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September 28, 2007

Greg M. Hughes  
Project Leader  
Mid-Columbia River Refuge Complex  
Hanford Reach National Monument  
U.S. Fish and Wildlife Service  
3250 Port of Benton Boulevard  
Richland, WA 99354

RE: Submittal of Final Emergency Stabilization Plan, Milepost 17 Fire  
Task Order No. 101817Y668 ~ Contract No. 101817D475

Dear Mr. Hughes,

This transmits our deliverable in accordance with Contract No. 101817D475, Order No. 101817Y668, entitled Draft Emergency Stabilization Plan, Milepost 17 Fire, dated September 28, 2007.

The following are pending changes (please insert):

- Part G (Heidi Newsome, USFWS to draft)

Please call me at 541-430-2812 if you have questions or Robert Krueger at (800) 447-3558.

Respectfully submitted,

Leo Sidebotham  
Project Team Leader  
**FIRST STRIKE ENVIRONMENTAL CO**

Enclosure

**MILEPOST 17 FIRE, MID-COLUMBIA RIVER NATIONAL WILDLIFE REFUGE COMPLEX,  
HANFORD REACH NATIONAL MONUMENT  
BURNED AREA EMERGENCY RESPONSE PLAN REVIEW AND APPROVAL**

**I. Project Leader** approval that the Burned Area Emergency Response Plan meets approved land management plan management objectives.

---

Gregory M. Hughes, Project Leader, Mid-Columbia River Refuge Complex

Date

**II. Regional Fire Management Coordinator** concurrence that the plan fits the technical definition for use of Emergency Stabilization funding.

---

*Regional/State Fire Management Coordinator, Region 1*

Date

**III. Emergency Stabilization Funding Approval (check one box below):**

Approved

Approved with Revision (see attached)

Disapproved

---

*Regional/State Director, Region 1*

Date

**IV. Emergency Stabilization Funding Approval (check one box below):**

Approved

Approved with Revision (see attached)

Disapproved

---

*National Office*

Date

**Milepost 17 Fire**  
**BURNED AREA EMERGENCY RESPONSE PLAN**



**UNIT:** U.S. Fish and Wildlife Service, Mid-Columbia River National Wildlife Refuge Complex, Hanford Reach National Monument

**LOCATION:** *Benton County, Washington*

**ORIGINAL SUBMISSION DATE:** *September 28, 2007*

**PREPARED BY:** First Strike Environmental/Shaw BAER Team

Submitted By: \_\_\_\_\_ Date: September 28, 2007  
*Leo Sidebotham, Team Leader*

## **EXECUTIVE SUMMARY**

### **Introduction**

This plan has been prepared in accordance with provisions contained within Chapter 620 DM 3- Burned Area Emergency Stabilization and Rehabilitation, Presidential Proclamation 7319 of June 9, 2000 and the Hanford Reach National Monument Fire Management Plan. This plan provides burned area emergency stabilization for all lands burned within the Milepost 17 Fire Area perimeter and downstream impact areas including public lands administered by the U.S. Fish and Wildlife Service. Although this plan does not include emergency stabilization of lands burned in the adjacent Department of Energy (DOE) Hanford Site, these areas were similarly affected and will require the implementation of stabilization measures to reduce impacts to work/safety within the DOE Hanford Nuclear Reservation. Burned area rehabilitation recommendations are provided in the Burned Area Rehabilitation Plan. The primary objectives of the Milepost 17 Fire Burned Area Emergency Response (BAER) Plan are:

- To prescribe cost effective post-fire stabilization measures necessary to protect human life, property, and critical cultural and natural resources.
- To promptly stabilize and prevent further degradation to affected resources on lands within the fire perimeter and downstream impacted areas in accordance with approved land management plans and policies, and all relevant federal, state, and local laws and regulations.
- Minimize the establishment of non-native invasive species within the burned area.

### **Emergency Stabilization**

This plan addresses the emergency stabilization needs for lands burned by the Milepost 17 wildfire and administered by the Service on the Hanford Reach National Monument (HRNM). Based on information provided by HRNM staff, field assessments conducted by First Strike Environmental/Shaw Natural Resource Specialists on August 28, 2007, an evaluation was conducted to include: suppression impacts, watershed stability, archaeological recommendations, vegetation impacts, and fire effects on Federally-and State-listed threatened and endangered (T&E) species and their habitats. The vegetation specialist evaluated and assessed fire damages and suppression impacts to vegetative resources, including T&E species, and identified values at risk associated with vegetative losses. The wildlife biologist conducted an assessment of T&E species, and other species of management concern to the HRNM. Geologist and watershed specialist conducted an assessment of selected wind erosion-prone areas. A cultural resource specialist was available in an advisory capacity but not present for the site visit. However, extensive information is available from previously published site specific documents. The cultural resource discussion and recommendations are based on these previous studies.

Individual resource Burned Area Assessment Reports produced by these specialists are in Appendix I. The cultural resource discussion and recommendations are based on previous

studies. The individual treatments specifications, including the effectiveness monitoring identified in the assessments, can be found in Part F. A summary of the activities and costs is in Part E. Appendix II contains the National Environmental Policy Act (NEPA) compliance documentation summary. Appendix III contains BAER Plan maps; Appendix IV contains the photo documentation respectively, Appendix V contains Supporting Documentation.

## **Fire Background**

The Milepost 17 Fire, fire number 13580-9141-DV91, started on August 13, 2007 at approximately 1300 hrs. The fire was human caused and the details related to the cause of the fire are under investigation. There were originally two different fires that burned into one fire shortly after they started. The fires started along the west side of HWY 240 near Milepost 17. Initial attack was done by a combination of resources (engines, dozers, Air Tankers) from U.S. Fish and Wildlife Service, Hanford Fire, Benton County Fire District, Grant County and Adams County. The Milepost 17 Fire eventually burned 4,708 acres, all of which were on U. S. Fish and Wildlife Service jurisdiction on the Hanford Reach National Monument.

The fire burned in light flashy fuels, mainly grass and young shrubs. The fire was a wind driven fire with East winds around 5-10 mph. The average flame lengths were approximately 3-5 ft and rates of spread at the peak of spread were approximately 100 ch/hr. Suppression efforts were hampered due to soft sandy soils and the terrain. Direct attack was used on both flanks of the fire utilizing retardant and disk/dozer line with support from engine crews.

The fire burned from Hwy 240 to the northwest until it hit the 1200 ft road. At that time crews were able to keep the fire from crossing the 1200 ft road with a combination of burn out and direct attack. Around 1900 hrs as the sun went behind Rattlesnake Mt. the winds changed from an east wind to a down slope wind. At this time the fire started pushing down slope back towards Hwy 240. With the reduced winds and the slower rates of spread crews were quickly able to pinch the head of the fire off. Full containment was complete by 2200 hrs. At that time crews were released to home units except for 3 engines that remained on scene all night.

Ground disturbance along the fire edge was substantial given the fire location and the necessary fire suppression actions (i.e., disking and bulldozing actions) that were employed to prevent the loss of additional acres. Approximately 18.25 miles of disk/dozer line was employed during the fire suppression action. Drought (extremely dry) conditions along with gusting winds had the potential to result in extreme fire behavior, lofting fire brands, and high potential for fire spread. The immediate need was to contain the fire to prevent further spread. A total of 35.4 acres were impacted due to disk and dozer line suppression during Milepost 17 Fire.

Suppression forces accessed the edges of the fire and along and through boundary fences, thereby creating wheel track trails in addition to the disked/bulldozed lines. These have compacted soils, increased access potential to off-road vehicles, and negatively impacted

native vegetation and micro-biotic crusts.

## **Fire Damages and Threats to Human Safety and Natural and Cultural Resources**

The Milepost 17 Fire burned 4,708 acres of public lands. Approximately 18.25 miles of disk/dozer line was employed during the fire suppression action. Drought (extremely dry) conditions along with gusting winds had the potential to result in extreme fire behavior, lofting fire brands, and high potential for fire spread. The immediate need was to contain the fire to prevent further spread. A total of 35.4 acres were impacted due to disk and dozer line suppression during Milepost 17 Fire.

Suppression forces accessed the edges of the fire and along and through boundary fences, thereby creating wheel track trails in addition to the disked/bulldozed lines. These have compacted soils, increased access potential to off-road vehicles, and negatively impacted native vegetation and micro-biotic crusts.

The entire fire has been mapped by the BAER Team for burn severity. Within shrub-steppe upland habitat areas (4,708 acres) approximately 95 percent of the fire area is classified as low burn severity with approximately 5 percent mapped as moderate burn severity. This attests to the fires' rapid spread through light fuels. Most of the soils examined in the area of the fire were not water repellent. Therefore, an overall water yield increase due to the fire is expected to be minor and not exacerbate flooding events. No Riparian zones were observed in the Milepost 17 Fire burn area.

In areas that were a shrub-steppe vegetation community prior to the fire, almost all plant and litter cover that was present in the burn area has been consumed by the fire. The loss of this vegetative cover has exposed fine sand and silty soils to ablation (wind driven erosion). Nearly 20 percent of soils within the burn area (4708 acres – see Wind Erosion map Appendix III) have a moderate risk of wind erosion (please see photo documentation), further, sandy soils within the burn area are especially susceptible to wind, and blowing dust poses an imminent threat to human life along state Highway 240.

The Milepost 17 Fire is within the footprint of the 24 Command Fire. As a result of the 24 Command Fire in 2000, the Hanford facility to the east experienced major shut-downs due to dust in March and October 2001. In addition, Hanford workers with asthma who were sensitive to the dust were sent home. According to a Hanford spokesperson, blowing dust following the 24 Command Fire caused at least 4 shut-down episodes in the 200 West and 200 East areas. It is likely that the effects of the Milepost 17 Fire will contribute to the dust hazard to SR 240 and selected areas of the Hanford facility.

The BAER Team conducted field surveys after the fire to identify impacts and compile the following recommendations for stabilization of affected lands:

### **Emergency Stabilization Treatments:**

- Stabilize soil to prevent loss or degradation of productivity by seeding to prevent

establishment of invasive plants; and direct treatment of invasive plants by using integrated pest management techniques to minimize the establishment of non-native invasive species within the burned area.

- Stabilize cultural sites by assessing significant heritage sites in those areas affected by fire and emergency stabilization including evaluating the risk of degradation to known/documented cultural resource sites.

Specifications were developed for all actions meeting the requirements for Emergency Stabilization (ES) funding.

Other resource impacts assessed as a result of the Milepost 17 Fire included a review of impacts to sensitive wildlife and vegetation resources.

An archeological records search needs to be conducted for sites that may be located on fire suppression lines. To conform with Section 106, further cultural resource damage assessments will be required prior to implementation of ground disturbing stabilization actions.

Federal T&E plant species listed as occurring in or having habitat within Benton County have not been entirely mapped within the fire area.

Wildlife species recorded within the fire area include 18 species of Federal or State concern, including ferruginous hawk, loggerhead shrike, and sagebrush lizard. The fire area may also be considered potential habitat for greater sage grouse (Federal candidate and State threatened) and Columbia Basin pygmy rabbit (Federal and State endangered) (see map section Appendix III – Wildlife Species of Concern and Potential Pygmy Rabbit Habitat maps).

There were no Federally listed Threatened plant species and nine previously inventoried State-listed species known to occur within the fire area. Vegetation resources provide valuable wildlife forage and habitat, watershed protection, and comprise a visually pleasing landscape. Vegetation resources were significantly reduced on approximately 95 percent of the fire area due to extremely dry conditions. The area suffered nearly complete loss of vegetation with the mortality rate between 97-100 percent of all vegetation and standing biomass (cover). The fire consumed 95 percent of the standing biomass that had regenerated after the Command 24 Fire within the fire boundary including shrubs, grasses, forbs, and injuring the remaining shrubs through heat scorch. Blowing dust and ash was observed in the areas where all vegetation had been burned and the soils were no longer stabilized by the vegetation. In addition, numerous test plots planted after the 24 Command Fire were scorched.

