming). Currently 2 million acres of vegetation are treated each year using all treatment methods. Prescribed fire was used on nearly 212,000 acres of public lands in 2003. The majority of the acres burned were in Idaho (54,620), Oregon (40,459), New Mexico (26,869), and Arizona (BLM 2006b). Since 1997, the number of acres treated using herbicides in all

states combined has ranged from about 58,000 to 166,000 acres annually. From 2001-2004 BLM treated between 250,000 to 320,000 acres of land with a combination of chemical, manual, biological, cultural and mechanical methods.

Table 5 shows a bar graph representing the amount of herbicides applied from 1997-2003 for all 14 states in which BLM is currently authorized to apply herbicides. About two-thirds of the acres were treated with three AIs: picloram, tebuthiuron and 2,4-D with the majority of treatments occurring in Idaho, New Mexico and Utah.

Table 5: Average Number of Acres Treated with Herbicides by State from 1997-2003.



BLM's current vegetation program includes the use of herbicide formulations containing 14 active ingredients: 2,4-D, bromacil, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, tebuthiuron and triclopyr.

BLM uses manual, mechanical, biological methods and the use of herbicides and prescribed burns to control the spread of invasive weeds. Regardless of the method used to remove vegetation, vegetation treatments can result in adverse impacts in the short term through increased rates of erosion and reduced water infiltration, leading to loss of soil and reduced soil productivity. The degree of these effects would vary by region depending upon differences in climate, landform, hydrology, soil, vegetation, and land use. In the western U.S., the combination of hydrologic characteristics, steep topography, and slow vegetative growth make soil erosion a serious concern in many regions (Kennard and Fowler 2005). An increase in soil erosion and surface water runoff could result from vegetation removal, which could lead to streambank erosion and sedimentation in wetlands and riparian areas (Ott 2000). Rate of runoff would be influenced by precipitation rate, soil type, and proximity to the treated area. All vegetation removal activities could disturb the soil and reduce the amount of vegetation binding to soil, potentially causing erosion and increased sedimentation of wetlands and riparian areas. Sediments can impact plants within wetland and riparian areas by

reducing the amount of sunlight reaching plants and slowing or stopping plant growth. The removal of vegetation would decrease the amount of rainfall captured by plants, detritus, and soil, potentially leading to increased stormwater flows and runoff velocity in both ecosystems. Increased stormwater runoff can scour wetlands, modify their morphology, and affect the distribution and abundance. A reduction in non-target aquatic vegetation could result in oxygen depletion as the vegetation began to decompose. Siltation of wetlands could reduce water quality and the amount of oxygen available to aquatic organisms. In addition, siltation could reduce the acreage of wetland and riparian habitat.

Herbicides can impair the physical, biological and chemical processes that collectively support the aquatic ecosystem (Preston 2002). Herbicides alter watershed characteristics by: disruption of growth of riparian deciduous vegetation, reduction of delivery of leaves and intermediate-sized wood, and alteration of hydrologic and sediment delivery processes (Spence *et al.* 1996). Herbicides can potentially impact the structure of aquatic communities at concentrations that fall below the threshold for direct impairment to salmonids. The integrity of the aquatic food chain is an essential biological requirement for salmonids, and the possibility that herbicide applications will alter productivity and watershed characteristics of streams and rivers exist. Macroinvertebrates and aquatic plants are generally more sensitive than fish to the toxic affects of herbicides. The application of herbicides can affect the productivity of the stream by altering the composition of benthic algal communities; the food source of marco-invertebrates. Benthic algae are important primary producers in aquatic habitats, and are thought to be the principal source of energy in many mid-sized streams (Minshall 1978, Vannote *et al.* 1980, Murphy 1998). Herbicides can directly kill algal populations at acute levels or indirectly promote algal production by increasing solar radiation reaching streams by disruption of riparian vegetation growth. The disruption of riparian vegetative growth caries with it other adverse consequences for salmonid habitat, such as loss of shade, bank destabilization and sediment control. Herbicides used by BLM as well as for agriculture and other commercial uses have been detected in ground water such that EPA has issued potable water standards (i.e., 2,4-D, diquat, glyphosate, bromacil and hexazinone) (BLM 2006a). EPA has issued health advisories for dicamba and has placed diuron on the drinking water contaminant list. Sulfometuron methyl has been detected in 2% of 133 stream water samples although it is not known to be a ground water contaminant (BLM 2006a).

There are over 150 plant species, 100 aquatic species and 75 terrestrial animal species occurring on or near public lands in the treatment area that are either listed or proposed for listing under the ESA by NMFS and/or USFWS. From 1997-2006 NMFS conducted 86 formal consultations in Oregon and no formal consultations in Washington on vegetation management activities conducted by BLM and/or USFS. Of these consultations in Oregon, 3 involved restoration activities, 70 involved natural resource management and 13 involved both restoration activities and natural resource management. Given the effects of these actions as described previously, none of these consultations concluded that the actions were likely to jeopardize the continued existence of any listed species or adversely modify any designated critical habitat.

Restoration Activities

Since European settlement, many wetland and riparian areas have been drained or altered and their functions and values lost or reduced. The Clean Water Act (1972) and Executive Order 11990, *Protection of Wetlands and Floodplains* (1977), identified the importance of wetland and riparian areas and directed federal and state agencies to focus more attention on the health of these areas. In accordance with these mandates and BLM's mandate to protect and restore public lands BLM conducts restoration and conservation activities to improve the conditions of the wetlands and rangelands under their administration. Over 200 miles of streams on BLM-managed lands were removed from impaired water quality lists through cooperative efforts of BLM, state agencies, and other land managers. In 2005, the Bureau restored or enhanced 9,158 acres of terrestrial or aquatic habitat to achieve habitat conditions that would support species conservation. Additionally, 1,015 miles of streams or shorelines were restored or enhanced. A total of 3,347 acres of lake and 164 miles of stream or riparian habitat were also treated to restore ecosystem function. Field Offices completed 8,160,344 acres of inventory and monitoring; 13,734 acres of vegetation treatments, assisted in the development of 30 recovery plans, implemented over 853 individual conservation and recovery actions, and monitored about 4,638 individual populations of special status species. BLM also administers areas where special management to preserve and protect these areas is required: national conservation areas (14,101,234 acres), wilderness areas (161 sites on 6,471,753 acres), wild and scenic and recreational rivers (38 rivers for 1,005,652 acres).

During Fiscal Year (FY) 2004, the program completed over 12.6 million acres of watershed-based land health assessments to support Rangeland Health Standards and Guidelines, environmental reviews of expiring livestock permits, watershed restoration activities, wildland fire rehabilitation, and mine land reclamation (USDI BLM 2005c). The program also collected soil inventory data on nearly 400,000 acres, monitored approximately 6,380 surface water stations, and cleaned up 60 abandoned mines (USDI BLM 2005c). BLM, as part of its vegetation management program, also restores public lands after wildfires and conducts hazardous fuels reduction activities to restore natural fire regimes and protect human life and property. In 2004 2,651 fires totaling 1,716,099 acres were suppressed.

Integration and Synthesis of the Environmental Baseline

Past land management activities on federally-administered lands in the western U.S. have contributed to the deterioration of wetlands and rangeland through timber harvest, grazing, recreational activities, energy extraction and mining. Changes in hydrologic function have occurred as a result of changes in flow regimes due to dams, diversions, and surface water and groundwater withdrawal, and as a result of changes in channel geometry due to sedimentation and erosion, channelization, and construction of roads. Large amounts of wetland and riparian habitat, which function to cleanse water and recharge groundwater aquifers, have been lost in the West due to agriculture and urbanization. Approximately 21% of land in the western states (excluding Alaska) has been converted to intensive uses—urbanization, agriculture, and pastureland—that provide fewer benefits for wildlife than undisturbed habitats or habitats subjected to less

intensive uses (Wright 2004). Watersheds are natural divisions of the landscape and the basic functioning unit of hydrologic systems. Stream flow regimes and water quality can be affected by modifications to watershed processes occurring from both natural disturbances and land management activities. Water quality and quantity are key components of wetland and riparian habitat and can also have substantial influence over the health of fish and other aquatic organisms.