The role of microbiotic crusts (MBC) in shrub-steppe ecosystems is still incompletely understood (Evans and Lih 2005:106) and estimating the magnitude and extent of MBC damage from the Wautoma Fire is a complex task that is beyond the scope of BAER field survey and assessment. Therefore, this assessment can make no definitive conclusions about the area wide condition and location of the MBC and the emergency stabilization

measures recommended reflect this finding.

This BAER Plan is the initial funding request for Emergency Stabilization funds. The Emergency Stabilization funding for this plan is for one year from the date of fire containment. At the conclusion of the funding period, a final Accomplishment Report will be due to the approval authority. The Accomplishment Report will document the funding received, (initial and supplemental funding), treatments installed, the effectiveness of the installed treatments and the results of monitoring activities.

### **Hanford Reach National Monument Management Requirements**

The uniqueness and biological diversity of the Hanford Reach was formally recognized by Presidential Proclamation 7319 of June 9, 2000 establishing this area as the Hanford Reach National Monument. The monument is described as a “biological treasure, embracing important riparian, aquatic, and upland shrub-steppe habitats that are rare or in decline in other areas. Within its mosaic of habitats, the monument supports a wealth of increasingly uncommon native plant and animal species, the size and diversity of which is unmatched in the Columbia Basin.” Because of the high diversity of native plant and animal species, the large number of rare and sensitive plant species and significant breeding populations of nearly all steppe and shrub-steppe dependent species, the FWS has been tasked to preserve and protect these objects of antiquity in perpetuity. Primary goals for the Monument through the current Draft Comprehensive Conservation Plan and Environmental Impact Statement include:

- Protect and restore the native habitats and biodiversity of the Hanford shrub-steppe ecosystem.
- Monitor, protect, and recover native plants and animals that are Federally or State-listed and any other species that are in any other way considered sensitive.
- Monitor status and trends of migratory birds, particularly those that are considered shrub-steppe obligate species and manage local populations.
- Provide for compatible education, interpretation, and wildlife-dependent recreational opportunities.
- Promote public understanding of the shrub-steppe ecosystem through scientific research and allow other compatible research opportunities afforded by the unique and isolated environment of the National Monument.
- Manage for the protection, preservation, evaluation, and understanding of the cultural heritage and resources of the ALE Reserve while consulting with appropriate Native American groups and complying with historic preservation legislation.
- Provide for operation and maintenance activities without compromising ecological and cultural values.

The following statements in the approved HRNM Fire Management Plan direct the development of the proposed burned area rehabilitation treatments funded through the Burned Area Stabilization and Rehabilitation funds:

- Emergency rehabilitation measures may be requested through the Burned Area Emergency Response (BAER). BAER plans for each fire will be reviewed by the Fire Analysis Committee. A final plan will be submitted to Region for establishing an account. Rehabilitation should be initiated prior to complete demobilization or early the following season.
- Protect and restore the native habitats and biodiversity of the Hanford shrub-steppe ecosystem (HRNM -CCP).
- Monitor, protect, and recover native plants and animals that are Federally or State-listed and any other species that are in any other way considered sensitive (HRNM-CCP).

### Cumulative Impacts of Fire on the Hanford Reach National Monument

The Milepost 17 Fire was preceded by several other large wildfires within the Monument and in the surrounding area that have caused increasing impacts to natural resources, cultural resources, and ongoing management and public use operations (Table 1). Losses of critical shrub-steppe habitat between 2000 and 2007 total 198,742 acres locally, with 111,696 acres lost within the Monument (not including the current acres burned within the Wautoma fire).

**Table 1:**

<b>Fire Name</b>	<b>Year</b>	<b>Cause</b>	<b>Total acres burned</b>	<b>USFWS acres burned (Monument)</b>
24 Command	2000	Human Caused - Auto Accident	163,884	78,732
Vernita Flat	2000	Lightning	119	119
White Bluffs	2002	Lightning	285	285
Shooting Range	2003	Human Caused - Firearms discharge	1391	507
Fuji	2004	Lightning	36	36
Weather Station	2005	Human Caused - suspected fireworks, unknown	4918	4840
McLane	2005	Human Caused - Agricultural burning	6850	6068
Saddle Mountain Lakes	2006	Lightning	26	26
<b>Overlook</b>	2007	Lightning	21233	21083
<b>TOTAL</b>			<b>198,742</b>	<b>111,696</b>

Burned Area Emergency Response (BAER) Plans have been implemented on several previously burned areas within the Monument. However, given the long time frames required for the regeneration of shrub-steppe vegetation, several of these previously burned areas are still considered to be recovering because they have not had sufficient time to re-establish what could be considered functional wildlife habitat. The repeated burn of this area has added to the cumulative loss of habitat within the fire boundary and applying herbicide and planting of native seeds will be necessary to protect this shrub-steppe community from further invasion of noxious and invasive weeds. Application of herbicide and planting of native seeds (including aerial seeding) to restore areas before invasive species become established is well supported by recent research (Bakker & Wilson, 2004:1058-1064) (Huddleston & Young 2005:507-515) (Thompson & Rounding, 2006) (Seabloom & Harpole 2003). In addition, Evans and Lih (2005) concluded that additional management intervention will be required to stabilize soils, suppress invasive species and promote recovery and the most optimistic scenario for the full recovery of shrub-steppe qualities on the Arid Lands Ecology Reserve involves many years of continued planting and monitoring, persistent efforts at weed and fire management, and years of patience as restored stands slowly develop.

The increasing frequency and intensity of range fires, introduction of a variety of non-native and invasive species and the change in climate throughout the Columbia and Great basins pose a critical threat to native grasses and shrubs and overall wildlife habitat in the shrub-steppe. Historically, fires in the shrub-steppe were less frequent and likely less intense and smaller, resulting in a complex mosaic of habitat over the landscape. With these changes in fire patterns, native shrubs are killed, seed reservoirs of grasses and shrubs are depleted and habitat is replaced with exotic annuals such as cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola kali*), or aggressive noxious weeds such as yellow starthistle (*Centaurea solstitialis*). Natural shrub regeneration is limited by incremental reestablishment from the existing shrub edge, a slow process exacerbated by current fire patterns and competition from non-native plant species.

Throughout shrub-steppe habitat in Washington, fire has continued to eliminate shrub-dominated sites at a rate faster than natural regeneration (or revegetation efforts) can restore. The regional negative impact of shrinking high quality habitat cannot be overstated. Additionally, while large landscape-sized fires also continue to occur on nearby habitat such as on the Yakama Indian Reservation the Yakima Training Center, their overall higher elevation, topographic variability and resiliency contrast with the middle and lower elevations of the Pasco Basin and the Monument, which are dominated by sand and gravel of the cataclysmic Missoula Floods. The unique geomorphic features of the Pasco Basin generally support a less resilient but highly diverse assemblage of plant communities and associated wildlife habitat.

## **Effectiveness of Emergency Stabilization and Rehabilitation on the Hanford Reach National Monument**

Emergency stabilization treatments have proven to be effective on the Hanford Reach National Monument. Treatments have met general Monument objectives (*see BAER final accomplishment report for 24 Command Fire (2003)*) and have attempted to provide for soil stabilization, prevent ecological degradation and reduce the fire risk across the landscape. The following Emergency Stabilization and Rehabilitation measures were strategically implemented on a very small percent of the 163,884 acre 24 Command fire.

- Treatment of 10,300 acres impacted by non-native invasive species;
- Stabilization of 1,713 acres of shrub steppe with shrub plantings;
- Stabilization of 9,840 acres of shrub steppe with native grass seed;
- Stabilization of 1,000 acres of shrub steppe by drill seeding of native species;
- Rehabilitation of 1.5 miles of dozerlines and handlines.

Based on the stabilization and rehabilitation measures implemented after the 24 Command Fire, the following factors could contribute to mitigating the spread of future fires:

- Immediate/timely implementation of emergency stabilization measures;
- Spraying larger burn areas to reduce invasive grasses
- Stabilizing riparian habitat to hinder the spread of fire.

With sufficient and timely ES measures, re-vegetation efforts combined with invasive species treatments have attempted to reduce fire risk and to stabilize the previously burned areas

Treatment of the Milepost 17 Fire area will be critical not only to reduce erosion and dust potential and to prevent site degradation but to reduce fire risk and create a more natural fire regime over time across the Monument area.

Evans and Lih (2005) findings/conclusions support the recommended Milepost 17 Fire ES measures over natural recovery:

- Careful management and a long term commitment to integrated and adaptive approaches to invasive species management, fire management and restoration practices will be required to successfully manage the ALE Reserve and other shrub-steppe ecosystems in the coming years.
- Aggressive management activity to control cheatgrass and to enhance the recovery of natural structure and function of sagebrush shrubland stands will be critical to the long-term ecological integrity of these habitats.
- The problem of cheatgrass must be addressed in relation to native plant community health and fire management practices. There are no simple answers; no permanent solution to the problem of cheatgrass control is currently available and management is extremely challenging.
- The rates of grass seedling emergence and recruitment from aerial seeding efforts observed in the study are probably typical of broadcast seeding efforts in the arid West. (*This infers that aerial seeding is a typical broadcast seeding practice in similar areas of the Western U.S.*).

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**PART A - FIRE LOCATION AND BACKGROUND INFORMATION**

Fire Name	Milepost 17 Fire
Fire Number	13580-9141-DV91
Agency Unit	U.S. Fish and Wildlife Service, Mid-Columbia River National Wildlife Refuge Complex, Hanford Reach National Monument
Region	USFWS Region 1
State	Washington
County(s)	Benton
Ignition Date/Cause	August 13, 2007/Human
Zone	Pacific Northwest
Date Fully Contained	
Jurisdiction	
Mid-Columbia River National Wildlife Refuge Complex, Hanford Reach National Monument	4,708 Acres
<i>Private land</i>	-0-
Total Acres	4,708
Date Contained	August 13, 2007

**PART B - NATURE OF PLAN**

Type of Action (check one box below)

<input checked="" type="checkbox"/>	Initial Submission
<input type="checkbox"/>	Amendment to the Initial Submission

## **PART C - EMERGENCY STABILIZATION ASSESSMENT**

### Emergency Stabilization Objectives

- *To prescribe cost effective post-fire stabilization measures necessary to protect human life, property, and critical cultural and natural resources.*
- *To promptly stabilize and prevent further degradation to affected resources on lands within the fire perimeter and downstream impacted areas in accordance with approved land management plans and policies, and all relevant federal, state, and local laws and regulations.*
- *Minimize the establishment of non-native invasive species within the burned area.*

**PART D - TEAM ORGANIZATION, MEMBERS, AND RESOURCE ADVISORS**

I. Burned Area Emergency Response Team Members: *(List of technical specialists used to develop the plan)*

<b>Position</b>	<b>Team Member (Agency)</b>
Team Leader	Leo Sidebotham (FSE)
Operations	Heidi Newsome, USFWS
Environmental Compliance & Planning	Robert Krueger (FSE) / Wes Harper (FSE)
NEPA Advisor	Tony Roth (FSE/Shaw)
Hydrologist/Geologist	Craig Fanshier (FSE/Shaw)
Watershed Scientist	Wayne Coppel (FSE/Shaw)
Soil Scientist	Todd Martin (FSE/Shaw)
Cultural Resources/Archeologist	Science Kilner (FSE/Shaw)
Vegetation Specialist	Rebecca Meyers (FSE/Shaw)
Wildlife Biologist	Bruce Kvam (FSE/Shaw)
GIS Specialist	Lindsey Hayes (USFWS), Kevin Goldie (USFWS)
Documentation/Computer Specialist	Michele Kruger (FSE)/Lori Lane (FSE)/Lori Onate (FSE)
Photographer	Wes Harper (FSE), Craig Fanshier (FSE/Shaw), Kevin Goldie (USFWS)

III. Resource Advisors: (Note: Resource Advisors are individuals who assisted the burned area emergency response team with the preparation of the plan. See Part H for a full list of agencies and individuals who were consulted or otherwise contributed to the development of the plan.

<b>Name</b>	<b>Affiliation</b>
Gregory M. Hughes	Project Leader, Mid-Columbia River National Wildlife Refuge Complex
Heidi Newsome	U.S. Fish and Wildlife Service/Wildlife Biologist
Kevin Goldie	U.S. Fish and Wildlife Service/Biologist
Howard Browers	U.S. Fish and Wildlife Service/Biologist
Chris Schulte	U.S. Fish and Wildlife Service, Fire Management Officer
Brandon Lewis	U.S. Fish and Wildlife Service, Supervisory Range Technician
Tony Roth	FSE/Shaw, Senior Review (Wildlife, Vegetation)
Erika Britney	FSE/Shaw, Senior Review ( Wildlife, Vegetation)
Debra Carey	FSE/Shaw, Senior Review (Hydrology, Geology)



## PART F - INDIVIDUAL SPECIFICATION

<b>TREATMENT/ACTIVITY NAME</b>	Perform a data evaluation and field inspection of cultural resource to determine whether known cultural resources including but not limited to known and unknown historic and prehistoric properties have been or are at risk of being degraded as a result of the Milepost 17 Fire.	<b>PART E SPECIFICATION #</b>	1
<b>NFPORS TREATMENT CATEGORY*</b>	Heritage Resources	<b>FISCAL YEAR(S) (list each year):</b>	2008
<b>NFPORS TREATMENT TYPE *</b>	Protect Heritage Sites	<b>WUI? Y / N</b>	N
<b>IMPACTED COMMUNITIES AT RISK</b>	None	<b>IMPACTED T&amp;E SPECIES</b>	None

\* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

### WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p><b>Number and Describe Each Task:</b></p> <p>A. General Description: Assess whether known historic properties were impacted from the fire suppression activities or are at risk of further degradation within the area burned by the Milepost 17 Fire including documenting potential areas of concern. Once identified, recommending appropriate measures to prevent and/or mitigate degradation at each location.</p> <p>B. Location/(Suitable) Sites: Approximately 10 to 15 cultural resource sites were located within the Milepost 17 burned areas and/or areas where suppression activities occurred. Such locations are exempt from public disclosure under the Archaeological Resources Protection Act of 1979 (ARPA), and the Freedom of Information Act (FOIA) The USFWS maintains its own records on the location of sensitive cultural resources, and will provide, as necessary such information to law enforcement officers, and the professional archaeologist having oversight for compliance with the implementing regulations under the NHPA.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> <li>1. Relocate previously recorded cultural resources within the burned area by conducting site reconnaissance. Identify potential conditions that could threaten sites.</li> <li>2. Site reconnaissance should include identification of potential degradation from environmental exposure; such as wind deflation, undercutting and loss of integrity, as well as wind-aided burial or erosion of surface features, increased visibility and vulnerability to looting.</li> <li>3. Develop mitigation, rehabilitation or monitoring recommendations, measures and cost estimates for each site that may be threatened by burial, destabilization, exposure to the public, or erosion consequent to fire/suppression effects.</li> <li>4. Initiate consultation with Tribal governments, Native American Indian communities and SHPO as required under 36 CFR 800.</li> </ol> <p>D. Purpose of Treatment Specification: This action is necessary to meet legislative mandates under Section 106 of the National Historic Preservation Act and 36 CFR 800.</p>
--

### LABOR, MATERIALS AND OTHER COST:

<b>PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).</b>	<b>COST / ITEM</b>
Principal Investigator and Project Manager 60 hours @ \$80/hour	4,800.00
Crew Chief 60 hours @ \$50/hour	3,000.00
Crew 60 hours @ \$28/hour	1,620.00
FWS Tribal consultation/interviews \$400/day for 2 days	800.00
<b>TOTAL PERSONNEL SERVICE COST</b>	<b>10,220.00</b>
<b>EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.</b>	<b>COST / ITEM</b>
<b>TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST</b>	
<b>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
<b>TOTAL MATERIALS AND SUPPLY COST</b>	

<b>TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
4 X 4 Pickup @ .485/mile x 100 miles/day x 5 days x 1 FY's –Field visits	242.50
2 – Round Trip travel from Regional Cultural Resources Office in Sherwood Oregon : 490 Miles @ .485/mile X 2 trips	950.60
Per diem Lodging and meals, Richland Washington 10 days (lodging \$60/day and Meals & incidentals \$50/day)	1,100.00
<b>TOTAL TRAVEL COST</b>	<b>2,923.50</b>
<b>CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
<b>TOTAL CONTRACT COST</b>	

**SPECIFICATION COST SUMMARY**

<b>FISCAL YEAR</b>	<b>PLANNED INITIATION DATE (M/D/YYYY)</b>	<b>PLANNED COMPLETION DATE (M/D/YYYY)</b>	<b>WORK AGENT</b>	<b>UNITS</b>	<b>UNIT COST</b>	<b>PLANNED ACCOMPLISHMENTS</b>	<b>PLANNED COST</b>
FY08	10/01/2007	7/23/2008	S	Sites	1,095.30		13,143.50
<b>TOTAL</b>							<b>13,143.50</b>

**Work Agent:** C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

**SOURCE OF COST ESTIMATE**

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	P
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

**RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:**

See Cultural Resource Burned Area Assessment.
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<b>JURISDICTION</b>	<b>UNITS TREATED</b>	<b>COST</b>
U.S. Fish and Wildlife Service, Mid-Columbia River Refuge Complex, Hanford Reach National Monument	12	13,143.50
	<b>TOTAL COST</b>	<b>13,143.50</b>

**TOTAL COST BY JURSDICTION**

## PART F - INDIVIDUAL SPECIFICATION

<b>TREATMENT/ACTIVITY NAME</b>	Non-native invasive species control- Integrated Pest Management	<b>PART E SPECIFICATION #</b>	2
<b>NFPORS TREATMENT CATEGORY*</b>	Invasive Species	<b>FISCAL YEAR(S) (list each year):</b>	2007, 2008
<b>NFPORS TREATMENT TYPE *</b>	Chemical/Biological/Mechanical	<b>WUI? Y / N</b>	N
<b>IMPACTED COMMUNITIES AT RISK</b>	Sagebrush steppe, Riparian	<b>IMPACTED T&amp;E SPECIES</b>	Sage Sparrow, Townsend's Ground Squirrel, Ferruginous Hawk, White-Tailed Jack Rabbit, Greater Sage Grouse, Long-Eared Myotis, Townsend's Big-Eared Bat, Mule Deer

\* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

### WORK TO BE DONE (describe or attach exact specifications of work to be done):

#### Number and Describe Each Task:

A. General Description: The treatment activity will stabilize soil to prevent loss or degradation of productivity using seeding to prevent establishment of invasive plants; and direct treatment of invasive plants by using integrated pest management techniques to minimize the establishment of non-native invasive species within the burned area. Minimize the noxious weed infestations remaining and control new infestations within Milepost17 Fire area (See Appendix III, Maps) prior to seed-set and maturation. Current weed species observed include Rush skeleton weed (*Chondrilla juncea*), Russian knapweed (*Acroptilon repens*), Perennial pepperweed (*Lepidium latifolium*), diffuse knapweed (*Centaurea diffusa*), yellow starthistle (*Centaurea solstitialis*), puncturevine (*Tribulus terrestris*), swainsonpea (*Sphaerophysa salsula*), Canada thistle (*Cirsium arvense*), Phragmites (*Phragmites australis*), kochia (*Bassia scoparia*), and Russian thistle (*Salsola kali*). Utilize integrated pest management techniques (herbicides mechanical and cultural control methods) as appropriate to prevent the spread and establishment of noxious weeds within the fire area. Control Cheatgrass (*Bromus tectorum*) that germinates in fall of 2007 and spring of 2008 to reduce competition with native species recovery and reseeding efforts.

B. Location/(Suitable) Sites: Control all visible noxious weed populations along roads, trails and disturbed sites within the fire area. Control sites identified include dozerlines, disklines. Control non-native invasive species, such as Cheatgrass, within the fire perimeter to decrease competition for native grass seeded species.

#### C. Design/Construction Specifications:

1. Control known populations of noxious weeds as identified in USFWS reviews (see Appendix III, Maps, #11) prior to seed set.
2. Recommended herbicide for cheatgrass control is Journey® (imazapic/glyphosate) or Plateau® (imazapic). Application at low concentrations (2-4 oz Plateau/acre, 6-11 oz Journey/acre) during late winter-early spring will minimize damage to native species. This treatment combination will evaluate which treatment works most effectively to reduce cheat grass. Adjuvants (e.g., surfactant, drift control agents, de-foaming agents) will be required for all weed treatments.
3. Roadside and small infestations will be treated by backpack spraying or truck/ATV mounted sprayer. Non-native invasive species control within interior of fire area will be treated using fixed-wing or rotary aircraft services.
4. Winds in the area to be sprayed should be less than 10 MPH (constant).
5. A buffer of 150 feet will be adhered to around all private land areas. Herbicides approved for aquatic use will be used in riparian wetland areas according to labeled specifications.
6. Applicator will be state certified. All aircraft used should be OAS certified; will be equipped with GPS guidance systems and contractor will be licensed and bonded.
7. Locate, map, and document (using photography, topographic maps, and Global Positioning System--GPS--technology), new weed occurrences within burned area. Provide GPS shapefile to aerial contractors for use in GPS guided applications. Document percent control or kill of noxious weeds.

D. Purpose of Treatment Specifications: Protect the ecological integrity and site productivity of shrub-steppe plant communities and riparian areas within the Hanford Reach National Monument in accordance with established management plan guidelines.

E. Treatment Effectiveness Monitoring Proposed: Spot checking of noxious weed sites to ensure control methods are meeting management objectives. A staff person from the Mid-Columbia River NWR Complex will visit sites controlled every week after initial treatment; this is especially important for weed populations that are sprayed to ensure effectiveness of herbicide application. If both spring and summer/fall applications are used then visits will occur during both these times. Also see Specification for Effectiveness monitoring of treatments.

### LABOR, MATERIALS AND OTHER COST:

<b>PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).</b>	<b>COST / ITEM</b>
Maintenance Laborers (WG-07), (2) x \$30/hour x 60-hours per treatment x 6 treatment periods x 1-year	\$ 21,600.00
Wildlife Biologist (GS-12) x \$39/hour x 40 hours per treatment x 6 treatment periods x 1 year	\$ 9,360.00
<b>TOTAL PERSONNEL SERVICE COST</b>	<b>\$ 30,960.00</b>

<b>EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note:</b>	<b>COST / ITEM</b>
<b>Purchases require written justification that demonstrates cost benefits over leasing or renting.</b>	
Misc. Spray nozzles, hoses, backpack sprayer, equipment repair	1,000.00
<b>TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST</b>	<b>1,000.00</b>

<b>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
Plateau® – 147-gal (4 fl oz/acre X 4,708 acres) @ 277.00/gal	40,746.70
2,4-D Amine- 120-gal (2 pt./ac. X 720-acres) @ \$9.50/gal.	1,140.00
<b>TOTAL MATERIALS AND SUPPLY COST</b>	<b>41,886.70</b>
<b>TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
4 x 4 Pickup @ 0.485/mile X 100 miles/day X 30 days X 1 FY	1,455.00
<b>TOTAL TRAVEL COST</b>	<b>1,455.00</b>
<b>CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
Aerial Application of Herbicide 4,708 Acres x \$18/ac.	84,744.00
Inventory and monitoring. Contract, (1) scientists @ \$50/hour x 5-weeks spring (200 hours) and 5-weeks fall (200 hours) = 20,000 per year X 1FY	20,000.00
<b>TOTAL CONTRACT COST</b>	<b>104,744.00</b>

### SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2007	7/23/2008	S	Acres	38.20	4,708	180,045.70
<b>TOTAL</b>							<b>180,045.70</b>

**Work Agent:** C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

### SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	M
2. Documented cost figures from similar project work obtained from local agency sources.	C, E
3. Estimate supported by cost guides from independent sources or other federal agencies	M
4. Estimates based upon government wage rates and material cost.	M, P, T
5. No cost estimate required - cost charged to Fire Suppression Account	