The rapid expansion of invasive species and build-up of hazardous fuels across public lands are threats to ecosystem health and one of the greatest challenges in ecosystem management. The spread of invasive plant species is one factor that degrades hydrologic function. Invasive species can be found in all taxonomic groups, from bacteria to mammals, and are second only to habitat destruction as a threat to global biodiversity (Mooney and Hofgaard 1999). Weed infestations are capable of destroying wildlife habitat; displacing many threatened and endangered species and reducing plant and animal diversity. In 2000 BLM estimated that approximately 36 million acres of BLM-administered lands are infested with weeds with a spreading rate of 2,300 acres per day. If we use this estimated spreading rate, then in 2007 there are approximately 41,876,500 acres of land infested with invasive weeds. Once established, aquatic plant pests can form dense beds of vegetation that impede drainage, encourage stagnation and silting, aggravate the effects of flooding and degrade water quality. Riparian areas with invasive weeds (e.g., giant reed grass, saltcedar, Japanese knotweed) often support fewer native insects than native species, which could affect food availability for insectivorous fish species, such as salmonids. The replacement of native riparian plant species with invasive species may adversely affect stream morphology (including shading and instream habitat characteristics), bank erosion, and flow levels. The invasion of non-native plants has caused various impacts to ecosystems, including displacement and endangerment of native species, reduced site productivity, and degraded water quality.

In addition, hazardous fuels buildup can lead to catastrophic wildfires that adversely impact water resources and quality. Changes in disturbance regimes, especially changes resulting from fire suppression, timber management practices, and livestock grazing over the past 150 years have resulted in the alteration of moderate to high levels of vegetation composition and structure and landscape mosaic patterns from historical ranges. On many rangelands, overgrazing by livestock in the late 19th and early 20th centuries reduced grass cover and scarified soil. Previously, wildland fire had maintained grasslands by rejuvenating decadent grasses and killing young woody species that might have seeded between fire occurrences. The decrease in grass cover caused by overgrazing provided open sites for the establishment of woody species. Later in the 20th century, organized fire suppression further contributed to the invasion of grasslands by woody species and the increased density of woodlands and shrublands.

New sources of pollution arose in the 20th century, including pollutants associated with agriculture (e.g., fertilizers, pesticides, and animals wastes), industry, and other human activities (e.g., sewage, household cleaning products). Assessments conducted by EPA (1999) on groundwater quality estimated that 21% of the watersheds have serious

problems. In the West, watershed water quality is poor to moderate over many areas due to total dissolved solids, primarily in areas associated with agricultural activities.

In addition to water quality and flow concerns, many wetlands and streams have lost the capability to support salmonids and other aquatic organisms. The direct and indirect effects of changes in land-use and land-cover have had a lasting effect on the quantity, quality, and distribution of every major terrestrial, aquatic, and coastal ecosystem of the U.S. By the mid-1990s, at least 27 types of ecosystem had declined by more than 98% (Noss *et al*. 1995). More than 99% of the native prairies of Texas have been destroyed (Smith 1993). About 90% of the original 58 million hectares of tallgrass prairie had been destroyed; 99% of the tallgrass prairie east of the Missouri River and 85% of the tallgrass prairie west of the Missouri River has been destroyed (Klopatek *et al*. 1979, Chapman 1993). The remaining tallgrass prairie exists in small fragments (Madson 1990). About 85% of the coastal redwood (*Sequoia sempervirens*) forests in California have been destroyed (Wilburn 1985) along with about 88.9% of the riparian forests of California's Central Valley (Barbour *et al*. 1991). Between 90% and 98% of the riparian and bottomland forests that once bordered the Sacramento River have been destroyed (The Nature Conservancy 1990, Jacobs 1992). Between 83% and 90% of the old-growth forests in the douglas-fir region of Oregon and Washington have been destroyed (Harris 1984, Spies and Franklin 1988; Norse 1990). Aquatic and semi-aquatic ecosystems have not fared much better than these terrestrial ecosystems. Between the 1780s and 1980s, 30% of the nation's wetlands had been destroyed, including 52% of the wetlands in Texas, 91% of all wetlands in California, including 94% of all inland wetlands (Barbour *et al*. 1991, Dahl 1990).