**P** = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

### RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Vegetation and Soils Resource Damage Assessment, Wildlife Damage Assessment, and Appendix III – Maps.
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### TOTAL COST BY JURSDICTION

JURSDICTION	UNITS TREATED	COST
U.S. Fish and Wildlife Service, Mid-Columbia River National Wildlife Refuge Complex, Hanford Reach National Monument	4,708	\$180,045.70
	<b>TOTAL COST</b>	<b>\$180,045.70</b>

## PART F - INDIVIDUAL SPECIFICATION

<b>TREATMENT/ACTIVITY NAME</b>	<b>Ecological Stabilization- Native Seeding</b>	<b>PART E SPECIFICATION #</b>	3
<b>NFPORS TREATMENT CATEGORY*</b>	Invasive Species & Wildlife Habitat	<b>FISCAL YEAR(S) (list each year):</b>	2007, 2008
<b>NFPORS TREATMENT TYPE *</b>	Preventative Seeding	<b>WUI? Y / N</b>	N
<b>IMPACTED COMMUNITIES AT RISK</b>	Sagebrush steppe	<b>IMPACTED T&amp;E SPECIES</b>	Sage Sparrow, Townsend's Ground Squirrel, Ferruginous Hawk, White-Tailed Jack Rabbit, Greater Sage Grouse

\* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

### WORK TO BE DONE (describe or attach exact specifications of work to be done):

#### Number and Describe Each Task:

A. General Description: This treatment activity will stabilize soil to prevent loss or degradation of productivity using seeding to prevent establishment of invasive plants within the burned area. Apply native seed mix through aerial broadcast, and drill seeding application in burned area to prevent the establishment of noxious weeds and invasive non-native species; and to limit erosion and stabilize soils.

B. Location/ (Suitable) Sites: The Milepost 17 Fire area on Monument lands (4,708 acres) is located on the west of SR 240 of the Hanford Reach National Monument (see Appendix III, Maps, #1). Reseeding should take place across the portions of the fire area (See Appendix III, Maps, #12) that were critical shrub-steppe habitat areas to stabilize soils, limit weed invasion, and promote ecological integrity.

1. Purchase native seed mix: in appropriate amounts to stabilize soils and ecological function according to the following specifications for native seed mix.

**Mix 1** : Sandy soils areas: 1,435-acres aerial application, with 452-acres drill seed application

#### Grasses

Indian Ricegrass ( <i>Oryzopsis hymenoides</i> ) (Nez Par)	3 lbs./ac. PLS
Needle and thread grass ( <i>Stipa comata</i> )	0.2 lbs/acre
Sandberg's bluegrass ( <i>Poa sandbergii</i> ) (Hanford)	2 lbs./ac. PLS
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	0.2 lb. /ac PLS
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	1.5 lbs./ac PLS
Thickspike Wheatgrass (Swindemar) ( <i>Elymus lanceolatus</i> )	4 lbs./ac PLS

#### Forbs

Yarrow, ( <i>Achillea millefolium</i> )	0.2 lbs./ac PLS
Columbia Blue Flax ( <i>Linum</i> sp.)	0.2 lbs./ac PLS

**Mix 2** : Loamy (less sandy) acres: 2,822-acres aerial application

#### Grasses

Indian Ricegrass ( <i>Oryzopsis hymenoides</i> ) (Nez Par)	3 lbs./ac. PLS
Needle and thread grass ( <i>Stipa comata</i> )	0.2 lbs/acre
Sandberg's bluegrass ( <i>Poa sandbergii</i> ) (Hanford)	2 lbs./ac. PLS
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	0.2 lb. /ac PLS
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	1.5 lbs./ac PLS
Bluebunch Wheatgrass ( <i>Pseudoroegneria spicata</i> )	4 lbs./ac PLS

#### Forbs

Yarrow, ( <i>Achillea millefolium</i> )	0.2 lbs./ac PLS
Columbia Blue Flax ( <i>Linum</i> sp.)	0.2 lbs./ac PLS

#### Shrubs

Wyoming Big Sagebrush ( <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> )	0.1 lbs/ac PLS
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.1 lbs/ac PLS
Antelope bitterbrush ( <i>Purshia tridentata</i> )	0.1 lbs/ac PLS

2. Seed Mixture Selection and Certification: The seed mix should be tested for purity and germination rates. Before accepting delivery of seed shipment the contractor must provide written evidence (seed label and letter) to the Monument managers (Deputy Project Leader or Natural Resources Specialist) that the seed conforms to the purity and germination requirements in the specification. Seed must also be source identified as to its origin. Columbia Basin derived and grown seed is required, where practical, for all native grass, forb and sagebrush species.

3. Delivery: Deliver certified weed-free seed sold on pure live seed basis. Deliver to Hanford Reach National Monument.

Storage: Seed should be applied as soon as possible after delivery. If immediate application is not possible the seed should be stored under dry, cool conditions and protected from rodents and other wildlife. Seed also needs to be protected from dew and rain.

4. Timing of Seeding Application: Seeding should occur in December, 2007, or no later than late January, 2008.

Application Rate: Seed will be applied at the above rates, on a PLS/acre basis.

5. **Application Method:** Seed will be applied by aerial contract services for broadcast seed operations. Broadcast seeding will be conducted by fixed-wing aircraft. Aircraft should be OAS certified; will contain GPS guided navigational systems for accurate seed placement to coordinates provided by the USFWS; contractor must be bonded.  
 Drill Seeding- Approximately 452 acres of the Milepost 17 fire will be seeded with a rangeland drill on silt loam and sandy soils on the northwestern portions of the fire. Drill seeding operations will be conducted at ½ the aerial application rate.

D. Purpose of Treatment Specifications: To stabilize soil to prevent loss or degradation of productivity. Seeding to prevent the establishment of invasive plants, and direct treatment of invasive plants.

E. Treatment Effectiveness Monitoring Proposed: Monitor to determine effectiveness

**LABOR, MATERIALS AND OTHER COST:**

<b>PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).</b>	<b>COST / ITEM</b>
Wildlife Biologist (2) each (GS-12) @ \$39/hr X 480 Hours X 1 Fiscal year	18,720.00
Maintenance Personnel (2) x \$30/hour x 40hours x 10 weeks (Drill seeding operations)	24,000.00
<b>TOTAL PERSONNEL SERVICE COST</b>	<b>42,720.00</b>
<b>EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.</b>	<b>COST / ITEM</b>
Rangeland drill seeders (2), Rental @ \$12/acre x 452- acres	10,848.00
<b>TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST</b>	<b>10,848.00</b>
<b>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
Native Seed Mix 1 @ \$250.68/ ac x 1,435 aerial seed acres & x 452- drill seed acres at ½ PLS rate (~226-acres full rate)	416,379.48
Native Seed Mix 2 @ \$ 258.68/ac x 2,822 aerial seed acres	729,995.00
Cultipack rings, bearings, grease, oil, fuel (drill seeding operations)	3,000.00
<b>TOTAL MATERIALS AND SUPPLY COST</b>	<b>1,149,374.48</b>
<b>TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
TOTAL TRAVEL COST	
<b>CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
Aerial Broadcast Seeding –Fixed Wing Aircraft \$36/ac x ~ 4,708- acres plus mobilization cost \$2,000	169,488.00
Effectiveness monitoring. Contract, (3) scientists @ \$50/hour X 5 weeks spring (200 hours) and 5 weeks fall (200 hours)= 40,000 per year X 1FY	40,000.00
<b>TOTAL CONTRACT COST</b>	<b>209,488.00</b>

**SPECIFICATION COST SUMMARY**

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY08__	10/1/2007	7/23/2008	S	acres	300.00	4,708	1,412,430.48
<b>TOTAL</b>							<b>1,412,430.48</b>

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

**SOURCE OF COST ESTIMATE**

1. Estimate obtained from 2-3 independent contractual sources.	C
2. Documented cost figures from similar project work obtained from local agency sources.	P,C,M
3. Estimate supported by cost guides from independent sources or other federal agencies	P
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

**RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:**

Please refer to Vegetation and Wildlife Assessments- Appendix I; Treatments Map- Appendix III.

JURISDICTION	UNITS TREATED	COST
U.S. Fish and Wildlife Service, Mid-Columbia River Refuge Complex, Hanford Reach National Monument	4,708 acres	1,412,430.48
<b>TOTAL COST</b>		<b>1,412,430.48</b>

**TOTAL COST BY JURISDICTION**

## PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Emergency Stabilization Plan Development	PART E SPECIFICATION #	4
NFPORS TREATMENT CATEGORY*	Planning	FISCAL YEAR(S) (list each year):	2007
NFPORS TREATMENT TYPE *	BAER/ES Plan	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	None	IMPACTED T&E SPECIES	Sage Sparrow, Townsend's Ground Squirrel, Ferruginous Hawk, White-Tailed Jack Rabbit, Greater Sage Grouse

\* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

### WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p><b>Number and Describe Each Task:</b></p> <p>Number and Describe Each Task:</p> <p>A. General Description: Prepare the Emergency Stabilization (ES) plan for the Milepost 17 Fire on the Hanford Reach National Monument.</p> <p>B. Location/(Suitable) Sites: Plan has been prepared to address all land under jurisdiction of U.S. Fish and Wildlife Service within the Milepost 17 Fire area. Plan costs include administrative costs, salaries of planning team, and supplies.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> <li>1. Conduct a detailed assessment of burn severity, its impacts to lands and the threats to life and property; protect critical cultural and natural resources.</li> <li>2. Write specifications based on assessment recommendations.</li> <li>3. Submit plan for approval and secure funding from appropriate sources.</li> <li>4. Per policy, complete annual reports with monitoring narratives and cost details.</li> </ol> <p>D. Purpose of Treatment Specifications: To prepare a comprehensive ESR plan to manage or mitigate the fire impacts in order to protect life, property and critical cultural and natural resources.</p> <p>E. Treatment Effectiveness Monitoring Proposed: Per policy, an annual and final accomplishment report will be prepared with detailed costs and monitoring narratives and will be completed within 7 days of fire containment (DM 620, Chapter 3).</p>
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### LABOR, MATERIALS AND OTHER COST:

<b>PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):</b> Do not include contract personnel costs here (see contractor services below).	<b>COST / ITEM</b>
TOTAL PERSONNEL SERVICE COST	
<b>EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note:</b> Purchases require written justification that demonstrates cost benefits over leasing or renting.	<b>COST / ITEM</b>
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
<b>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
FWS Assistance and Reports	5,000.00
TOTAL MATERIALS AND SUPPLY COST	5,000.00
<b>TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
TOTAL TRAVEL COST	
<b>CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):</b>	<b>COST / ITEM</b>
Contractor Price	27,400.00
TOTAL CONTRACT COST	27,400.00

### SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	7/16/2007	10/15/2007	P	1		1	32,400.00
<b>TOTAL</b>							<b>32,400.00</b>

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

**SOURCE OF COST ESTIMATE**

1.	Estimate obtained from 2-3 independent contractual sources.	C
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

**RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:**

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JURISDICTION	UNITS TREATED	COST
U.S. Fish and Wildlife Service, Mid-Columbia River Refuge Complex, Hanford Reach National Monument	1	32,400.00
	<b>TOTAL COST</b>	<b>\$32,400.00</b>

**TOTAL COST BY JURSDICTION**

## **PART G - POST-EMERGENCY STABILIZATION REQUIREMENT**

The following are post-emergency stabilization, implementation, operation, maintenance, monitoring, and evaluation actions after three years from the control of the fire to ensure the effectiveness of initial investments. Estimated annual cost and funding source is indicated.