Beginning in the 1960s, a wide variety of programs undertaken by federal, state, and local governments, non-governmental organizations, and private individuals have been established to protect or restore our nation's forests, grasslands, wetlands, estuaries, rivers, lakes, and streams. Those programs have helped slow and, for many ecosystems, reverse declining trends that began in the past. However, those efforts have benefited some ecosystems and their associated flora and fauna more than other ecosystems. Even with efforts to restore natural disturbance regimes in the West 25% of wetlands on public lands in the lower 48 states are not functioning properly (BLM 2005), while 52% of riparian areas are considered non-functional, or functioning at risk. Ongoing efforts by the BLM to enhance vegetation, if designed properly, could help to restore the ecological functions of watersheds. Improvement of watershed and water resources and quality would also benefit listed resources that depend upon these habitats for their survival. Vegetation treatments that control populations of non-native species on public lands would be expected to benefit native plant communities over the long term by aiding in the re-establishment of native species. The degree of benefit would depend on the success of these treatments over both the short and long term.

7.0 EFFECTS OF THE ACTION

The *Description of the Proposed Action* section of this Opinion summarized BLM's proposed vegetation treatment program. The *Status of Listed Resource*s section summarized the status and trends of endangered and threatened species and their critical habitat that were likely to be adversely affected by the proposed vegetation treatment program. The preceding section of this Opinion, the *Environmental Baseline*, summarized the consequences of a variety of human activities, including the consequences of BLM's treatment program on listed resources.

As discussed in the *Approach to the Assessment* section of this Opinion, this national consultation assesses the potential direct and indirect adverse consequences of BLM's vegetation treatment program on the environment generally, and threatened and endangered species in particular. Unlike site-specific effects analyses where we examine the types of potential stressors (including their frequency, duration and intensity) and subsidies that arise from a proposed action to evaluate the likelihood of jeopardizing the continued existence of listed species or destroying or adversely modifying designated critical habitat, this effects analyses will examine the process by which BLM determines when treatments will occur since this is when listed resources will be exposed to potential adverse or beneficial consequences. If the process BLM employs to implement its vegetation treatment program to protect listed resources are effective, then listed resources should not be exposed to any potential adverse effects from vegetation treatments unless and until BLM engages in section 7 consultations on those activities. If there are subsequent section 7 consultations and those consultations satisfy all applicable legal standards, listed resources should not be exposed to aspects of the treatment program that are likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

BLM's Vegetation Treatment Process

BLM developed manuals and policies at the national level to comply with the relevant statutes and other mandates that determine how BLM is to conduct its vegetation treatment program to restore and protect public lands. These manuals and policies are implemented at the field level in the form of Land Use Plans (LUPs) which outline the general resource goals and objectives based on desired future conditions for the land, land use allocations (e.g., timber harvest, grazing allotments) and, land health standards and associated guidelines on how to meet those standards. Activity Level Plans design and select the vegetation treatment methods to achieve the objectives of the LUPs. Activity Level Plans require inventories of the land including sensitive habitat and listed or otherwise sensitive species. The requirements of the national vegetation management program are implemented at two stages in BLM's process: Activity Level Plans when land and treatment methods are selected, and at the project level when site-specific treatments selected and designed to meet LUP goals and objectives while minimizing any adverse effect of treatment activities to listed resources. The vegetation treatment methods including SOPs and proposed protective measures are selected and designed at the Activity-Level planning stage and further refined and carried out during the actual

site-specific treatments (Project-Level activities). It is only at this stage that BLM proposes to conduct any site-specific vegetation treatment activities.

The general nature of the national guidance accompanying this national vegetation program (i.e., SOPs and protective measures) requires us to focus on how that guidance is incorporated into the Activity-level plans which design and select vegetation treatment methods and more importantly various site-specific treatment activities since this is when listed resources may be exposed to any direct or indirect effects caused by the treatment program. BLM addresses threatened and endangered species issues using the section 7 consultation procedures outlined in the interagency section 7 regulations (50 CFR 402). BLM delineates the requirements of the ESA, especially section 7, in its Manual 6840. Manual 6840 reiterates that BLM must ensure that all actions authorized, funded, or carried out are in compliance with the ESA by:

- evaluating all proposed actions to determine if individuals or populations of listed species or their habitat, including designated critical habitat, may be affected.

- initiating consultation with FWS and/or NMFS, including preparation of biological assessments, as appropriate, for those actions that may affect listed species or their habitats.

- ensuring that BLM not carry our any action during consultation that would cause an irreversible or irretrievable commitment of resources such that it would foreclose the formulation or implementation of any reasonable and prudent alternative measure that might avoid jeopardy to listed species and/or prevent the adverse modification of critical habitat.

- ensuring that BLM actions will not reduce the likelihood of survival and recovery of any listed species or destroy or adversely modify their designated critical habitat.

- implementing mandatory terms and conditions and reasonable and prudent alternatives as outlined in final biological opinions.

- implementing conservation recommendations included in biological opinions if they are consistent with BLM land use planning and policy and they are technologically and economically feasible.

- conferring with FWS and/or NMFS on any action that is likely to adversely affect a proposed species or proposed critical habitat.

The national vegetation treatment program does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from NMFS and/or USFWS both lethal and non-lethal “takes” of protected species are in violation of the ESA.

The section 7 consultation procedures for areas covered by the Northwest Forest Plan and the Columbia River Basin are conducted according to a consultation streamlining Memorandum of Agreement between NMFS, USFSW, the U.S. Forest Service (USFS) and BLM (MOA, NMFS *et al.* 1999). This agreement was established to: insure compliance with ESA's mandate that federal agencies ensure that their actions are not likely to jeopardize the continued existence of listed species and likewise are not likely to destroy or adversely modify designated critical habitat; involve personnel from the action agency and NMFS and/or USFWS early in the project development phase; and, facilitate completion of section 7 consultations within specified time frames. Level 1 Teams, for consultations involving BLM vegetation management, consist of at least one biologist from BLM, NMFS and USFWS and USFS as appropriate. Level 2 Teams are staffed by BLM ecosystem/district managers, NMFS personnel with decision-making authority and USFS forest supervisors and USFWS personnel with decision-making authority as appropriate. Level 1 Teams either review or design vegetation treatments including refinement of the SOPS and protective measures included in the national vegetation program. The Level 1 Teams design vegetation treatments to prevent either the exposure of listed species or their critical habitat to vegetation treatment activities or to prevent jeopardizing listed species or adversely modifying critical habitat from adverse consequences of vegetation treatment activities. These Teams agree on the information, documentation, format and timeframes before proceeding with development of BAs and Biological Opinions and also review draft Bas and the rationale for preliminary effects determinations contained in those BAs, Ecological Risk Assessments, NEPA documents and draft Biological Opinions. Consultations can be batched with other similar actions in the same area or with similar timing needs and will be completed informally within 30 days or formally within 60 days after receipt of an agreed-upon BA.

A second MOA between BLM, USFS, USFWS and NMFS (BLM *et al.* 2000) streamlines consultation procedures for all new, amended and revised LUPs and other programmatic-level proposals (e.g., Activity-level Plans) as well as outlines guidance for the conservation of candidate and proposed species and critical habitat during LUP and programmatic-level consultations. These consultations take place before consultations for project-level activities and implements consultation requirements at each stage of BLM's planning process (i.e., from LUPs to Activity-level projects). This MOA is applicable to all BLM field offices and establishes Level 1 and Level 2 Teams with their respective roles as in the 1999 MOA. Time frames for informal consultation is 30 days, however, formal consultation is 90 days. During planning processes, consultations and conferences, if appropriate, will occur to minimize or avoid adverse impacts and insure that future conservation opportunities are not precluded, to avoid conflicts between Plans and conservation of species and critical habitat proposed for listing, and analyze the effects of Plans on candidate species.

The following BLM field offices administer lands where listed species and critical habitat occur and have engaged in section 7 consultation with NMFS: Burns, Coos Bay, Eugene, Lakeview, Medford, Prineville, Roseburg, Salem and Vale in Oregon, Arcata, Folsum, Redding and Ukiah in California and Cottonwood, Salmon and Challis in Idaho. There have been no formal consultations in Washington. BLM's field offices in Washington,

Oregon, California and Idaho all engage in section 7 consultations according to the streamlining procedures contained in the MOAs whether or not the treatment activities occur in the Northwest Forest Planning area.