1. Maintain access and service roads (grading, spraying, mowing) (\$3,000 – 1262)
2. Maintain fire breaks (disking, mowing, spraying) (\$3,000 – 9131)
3. Maintain fences and signs (\$500 – 1262)
4. Continue invasive species monitoring and control (\$3,000 – 1261)
5. Manage biological control population reservoirs for transfer to other sites as needed/available (GS-09 Wildlife Biologist, 10 hours, \$205 – 1261)
6. Revisit photo-monitoring points (GS-09 Wildlife Biologist, 8 hours, \$164 – 1261)
7. Monitor native plantings (GS-09 Wildlife Biologist, 16 hours, \$328 – 1261)
8. Monitor rare plant populations/sensitive vegetation (GS-09 Wildlife Biologist, 8 hours, \$164 – 1261)
9. Wildlife resource monitoring/sensitive species surveys (GS-11 Wildlife Biologist, 40 hours, \$1,020 – 1261)
10. Produce publications and reports, and coordinate University research related to fire and arid lands ecology (GS-12 Research Biologist, 40 hours, \$1,200 – 1261)
11. Provide education and interpretation of stabilization/rehabilitation area (GS-11 Outdoor Recreation Planner, 20 hours, \$510 – 1263)
12. Cultural Resource protection (GS-09 LE Officer, 32 hours, \$656 – 1264)
13. Cultural Resource management, including Tribal cooperation and coordination (quarterly meetings, GS-11 Cultural Resource Specialist, 40 hours plus travel costs, \$1,600 – 1261)

## **PART H - CONSULTATIONS**

Please see Consultations within each specific Resource Damage Assessment report.

## **APPENDIX I - BURNED AREA ASSESSMENT REPORTS**

### **BURNED AREA EMERGENCY STABILIZATION PLAN MILEPOST 17 FIRE- MID-COLUMBIA RIVER NATIONAL WILDLIFE REFUGE COMPLEX, HANFORD REACH NATIONAL MONUMENT**

#### **RESOURCE ASSESSMENTS**

- **CULTURAL RESOURCE DAMAGE ASSESSMENT**
- **VEGETATION AND SOILS RESOURCE DAMAGE ASSESSMENT**
- **WILDLIFE RESOURCE DAMAGE ASSESSMENT**
- **OPERATIONS RESOURCE ASSESSMENT**
- **WATERSHED AND SOIL DAMAGE ASSESSMENT**



**BURNED AREA EMERGENCY STABILIZATION PLAN  
MILEPOST 17 FIRE  
CULTURAL RESOURCE DAMAGE ASSESSMENT**

**I. OBJECTIVES**

The overall objective of this report section is to provide recommendations for additional cultural resources damage assessment as follows:

- Assess damage to known historic and prehistoric cultural resources as a result of fire behavior and suppression activities.
- Assess potential future risks to known/documented cultural resources as a result of the fire (e.g. erosion, flooding).
- Assess potential risks to known cultural resources as a result of emergency stabilization activities for other resources.
- Coordinate with Federally recognized Tribes.

**II. ISSUES**

- Identify known/documented resources that have been subject to direct or indirect effects of fire and fire suppression actions.
- Identify emergency stabilization and/or protection needs for cultural resources within the fire.
- Other resources stabilization measures that may put cultural resources at risk.
- Consultation with appropriate parties to meet legal compliance and tribal consultation.

**III. OBSERVATIONS**

**A. Background**

The following information is derived from several widely available sources including the 24 Command Fire Burned Area Emergency Rehabilitation Plan (June, July 2000), 24 Command Fire Burned Area Emergency Rehabilitation Plan Amendment (December 17, 2001), 24 Command Fire Burned Area Emergency Stabilization and Rehabilitation (BAER) Plan, Final Accomplishment Report for 2000-2003 Treatments, and is intended to be a cursory overview of present knowledge to provide a context within which the fire, suppression activity, post-suppression inventory, and recommended cultural resource prescriptions may be considered. Supporting documents are cited in the Reference, Part VI.

The Milepost 17 Fire burned 4,708 acres of public lands. Approximately 18.25 miles of disk/dozer line was employed during the fire suppression action. Drought (extremely dry) conditions along with gusting winds had the potential to result in extreme fire behavior, lofting fire brands, and high potential for fire spread. The immediate need was to contain the fire to prevent further spread. A total of 35.4 acres were impacted due to

disk and dozer line suppression during Milepost 17 Fire.

The HRNM has a large number of historic and prehistoric sites recorded within its boundaries. Most of the historic properties are related to the Hanford Site's nuclear development, including the Manhattan Project, Cold War developments, and cleanup activities associated with decommissioning of the facilities. In addition, there are pre-Hanford homesteads that were displaced in 1943 for the Hanford Site. The prehistoric component is primarily known from earlier work done by a number of archaeologists at large village sites along the Columbia River, as well as other sites located during National Historic Preservation Act, Section 106 compliance surveys (Source: Alex Bourdeau, USFWS).

The prehistoric cultural chronology of the Hanford Site area is taken from the *National Register of Historic Places Multiple Property Documentation Form – Historic, Archaeological and Traditional Cultural Properties of the Hanford Site, Washington* (U.S. Department of Energy 1997). The chronology summary states:

The prehistoric Columbia Plateau region has been impacted by basalt flows, catastrophic flooding, and environmental change which has meant that prehistoric regional inhabitants adapted their cultural subsistence systems as necessary to survive. The moist, cool conditions of the early Holocene meant that early peoples [12-15,000 B.P. to 8,000 years B.P.] were probably mobile, taking advantage of available resources in an organized fashion.

As the environment became drier after 8,000 years B.P., it is likely that the descendants of these early people developed a more mobile, generalized riverine-based economy. The arrival of a moist and cool environment at approximately 4,500 years B.P. was coupled with year-round residency and a hunter-gatherer subsistence pattern which was modified briefly at 3,800 years B.P.

Approximately four-hundred years later, circa 3,400 years B.P., the climate cooled once again but the sedentary lifestyle did not return to the study area until 3,000 years B.P. After this point, populations increased along the rivers as groups focused on salmon, roots and ungulates. A significant increase in storage and food processing activities were common to many people throughout the Columbia Basin although the mobility of the hunter-gatherer lifestyle remained a strong component into the ethnographic period (1997:2-1) (Source: Alex Bourdeau, USFWS).

The Ethnographic/Contact Period (1805-1943) extends from the time of first Euroamerican contact to when Native Americans were excluded from settlement and/or use of the area. This period reflects both a continuity of earlier, pre-Contact life ways and subsequent changes to Euroamerican building styles and incorporation of Euroamerican materials. During this period, Native groups ceded lands and were, for the most part, moved onto reservations. At the present time, the Federally-recognized Confederated Tribes of the Umatilla Indian Reservation, Yakama Indian Nation, Confederated Tribes of the Colville Indian Reservation, Nez Perce Tribe and the non

Federally-recognized Wanapum have expressed interest in this area (U.S. Department of Energy 1997:3.4-3.35).

Euroamerican Resettlement on the Hanford Site (1805-1943): The Historic Period began with the passage of the Lewis and Clark expedition (1805-1806) near the area. Subsequent to this came the passage of missionaries, mining, ranching, establishment of trading posts, river travel and community development (U.S. Department of Energy 1997:4.6-4.21). With the possibility of grazing and limited homestead use, the area within the Wautoma Fire appears to have been bypassed by historic development in favor of other locations with better access to water.

Hanford Development (1943-1990). The history associated with the Hanford Site and its nuclear development is included in *History of the Hanford Site 1943-1990* (Harvey n.d.) and *History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990. Manhattan Project 1943-1946, Cold War Era 1947-1990.* (U.S. Department of Energy 2002).

Natural gas was discovered on Rattlesnake Mountain in the 1920's but the deposits proved too small to be a major continuing economic force. The remains of numerous exploration sites and gas wells are scattered along the foot of Rattlesnake Mountain. The federal government acquired the land for the Hanford Engineer Works in 1943 and proceeded to evacuate all civilians (Indians and whites) from the area. Subsequent removal of much of the standing structures created a large historic archaeological district at the Hanford Site.

Since the Milepost 17 Fire occurred on lands that were acquired as a buffer for the Hanford Site, no development occurred from 1943-1950. Beginning in 1950, Cold War tensions resulted in military presence at Hanford. In 1950, the first 16 anti-aircraft artillery batteries were established to encircle and protect Hanford's nuclear reactors. The typical layout of a battery covered about 20 acres and had up to 20 associated buildings and structures. Beginning in 1954, the U.S. Army began supplementing the anti-aircraft artillery guns with NIKE surface to air missiles and, by late 1957-early 1958, had phased-out the artillery sites within the fire area (Harvey 2002:2-93 – 2-96). The battery sites were later razed at some unspecified date after their deactivation (Source: 24 Command Fire Cultural Resources Assessment, June/July 2000).

## **B. Methodology and Results**

The first step in conducting a Cultural Resource Damage Assessment is identifying locations of historical properties and other culturally significant locations within the fire suppression and burn areas. Site specific information was requested from the U.S. Fish and Wildlife by the Cultural Resource Specialist. This information was not made available to incorporate into this assessment.

The BAER Team site visited the western boundary of the Milepost 17. The BAER Team Cultural Resource Specialist was available in an advisory capacity and was not present

during the BAER Team's burn area site visit. Although the limited reconnaissance was not sufficient to fully assess the cultural resource damage resulting from the fire and fire suppression activities, the following effects of fire suppression were observed during the burned area site visit:

-Vehicular off-road track marks as indicated by denuded vegetation;

-Disk-line areas along the periphery and selected areas as indicated by denuded vegetation;

Based on these observations, it is possible that fire suppression activities listed above may have disturbed or displaced features of both previously recorded and unrecorded cultural resources. The operation of fire fighting equipment beyond fire lines and roads also has the potential to affect sites. In addition, the fire may have exposed sites previously covered with vegetation. There is some potential that increased wind erosion may deflate sites previously protected by vegetation.

BAER policy recognizes cultural resources as a critical resource requiring assessment and protection. A guiding principle as well as a legal requirement of burned area rehabilitation is to regard archaeological sites and other materially fragile cultural resources when proposing emergency rehabilitation treatments. If post-fire conditions indicate erosion threats or other actual or potential watershed problems, cultural resources must receive special attention to ensure that their unique and irreplaceable values are given full consideration.

Protection of human life and property from wildfire takes precedence over the protection of historic and prehistoric cultural properties. However, the diminishing numbers of archaeological sites, traditional cultural properties and other resources of cultural importance representing millennia of human life must be provided protection whenever possible.

Incident-related damages to cultural resources fall in two broad categories: fire-related and suppression-related. Fire-related impacts are dependent on the severity of the incident and can include thermal fracture of obsidian, basalt, chert, granite and other stone artifacts; destabilization or destruction of structures and features. Other impacts include destruction of organic elements or midden deposits at the site, destabilization of soils within a site or landscape with resultant increased erosion and deflation of loosened sediments. Indirect impacts may arise from increased susceptibility to looting and surface collection due to greater visibility.

Suppression related impacts occur with disturbance or destruction from dozer or hand line construction or equipment staging. Stabilization and rehabilitation activities also may cause impacts, including restoration of dozer and hand lines, silt basin construction, restoration of range and forest land, and replacement of infrastructure.

### **C. Findings of Previous Onsite Assessments and Studies**

The Milepost 17 Fire (4,708 acres) was entirely within the footprint of the 24 Command Fire (78,732 acres within the Monument). The 24 Command Fire cultural resource assessment performed in July 2000 addressed possible effects to a minimum of 190 previously recorded historic and prehistoric archaeological sites. A total of 136 sites had previously been recorded. Sites consisted of prehistoric (46) and historic (45) sites plus 12 sites with both historic and prehistoric components. Several isolated finds were also represented with 18 prehistoric and 15 sites. Historic site types included Euroamerican homesteading and ranching activities, sheep herding, and transportation systems. Artifacts and features associated include rock cairns, and domestic debris scatters, cisterns, gas wells, and ditches. Prehistoric site types consist of rock cairns, lithic scatters, isolated project points and other tools. According to the Final Implementation Report (2003), cultural damage was minimal (Source: 24 Command Fire Burned Area Emergency Stabilization and Rehabilitation (BAER) Plan, Final Accomplishment Report for 2000-2003 Treatments).