Despite the guidance contained in the national treatment program and the streamlining procedures, adverse effects to listed species still occur as evidenced by the number of consultations that have taken place. A careful search of NMFS' consultation database identified 26 formal and 22 informal section 7 consultations that were conducted on BLM's vegetation management activities since 2000 when the database was initiated. The database also reports 17 instances of technical assistance regarding BLM's vegetation treatment activities, however these entries in the database were sometimes associated with projects that resulted in biological opinions and do not give us any insight into the number of "no-effect" conclusions that BLM may have determined which would not undergo section 7 consultation. Consultations regarding vegetation management occur most frequently in Idaho and Oregon and less so in California. Queries of NMFS' field staff in Idaho, Oregon and California indicate that the streamlining process is effective at avoiding or minimizing adverse effects to listed resources in their respective states.

None of the activities proposed in the 26 formal consultations resulted in jeopardy to listed species or adverse modification of designated critical habitat. Consultations for these biological opinions have lasted from 60 days per the 1999 streamlining agreement to 3 years (NMFS 2005) reflecting the complexities of the consultations, specific types of information needed to conduct effects analyses and the deliberations of the Level 1 Teams and to a lesser degree shortages in staffing. Only one consultation developed an impasse such that elevation to the Level 2 Team was necessary (NMFS 2001). The impasse involved monitoring requirements in a draft no-jeopardy biological opinion; however, the impasse was resolved by the Level 2 Team.

Monitoring is required in all of the 26 formal consultations for vegetation management activities. Monitoring includes implementation monitoring (were the treatment activities conducted as described), effectiveness monitoring for treatments (were the treatments effective at reaching the desired level of land condition), effectiveness monitoring for CMs and mitigation measures (e.g., were buffers effective at preventing herbicides from reaching riparian areas or streams) as well as the standard monitoring included in all section 7 consultations to document levels of take. Queries of NMFS' field staff in Idaho, Oregon and California revealed that BLM field offices do comply with the monitoring requirements of the biological opinions issued for their vegetation treatment activities.

Integration and Synthesis of Effects

BLM's vegetation management activities are likely to cause adverse effects to listed species as evidenced by the number of consultations that have resulted in formal section 7 consultations. We have no evidence to indicate that the SOPs and protective measures that are part of the national vegetation program are sufficient to prevent adverse effects to listed resources. It is only through site-specific consultations that vegetation management

activities are designed to avoid or minimize adverse effects to listed resources. Since monitoring is required in all formal consultations and vegetation management activities are scrutinized for project implementation, effectiveness monitoring to determine efficiency of treatments and to determine the efficacy of SOPs and protective measures as well as monitoring for actual amounts or extent of take NMFS is able to examine the actual effects of vegetations treatments and determine when adjustment are needed to further reduce adverse effects. Queries of NMFS' field staff in Idaho, Oregon and California indicate that the streamlining process is effective at avoiding or minimizing adverse effects to listed resources in their respective states. BLM ensures that its vegetation treatment program is not likely to jeopardize the continued existence of threatened and endangered species and not likely to adversely modify their critical habitat through the streamlining agreement process during which vegetation treatments are designed to avoid or minimize adverse effects to listed resources. These consultations account for not only individual effects to listed species, but also any incremental cumulative effects caused by continual vegetation treatment activities.

While vegetation treatments can result in adverse effects to listed species and designated critical habitat, these treatments, if designed properly, generally result in short-term adverse effects. Although repeated treatments are required in some circumstances, these treatments could help to restore the ecological functions of watersheds. Vegetation treatments that control populations of non-native species on public lands would be expected to benefit native plant communities over the long term by aiding in the re-establishment of native species. Improvement of watershed and water resources and quality would also benefit listed resources that depend upon these habitats for their survival. The degree of benefit would depend on the success of these treatments over both the short and long term.

8.0 CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Population growth rates and urbanization are expected to increase in the future compounding already tenuous ecosystems for listed resources. The western states contain some of the fastest population growth rates in the U.S. According to the U.S. Census Bureau Idaho's estimated population of 1,293,953 (in 2000) is projected to increase 52% by the year 2030; Washington's estimated population of 5,894,121) in 2000) is projected to increase by 46% by the year 2030; Oregon's estimated population of 3,421,399 (in 2000) is projected to increase by 41% by the year 2030; and, California's estimated population of 33,871,648 (in 2000) is projected to increase by 37% by the year 2030 (U.S. Census Bureau 2005).