These sites range from lithic scatters to can scatters, Indian hunting sites to ranch buildings, spirit quest monuments to gas production wells. As many of these sites can occur within the same physical space rehabilitation can be quite complex.-

As part of the 24 Command Fire cultural assessment, a preliminary inventory of prehistoric and historic sites on the ALE was conducted by archaeologists assigned to the BAER team. Of the 19 sites marked on maps in the Smithsonian trinomial system 8 were visited. Two other locations were noted in transit and inspected. Subsequent review of site maps indicated that one of these locations had been recorded as several sites but none were issued trinomial site numbers. One site appears to have been an unrecorded spirit quest monument. The second location has components from several periods of occupation, including many fragments of depression era glass. The glass had not been melted, spalled, shattered, or otherwise severely altered by the fire. This observation was also noted for lithic debris at prehistoric sites. However, wood structures, such as a corral, were apparently destroyed by the 24 Command fire (Source: 24 Command Fire Cultural Resources Assessment, June/July 2000).

The Milepost 17 Fire burned 4,708 acres within U.S. Fish and Wildlife Service jurisdiction on the HRNM west of Washington State Road (SR) 240 in Benton County, Washington. Fire suppression impacts included: 18.25 miles of disk/bulldozer were constructed on the perimeter of the Milepost 17 Fire on the HRNM. The estimated damage to resources on the Monument from dozer/disk lines is 35.4 acres (based on average 16 foot width). These areas need to be surveyed to assess whether cultural resources were affected or could be further degraded.

The entire fire has been mapped by the BAER Team for burn severity. Within shrub-steppe upland habitat areas (4708 acres) approximately 95 percent of the fire area is classified as low burn severity with approximately 5 percent mapped as moderate burn severity. This attests to the fires' rapid spread through light fuels.

To conform with Section 106, further cultural resource damage assessments will be required prior to implementation of ground disturbing stabilization actions.

#### **IV. RECOMMENDATIONS**

Site specific cultural resource location information provided by the U.S. Fish and Wildlife Service indicated that between 10 to 15 cultural locations could have been affected by the Milepost 17 Fire. It is recommended that cultural resources location data be evaluated to enable a systematic and target field assessment. A cultural resources damage assessment field methodology can be developed based on site type and its susceptibility to fire related impacts, as well as its National Register of Historic Places status and significance. Once sites are selected for assessment, field work would include a basic inspection to characterize fire damage with minimally intrusive techniques. Field inspection would also include assessing long-term risk of potential fire-related degradation to the site. Inspections would be documented on conditions assessment forms. Field methodology can be coordinated with Washington State Historic Preservation Office and appropriate tribes. It should be noted that the five (5) area tribes are very active and vocal, and regularly participate in Hanford preservation activities.

It is recommended that fire lines and other areas where suppression activities occurred be systematically surveyed for the presence of previously unreported sites and to determine if the known sites mapped near fire lines were actually affected. If any such sites were affected, it is recommended that damage be reasonably characterized to support stabilization treatment recommendations. For impacted sites, eligibility determinations can be made for the National Register of Historic Places, for previously unrecorded sites and recorded sites with no determination. If it is determined that any site(s) is eligible, then stabilization and/or mitigation measures should be developed in consultation with the Washington State Historic Preservation Office and appropriate tribes.

No treatment measures to cultural resources are advanced at this time. However, assessment with fieldwork will be conducted subsequent to the submission of this plan and treatment recommendations submitted thereafter with the Milepost 17 Fire rehabilitation plan.

If ground-disturbing activities are proposed for other resources under emergency stabilization, Section 106 consultation, including appropriate tribal consultation, should be included in the planning and execution process for that specification.

#### **Emergency Stabilization: (specification related)**

The following specification, Part F, Specification #1 is offered to assist in protecting the cultural resources from the impacts of the Milepost 17 Fire:

- 1) Perform a cultural resources data evaluation to inventory and identify cultural resources including but not limited to historic and prehistoric properties within the burn and fire suppression areas. The evaluation will include a damage assessment field methodology for performing a site reconnaissance inspection.
- 2) Conduct a field reconnaissance inspection on sites and areas identified in the data evaluation. For estimating purposes, the number of sites to be visited and/or addressed is 12; the number of sites calculated based on 190 sites identified in the Command 24 Fire multiplied by the fraction of area burned in the Milepost 17 Fire versus the Command 24 Fire.
- 3) Develop mitigation, rehabilitation or monitoring recommendations, measures and cost estimates for each site that may be threatened by burial, destabilization, exposure to the public, or erosion consequent to fire/suppression effects.
- 4) Initiate consultation with Tribal governments, Native American Indian communities and SHPO as required under 36 CFR 800.

## **V. CONSULTATIONS**

The detailed scoping document of the proposed cultural resources assessment will be prepared based on coordination/consultations with the following agencies/stakeholders:

- Washington State Historic Preservation Office (WA SHPO) to verify that Section 106 NHPA procedures will be followed for any treatments that may affect cultural resources.
- Pacific Northwest National Laboratory – Contact: Darby Stapp, Project Manager, Cultural Resources Project Manager, Richland, Washington.
- Confederated Tribes of the Umatilla Indian Reservation
- Yakama Indian Nation
- Confederated Tribes of the Colville Indian Reservation
- Nez Perce Tribe
- Wanapum Tribe

## **VI. REFERENCES**

United States Department of Fish and Wildlife.  
Overlook Fire, Burned Area Emergency Response Plan, August 2007

United States Department of Fish and Wildlife.  
24 Command Fire Burned Area Emergency Rehabilitation Plan (June, July 2000),

United States Department of Fish and Wildlife.  
24 Command Fire Burned Area Emergency Rehabilitation Plan Amendment  
(December 17, 2001),

United States Department of Fish and Wildlife  
24 Command Fire Burned Area Emergency Stabilization and Rehabilitation  
(BAER) Plan, Final Accomplishment Report for 2000-2003 Treatments.

**BURNED AREA EMERGENCY STABILIZATION PLAN  
MILEPOST 17 FIRE  
VEGETATION RESOURCE DAMAGE ASSESSMENT REPORT**

**I. OBJECTIVES**

- Evaluate the potential for encroachment of invasive species into native plant communities within the burned area.
- Evaluate and assess the impacts of fire to vegetation resources and identify other natural resource values at risk associated with vegetation losses.
- Identify and locate threatened and endangered plant species impacted by the fire and/or fire suppression actions.
- Determine emergency stabilization and monitoring needs supported by specifications to aid in vegetation recovery and soil stabilization.

**II. ISSUES**

- Protection of other resource values including site productivity, wildlife habitat, vegetation resources, cultural resources and watershed stability.
- Monitoring of impacted lands for the early detection and control of invasive and noxious weed species.
- Determine impacts of fire to one plant species that is considered State Sensitive.
- Develop management strategies that provide for the stabilization, natural regeneration and recovery of impacted areas.
- Immediate stabilization of denuded soils (i.e. vegetation has been removed) that may impact or redirect ecological function.
- Monitoring of the planting/seeding effectiveness of emergency stabilization efforts according to plan specifications.

**III. OBSERVATIONS**

**A. Background Information**

The Hanford Reach land base, originally established in 1943 by the US Government as a national security area for the production of weapons-grade plutonium has restricted public access and has been free of agricultural influences for over four decades. Because of this fact the area has preserved an immense natural habitat which now serves as a refuge for native plants and animals. Within the area a mosaic of habitats that support a wealth of increasingly uncommon native plant and animal species exists, which is unmatched in the Columbia Basin (Clinton 2000). Because of the high diversity of native plant and animal species, the large number of rare and sensitive plant species, the well developed microbial crusts and significant breeding populations of nearly all steppe and shrub-steppe dependent species, the USFWS has been tasked to preserve and protect these objects of antiquity in perpetuity (USFWS 2000)

This report identifies and addresses known and potential impacts to vegetation within this preserved habitat affected by the Mile Post 17 Fire, which is located on the Hanford Reach National Monument. The fire ignited on August 13, 2007 near mile post 17 on Highway 240 near the Department of Energy's (DOE) Hanford Site. Fueled by erratic winds, extreme day-time temperatures and dry fuel conditions, the fire spread quickly throughout the Arid Lands Ecologic Refuge (ALE). The burned area consists of approximately 4,708 acres of contiguous area all of which were within the boundaries of the Hanford Reach National Monument (Monument).

Vegetative resources were extensively impacted by this fire on federal lands that can be described as Columbia Basin bunchgrass community, considered suitable for wildlife forage and when intact offer quality soil stabilization. Findings and recommendations contained within this stabilization plan are based upon field reconnaissance of the burned area, interviews with local resource specialists, local land managers, and review of relevant documents and literature. This report will detail the known damage to the vegetation and soil resources, will discuss re-vegetation processes and future monitoring criteria, and will outline management considerations for recovery of vegetation resources.

## **B. Reconnaissance methodology**

On August 27, 2007, the First Strike/Shaw Environmental BAER Team assembled at the United States Fish and Wildlife Services (USFWS) Office in Richland, Washington initializing the start of the Emergency Stabilization (ES) assessment plan. Ground reconnaissance of the fire was conducted on August 28, 2007, with the aide Fish and Wildlife staff member, Kevin Goldie. Kevin has photos taken directly after the fire and the BAER team took photographs at the time of the ES reconnaissance, selected photos have been included in the photo documentation section of this plan. Within the burned area near the Hanford Nuclear Power Plant, vegetation resources were significantly reduced on approximately 95 percent of the fire area due to extremely dry conditions and high wind. The burned area suffered nearly complete loss of vegetation with the plant mortality rate between 97 to 100 percent of all vegetation and standing biomass (cover). The fire consumed 95 percent of the standing biomass that had regenerated after the Command 24 Fire, which is within the fire boundary, including shrubs, grasses, forbs. The remaining shrubs have been injured through heat scorch. Blowing dust and ash was observed in areas where all vegetation had been burned; soils in the burned area are no longer stabilized by the vegetation (Please see Wind Erosion Risk map – Appendix III).

On August 29, 2007, the Vegetation Specialist met with representatives from USFWS to gather information on issues and objectives for emergency rehabilitation actions, baseline information pertaining to known impacts and information related to vegetation emergency stabilization at the Monument. This meeting verified that the Monument contains many endemic plant communities of which one has been lost or significantly reduced throughout all or a significant portion of their range. Sensitive plant communities have been defined as those that are foundation plant communities,

representing historic conditions within the Columbia Basin eco-region and have been identified as either state ranked, globally rare, or ecologically significant within western shrub-steppe environments (USFWS 2006). The Mile Post 17 Fire damaged/destroyed plant communities identified as sensitive and ecologically significant, these represent intact plant communities representing historical vegetation conditions and may be irreplaceable or irrevocably damaged (Please see Sensitive Plant Communities map, Appendix III). Stabilization is critical to protect and prevent further degradation to these areas.

Plant associations were inspected to determine losses, requirements for stabilization efforts, and recovery potentials. Observations were made of fire impacts to duff layers, live crown tissue on grass and shrub species, and on impacts of the fire to existing seed banks. Direct fire impacts have been documented for all plant communities based upon consultation with local staff, and after reviewing the burned areas within the fire perimeter through visual assessment, photos and map documentation.

## **C. Findings**

### **1. Vegetation:**

Due to extreme fire behavior, fuel conditions, topography, and weather most of the vegetation was lost. The Mile Post 17 Fire area has low vegetative diversity compared to the other native plant communities found on the Hanford Site. The Monument area was identified as unique and deserving of full protection by Presidential proclamation in 2000. One of the unique features of the Monument that contributed to its establishment is the diversity and vast size of native plant communities. The area has been surveyed by The Nature Conservancy of Washington and the Washington Natural Heritage Program. These surveys have identified a total of 17 terrestrial, native plant community types (or elements) that occurred as 48 separate element occurrences on the Monument. These elements are unique in the state for their character and plant associations. Additionally, 112 populations/occurrences of 28 rare plant taxa were located across the Hanford Site (TNC 1999).

Plant associations within the Mile Post 17 Fire include bunchgrass mosaic which includes bluebunch wheatgrass (*Pseudoroegneria spicata*), and the noxious weed Cheatgrass (*Bromus tectorum*). Topography, aspect, and elevation dictate the variability of the vegetative communities within the fire area as well as the soil textures and depths.

Primary plant communities impacted by the fire included the following plant associations:

Bunchgrass Mosaic: This community type is characterized by bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass (*Poa secunda*), mixed with cheatgrass, diverse forbs, and where relatively undisturbed, a robust microbiotic crust. This community is widely dispersed throughout the region in sandy and loamy soil types

although it is frequently associated with an understory cover of cheatgrass.

Winterfat/Bunchgrass mosaic: This plant community is primarily composed of winterfat (*Eurotia lanata*) and Sandberg's bluegrass. Overall species diversity is low, however the rare plant Piper's daisy (*Erigeron piperianus*) frequently occurs.

Vegetation within this area has been altered through the establishment of cheatgrass within communities and the resulting shortening of the natural fire return interval (Please see Areas of Greatest Invasive Grass map- Appendix III). Historically, fire return intervals were between 50 to 100 years in the shrub-steppe region (Wisdom et. al. 2000). Fires burned in a complex mosaic pattern across the landscape leaving many healthy remnant stands of bunchgrass and sagebrush. These patterns allowed for the survival of healthy shrub-steppe communities and habitat for wildlife species. The Mile Post 17 Fire is considered more of a complete because 97 to 100 percent of vegetation was affected and because of this rapid natural regeneration will be inhibited.

However, with the current vegetation structure, cheatgrass provides ladder and bridge fuels for fire to quickly spread into and throughout big sagebrush communities, creating larger more frequent fires that burn hotter depleting the shrub component of the shrub-steppe habitat. In addition, cheatgrass matures and dries out early in the year, creating bridge fuel for much of the spring and summer. This often results in fires that occur earlier than historically recorded and before many native grass species have entered summer dormancy creating a more vulnerable disposition to mortality from fires because there is limited time to store energy for next years growth (USFWS 2007).

## 2. Rare Plants

Emergency consultation was held with the U.S. Fish and Wildlife Service Ecological Services Office, Richland, Washington on August 29, 2007 for threatened and endangered (T&E) species known to occur within the Milepost 17 Fire area in Benton, County, Washington. Species lists were obtained using the following web based address:

<http://www.fws.gov/easternwashington/countypercent20speciespercent20lists.htm>. A current list of species considered by the USFWS as Endangered, Threatened or as Species of Concern for the counties in which the fire occurred and GIS data layers of known rare plants for the refuge were consulted. Plant species listed by the USFWS that occur within Benton County and/or taxa considered Endangered Threatened or Sensitive in Washington (WNHP 2007) with known occurrences within the burned area are listed below; species known to occur within the area burned by the Milepost 17 Fire are in bold in the list.

<u>SPECIES</u>	<u>LISTING STATUS</u>
Columbia milk-vetch ( <i>Astragalus columbianus</i> )	FSC/SS
Stiff milk-vetch ( <i>Astragalus conjunctus</i> var. <i>rickardii</i> )	NL (regional endemic)
Small flower evening primrose ( <i>Camissonia minor</i> )	SS
Dwarf evening primrose ( <i>Camissonia pygmaea</i> )	SS

Snake River Cryptantha ( <i>Cryptantha spiculifera</i> )	SS
<b>Piper's daisy</b> ( <i>Erigeron piperianus</i> )	SS
Hoover's desert-parsley ( <i>Lomatium tuberosum</i> )	FSC/SS
Few-flowered purple mat ( <i>Nama densum</i> var. <i>parviflorum</i> )	SW
Coyote tobacco ( <i>Nicotiana attenuate</i> )	SS
Tufted evening primrose ( <i>Oenothera caespitosa</i> )	SS

KEY TO LISTING STATUS:

E	FEDERAL ENDANGERED
T	FEDERAL THREATENED
C	FEDERAL CANDIDATE
FSC	FEDERAL SPECIES OF CONCERN
SC	STATE CANDIDATE
SE	STATE ENDANGERED
ST	STATE THREATENED
SS	STATE SENSITIVE
SW	STATE WATCH LIST
NL	NOT LISTED

The elimination of surrounding vegetation, the potential for invasion by non-native species, combined with erosion due to wind and precipitation over the winter months may result in larger impacts to this species than are currently anticipated. Further, fire rehabilitation plans may call for use of herbicides, reseeding efforts or other management actions that may influence the population of this species (USFWS 2007). Habitats for the plant listed below were 97-100 percent burned during the Milepost 17 Fire. Annual surveys for the next several years should be conducted in appropriate habitat to evaluate impacts from the fire on this rare plant.

**Columbia milk-vetch** (*Astragalus columbianus*) is associated with deep sandy loams and gravelly loams in the shrub-steppe vegetation zone at an elevation range of 500 to 2,100 feet. Low-intensity fires are known to increase numbers of this plant, with a historic fire frequency of approximately 30 to 40 years within its habitat. Columbia milk-vetch finds eroded areas suitable for colonization, however, will not expand in number in these disturbed areas.

**Stiff milk-vetch** (*Astragalus conjunctus* var. *rickardii*), a relatively common milkvetch on the north-facing slopes and summit of Rattlesnake Mountain, has been determined to be a new variety. For many years prior to this determination, it was mistakenly referred to as the variety *reventiformis* (Yakima milkvetch). On the Monument, the milkvetch is scattered in bunchgrass areas along the main ridges of Rattlesnake Mountain where the population includes several tens of thousands of plants. However, the population remains incompletely mapped. The two known locations of the plant are both in Benton County—the large population on Rattlesnake Mountain and a small population in the Chandler Butte portion of the Horse Heaven Hills. The Monument's population is

entirely included within the boundaries of the ALE where it benefits from very limited access and low disturbance levels. Maintenance of public ownership and the current management regime are the most likely methods to ensure the long-term survival and viability of this plant. Basalt milk-vetch's relatively mesic, high elevation habitats support plant communities that appear to be somewhat resilient following fire, and which exhibit lower levels of invasion by non-native species than shrub steppe communities at lower elevations.

**Small flower evening primrose** (*Camissonia minor*) is associated with gravelly basalts, sandy soils, and cryptogamic crusts in the shrub-steppe vegetation zone at elevations ranges of 460 to 1,140 feet. Negative impacts of the burn on this species are expected, but unknown.

**Dwarf evening primrose** (*Camissonia pygmaea*) is found on unstable soil or gravel in steep talus, dry washes, banks and roadcuts. The taxon occurs in habitats that are maintained in an open condition by erosion and the generally harsh environment. Because of the unstable nature of the habitat and the annual habit of the taxon, it is probable that the number, size and location of the populations vary from year to year. There are few known sites of the species in Washington, many of which are small in size. Negative impacts of the burn on this species are expected, but unknown. The plants are emergent and identifiable from June through August; therefore, the fire burned during the appropriate season to impact this plant this growing season and next growing season because the plant may not have reached the mature seeding stage at the time of the fire.

**Snake River cryptantha** (*Cryptantha spiculifera*), is regionally endemic, known from central Washington and eastern Oregon to northeastern California and northern Nevada, east through the Snake River Plains of Idaho, and western Montana. In Washington, the taxon has been found in the Okanogan Highlands, Eastern Cascades and Columbia Basin physiographic provinces. The taxon occurs on dry, open, flat or sloping areas in stable or stony soils. This plant occurs where overall cover of vegetation is relatively low. Based on the species' choice of habitats, it probably does not tolerate direct competition with other herbs or is not able to endure the shade of shrubs or trees. Its ability to grow and reproduce in a relatively harsh environment enables the taxon to colonize areas where others species may not survive (Higgins 1971). Agricultural conversion, grazing, ORV use, and irrigation related groundwater changes are all threats to the species. Identified in Hitchcock et al. (1959) as a synonym for *Cryptantha interrupta* (Greene) Pays. However, the taxa are now treated as distinct, with *Cryptantha spiculifera* occurring in Washington, but not *Cryptantha interrupta*. Due to the lack of species specific information regarding Snake River cryptantha response or relationship to fire, two species of cryptantha were used as a possible indicator of how *C. spiculifera* would respond to a burn event. According to the Craters on the Moon National Monument's Wildfire Management Plan, *Cryptantha spp.* may increase greatly in the years following a fire until perennials dominate the burned site. Also, Cohn states that "native fire followers, such as *Cryptantha micromeres*, were predominant in the first 14 months after a burn. Both of these species accounts would indicate that *C.*

*spiculifera* could possibly benefit from a fire event, at least temporarily. Due to its rare status though, one could assume that a fire would be detrimental to the long-term success of the species.

**Piper's daisy** (*Erigeron piperianus*) is most common in undisturbed areas of the sagebrush steppe. This daisy occurs in dry, open places, often with sagebrush. It grows on level ground to moderate slopes of all aspects at elevations ranging from 400 to 2,250 feet. The soil is typically well drained, and is generally somewhat alkaline. It occurs most commonly in the big sagebrush/bluebunch wheatgrass plant community. Species response to periodic fires is not known. Recent information on Piper's daisy response to fire was gathered following the 24 Command fire of 2000. Post-wildfire monitoring from 2000 to 2004 on the ALE within the Monument suggested that the abundance of Piper's daisy decreased following a large wildfire but gradually recovered over several (3 to 4 years) to pre-fire levels (TNC 2005). This information, however, was generated in an area that is relatively undisturbed and was able to regenerate post-fire with little other disturbance.

**Hoover's desert parsley** (*Lomatium tuberosum*) occurs only on loose talus habitats, typically on east to north facing slopes of 45 to 60 degrees, associated with basalt outcroppings and sparse vegetation. This species occurs within the shrub-steppe vegetation zone at elevations of 600 to 2,300 feet. Negative impacts of the burn on this species are expected, but unknown.

**Few-flowered purple mat** (*Nama densum* var. *parviflorum*) occurs in sandy soils within the shrub-steppe vegetation zone. Negative impacts of the burn on this species are expected, but unknown.

**Coyote tobacco** (*Nicotiana attenuata*) occurs in dry, sandy bottom lands, dry rocky washes, and in other dry open places at elevation ranges from 400 to 10,000 feet. The species occurs in areas that receive periodic natural disturbances. Due to the amount of disturbance to its habitat, both natural and human-caused, *N. attenuata* is associated with several aggressive exotic species that have invaded the habitat and presumably compete for resources. This, combined with the relatively large number of historical collections of the taxon in Washington and the few currently known sites, suggests that the species may be in decline in the state. Negative impacts of the burn on this species are expected but unknown.

**Tufted evening primrose** (*Oenothera caespitosa*) occurs on road cuts, dry hills, arid and rocky slopes in open and wooded areas, and in desert regions. This plant is very diverse ecologically throughout its range, occurring on a variety of substrates, including limestone, volcanic cinders, sandstone, shales, and gypsum, and in a variety of vegetation types, including juniper woodlands (mainly), Arizona chaparral, conifer forests, sagebrush scrub, and grasslands. Negative impacts of the burn on this species are expected, but unknown.

In addition to the species listed above, there is potential for other species considered to

be rare in Washington to occur in the area burned in the Mile Post 17 Fire. This includes species not known to occur in the State at the time the rare plant inventories were conducted, such as the ephemeral annuals spreading pygmyleaf (*Loeflingia squarrosa* var. *squarrosa*) and rosy pussypaws (*Calyptridium roseum*). Over the course of the field survey no evidence of native plant survival had been noted. Seeds from these plants remain in the soil seed bank and will germinate and proliferate. While this may be true, noxious weeds and invasive plants have an evolutionary growth advantage of putting down roots quickly and before most natives and will most likely result in loss of habitat for native and rare species in the freshly burned area.