State and private activities on lands adjacent to BLM-administered lands include pesticide treatments on agricultural lands and rangelands as well as private lawns which could adversely affect listed resources by drift and runoff either directly killing listed species or degrading riparian habitat that provides shade, cover and other essential functions. Legacy pesticides such as DDT, and non-point source pollution will continue to impact the water quality essential to the survival and recovery of listed species.

9.0 CONCLUSION

After reviewing the current status of southern resident killer whales, California coastal, Central Valley spring-run, Lower Columbia River, Puget Sound, Sacramento River winter-run, Snake River fall-run, Snake River spring/summer-run, Upper Columbia River spring-run and Upper Willamette River Chinook salmon; Columbia River, Hood Canal summer run chum salmon; Central California Coast, Lower Columbia River, Southern Oregon Northern Coastal California coho salmon; Snake River sockeye salmon; California Central Valley, Central California Coastal, Lower Columbia River, Middle Columbia River, Northern California, Snake River Basin, South Central California coast, Southern California, Upper Columbia River, Upper Willamette River steelhead; and Green sturgeon (southern population), the environmental baseline for the action area, the effects of the vegetation treatment program, and the cumulative effects, it is NMFS' biological opinion that the BLM's proposed vegetation treatment program is not likely to jeopardize the continued existence of these species. The treatment program is also not likely to result in the destruction or adverse modification of critical habitat that has been designated for listed salmon or southern resident killer whales. These conclusions are based on the fact that the streamlining process for site-specific consultations provide sufficient safeguards to ensure that BLM's actions will remain consistent with section 7(a)(2) of the Act. Although vegetation management activities do cause adverse effects to listed species and designated critical habitat these effects do not occur until section 7 consultations have been conducted through the streamlining process during which vegetation treatments are designed to avoid or minimize adverse effects to listed resources such that jeopardy and adverse modification are prevented.

10.0 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibits the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section

7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take
The proposed vegetation treatment program does not authorize the "take" of a threatened or endangered species unless that "take" has already been exempted from the prohibitions of section 9 of the Endangered Species Act of 1973, as amended, through a separate biological opinion. As these vegetation management actions arise NMFS would conduct a separate section 7 consultation and issue a separate biological opinion before any endangered or threatened species might be "taken"; the amount or extent of "take" would be identified in those subsequent consultations. Therefore, no incidental take of listed fish or wildlife species is identified or exempted from the prohibitions of section 9 of the ESA in this programmatic opinion.

11.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. NMFS believes the conservation recommendation listed below is consistent with these obligations and, therefore, should be implemented.

> We recommend that BLM make efforts to establish or join regional monitoring programs. Such an effort is underway for Oregon and Washington lead by the United States Forest Service. These efforts will relieve the burden of duplicative monitoring, make more efficient use of increasingly scarce funds and possibly monitor more sites for trends in water quality due to vegetation treatment activities.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request that BLM notify OPR if this conservation recommendation is implemented in the final action.

12.0 REINITIATION OF CONSULTATION

This concludes formal consultation on the BLM's proposed vegetation treatment program. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed

species or critical habitat in a manner or to an extent not considered in this opinion (e.g., if site-specific consultations form a pattern that demonstrates that the conclusions reached in this programmatic consultation were generally false (rather than false in a handful of specific cases); (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

This programmatic vegetation treatment program requires subsequent section 7 review on site-specific vegetation treatments and does not authorize the take of listed species unless that take has been exempted from the section 9 prohibitions by a biological opinion on a site-specific action where a vegetation treatment is anticipated to take listed species. There is no incidental take identified or exempted in this programmatic biological opinion. If take is anticipated for site-specific treatments then the amount or extent of take will be identified during those consultations. In instances where the amount or extent of authorized take is exceeded, BLM must immediately request reinitiation of section 7 consultation from the NMFS region that conducted the consultation for the site-specific activity. Reinitiation of consultation may also be required on this programmatic biological opinion.

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