### **3. Vegetation/Structural Impacts**

Vegetation resources were directly impacted by the Mile Post 17 Fire and by suppression tactics utilized to control the fire. Documented impacts to vegetation resulted from:

- Potential for invasion by aggressive non-native species throughout the disturbed site.
- Impacts to native shrub and grass species during line construction, suppression and mop-up activities
- Vegetation losses and microbial crust loss due to fire intensity. Most grassland communities were completely consumed and/or scorched.
- Construction of disk/dozer lines on previously undisturbed sites.

Most sagebrush, bunchgrass, and cheatgrass communities experienced greater than 90 to 95 percent vegetation loss of above ground cover. It was observed that the fire completely consumed approximately 95 to 100 percent of all vegetation resources within the Mile Post 17 Fire area. Most shrub, grass, and forb species and organic material on the soil surface was consumed indicating extreme fire intensity in areas of cheatgrass invasion.

Negative impacts resulting from vegetation losses include potential for increased non-native species invasion, bare or windblown soils, significant reduction in wildlife habitat, forage for wildlife species, and potential for increased non-native and reduced species diversity. The loss of wildlife habitat and potential impacts to Threatened and Endangered Species are discussed further within the Wildlife Assessment (USFWS 2007).

Ground disturbing impacts to Monument property resulted from and disks, and equipment driving off road during suppression efforts. A complete inventory was conducted of disked lines and dozerlines on the fire area and emergency stabilization needs assessed (Please see Fire Suppression map- Appendix III). More information can be found in the Watershed and Soils section of this report.

The role of microbiotic crusts (MBC) in shrub-steppe ecosystems is still incompletely understood (Evans and Lih 2005) and estimating the magnitude and extent of MBC damage from the Wautoma Fire is a complex task that is beyond the scope of BAER field survey and assessment. Therefore, this assessment can make no definitive conclusions about the condition and location of the MBC and the emergency stabilization measures recommended reflect this finding.

## **D. Vegetation Recovery**

Revegetation of the fire area through natural processes will take between 7-30 years to visually represent pre-fire conditions. However, due to the presence of non-native plants and noxious weeds, the site is at risk of becoming dominated by non-native annuals, such as cheatgrass, Russian thistle and kochia, and aggressive perennial species such as yellow starthistle, rush skeletonweed, perennial pepperweed, Russian knapweed, diffuse knapweed, puncture vine and salt cedar. Without active restoration, it is unlikely that the site will recover to its pre-fire characteristics. Some impacted plant communities will take decades to re-establish back to pre-fire levels and some may be permanently altered. For example, most research indicates that fire eliminates spiny hopsage altogether, and sagebrush and bitterbrush for at least several years. Because native plants such as big sagebrush do not sprout after fire and bitterbrush rarely sprouts in our area, recovery can be very prolonged on many sites. The perennial bunchgrasses may resprout depending on the severity of the burn in specific areas. Cheatgrass tends to burn very hot and quickly for this reason it is unknown the level of bunchgrass regeneration. Of particular concern are the re-establishment of critical sagebrush communities for agency listed T&E wildlife habitat and the protection of the ecological integrity of the shrub-steppe community.

### **1. Noxious Weed Establishment**

Invasive alien plant species pose one of the most serious threats to the native biodiversity, and wildlife habitat which the Hanford Reach National Monument was declared to protect, and for which the entire Hanford Site is well known (Soll et al. 1999). At Hanford, and elsewhere in western North America, invasive and noxious alien plant species compete against and reduce habitat available for rare plant taxa and native plant species in general. Weeds alter ecosystem structure and function, disrupt food chains and other ecosystem characteristics vital to wildlife (including rare and endangered species), and can dramatically alter key ecosystem processes such as hydrology, productivity, nutrient cycling, and fire regime.

Conditions created by wildfire favor the spread of many noxious weed species (Evans, J.R., J.J. Nugent, and J.K. Meisel, 2003). The fire presents a large-scale disturbance and created new open sites vulnerable to weed invasion. This creates a fertile bed for the rapid colonization and spread of non-native species, especially coupled with the added nutrients from the ash. Thus, invasive species and noxious weeds which compete with the recovery native vegetation are likely become established and/or

spread within the burned area.

Control of weed species known on the Monument was prioritized in the Weed Inventory and Management Plan (2003) based on the following criteria: aggressiveness, level/size of infestation, degree of ecological threat or impact, value of habitat surrounding weed infestations, and effectiveness of available control technologies. Priority 1 species that pose the greatest threat and require immediate control. Priority 2 species do not spread quite as rapidly as Priority 1 species, but are still of great concern. Priority 3 species are all other invasive species that are perceived as slightly less likely to threaten Monument resources but are still of concern.

During post-fire reconnaissance and field assessment, wildlife biologists recorded sightings of any non-native or invasive species. In addition, known infestations of invasive species of concern that are located within and near the burned area and their priority for control are listed in the following table. Several of these species are located within the fire area, and others are very near to the fire area (see Invasive Weeds map-Appendix III).

Species	Priority for control
Downy Brome ( <i>Bromus tectorum</i> )	NL
Diffuse knapweed ( <i>Centaurea diffusa</i> )	1
Rush skeletonweed ( <i>Chondrilla juncea</i> )	1
Puncturevine ( <i>Tribulus terrestris</i> )	1
Russian knapweed ( <i>Acroptilon repens</i> )	2
Whitetop ( <i>Cardaria draba</i> )	2
Canada thistle ( <i>Centaurea solstitialis</i> )	2
Kochia ( <i>Kochia scoparia</i> )	3
Perennial pepperweed ( <i>Lepidium latifolium</i> )	3
Common reed ( <i>Phragmites australis</i> )	3

All of these non-native plants and noxious weeds spread vigorously and pose significant threats in the burned area. It is therefore imperative to treat known populations prior to seed-set in order to reduce the expansion potentials of these populations into the burned area; immediate treatment is highly recommended through spray and reseeding methods.

Inventories for targeted invasive plant species throughout the Monument have been conducted on only 30,000 acres (>12000 ha) of the 195,000 acre Monument. These inventories were focused on areas where noxious weeds had been previously reported, on special habitats (e.g., natural springs) where certain target species are expected to occur, and in disturbed lands and dispersal corridors (Evans 2003). Thus, not all of the Monument lands have been surveyed for noxious weeds and some key areas likely to harbor priority invasive species have NOT yet been inventoried. For example, riparian and aquatic habitats were only partially surveyed, and invasive species there are undoubtedly substantially underreported in the current Monument database. Thus, the

burned area is likely to have undocumented occurrences of noxious weeds, and immediate, thorough surveys of the area are important to prevent their unchecked expansion.

Chemical treatment methods should be used within the fire area to achieve prioritized weed control objectives immediately followed by reseeding with Mix 1 or Mix 2 depending on the area. Treatment methodologies should be based upon the best information available from weed management literature and professional experience, tailored to the characteristics of the particular species and site.

Evans and Lih (2005) conclusions support the recommended Wautoma Fire ES measures over natural recovery:

- Careful management... and a long term commitment to integrated and adaptive approaches to invasive species management, fire management and restoration practices will be required to successfully manage the ALE Reserve and other shrub-steppe ecosystems in the coming years.
- Aggressive management activity to control cheatgrass and to enhance the recovery of natural structure and function of sagebrush shrubland stands will be critical to the long-term ecological integrity of these habitats.

The problem of cheatgrass must be addressed in relation to native plant community health and fire management practices. There are no simple answers; no permanent solution to the problem of cheatgrass control is currently available and management is extremely challenging.

## **2. Revegetation**

There are several reasons revegetation is essential at this site. The Mile Post 17 Fire burned significant acreage of native habitat that is at high risk of invasion from non-native species and noxious weeds. Revegetation is critical to protect the plant community and ecology of the site and should be conducted in order to protect soils, reduce the amount of dust and degradation of habitat. As stated above, it is unlikely that the fire area will recover without some intervention and active restoration effort.

Application of herbicide and planting of native seeds (including aerial seeding) to restore areas before invasive species become established is well supported by recent research (Bakker & Wilson, 2004:1058-1064) (Huddleston & Young 2005:507-515) (Thompson & Rounding, 2006) (Seabloom & Harpole 2003). Evans and Lih (2005) stated that the rates of grass seedling emergence and recruitment from aerial seeding efforts they observed were probably typical of broadcast seeding efforts in the arid West. (*This infers that aerial seeding is a typical broadcast seeding practice in similar arid areas of the Western U.S.* To sum, Evans and Lih (2005) recommended that additional management intervention will be required to stabilize soils, suppress invasive species and promote recovery and the most optimistic scenario for the full recovery of shrub-steppe qualities on the Arid Lands Ecology Reserve involves many years of continued

planting and monitoring, persistent efforts at weed and fire management, and years of patience as restored stands slowly develop. The following ES measures support Evans' and Lih's 2005 recommendations.

#### **IV. RECOMMENDATIONS**

##### **A. Fire Suppression Stabilization:**

Suppression account -Dozer/Disk line Rehabilitation- Drill-seed all disturbed areas which resulted from suppression actions with native seed species to protect the ecological integrity of the area. Seeding will be postponed until fall or until such time as adequate moisture provides a firm seedbed for stabilization actions.

##### **B. Emergency Stabilization: (specification related)**

- The following recommendations are offered to stabilize soil to prevent loss or degradation of productivity by seeding to prevent establishment of invasive plants; and direct treatment of invasive plants and by using integrated pest management techniques to minimize the establishment of non-native invasive species within the burned area.
- 1) Non-Native Invasive Species Control: Herbicide Spray followed with Native Plant Seeding- Apply herbicide spray to significantly reduce invasive weed spread and diminish threats in areas of concern from noxious weeds and non-native species. Spray should be applied to avoid high wind storms. Follow the spray with aerial and drill seeding of native plants Mix 1 and Mix 2 in the fall to establish prolific native colonies and minimize invasive weed infestation into non-infested areas. Seeding methods should follow weather patterns to determine times of appropriate seeding considering expected moisture and wind.
  - 2) Effectiveness Monitoring: Monitor non-native invasive species growth and native plant seedings in first year following treatment to determine success of revegetation efforts and to determine if additional treatments are required to protect and maintain the ecological integrity of the site.

##### **C. Rehabilitation (non-specification related treatments)**

- Submit long-term rehabilitation plan as required to stabilize soils, control non-native invasive species and protect ecological integrity of the site.

##### **D. Management Recommendations (non-specification related)**

- Coordinate emergency stabilization needs with the Department of Energy and the Washington Department of Transportation to ensure public safety is protected along county roads and state Highway 240. A meeting of USFWS and ODOE staff was conducted on August 29, 2007 to coordinate anticipated emergency stabilization activities including dust control.
- Increase law enforcement patrols through the fire area until vegetation is re-established.

- Monitoring: Invasive Plant Species- Develop monitoring protocols and conduct field inventories on disturbed sites including but not limited to dozerlines, handlines, safety zones, and initiate control measures on invasive species infestations that threaten native plant community recovery as discovered.

## **V. Consultations:**

Carol Mallory-Smith, President National Weed Management Association. Head Chair of Weed Management Department and Professor at Oregon State University.

Bob Parker, Eastern Washington Extension Weed Scientist, Professor at University of Washington.

Don Morishita, Idaho Extension Weed Scientist.

Kevin Goldie, USFWS. Hanford Wildlife Refuge National Monument.

Heidi Newsome, USFWS. Hanford Wildlife Refuge National Monument.

Ron Hamill, Cryptogam Research Inc.

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**BURNED AREA EMERGENCY STABILIZATION PLAN  
MILEPOST 17 FIRE  
WILDLIFE RESOURCE DAMAGE ASSESSMENT**

**I. OBJECTIVES**

- Assess effects of fire and suppression actions to 1) Federal species with special status [species listed as endangered, threatened, proposed, candidates or species of concern under the Endangered Species Act (ESA)]; 2) State species of concern [(species listed as endangered, threatened, sensitive or candidates by the Washington Department of Fish and Wildlife (WDFW)]; and 3) species of Tribal Importance. This assessment covers birds, mammals, amphibians, reptiles, fish, insects and their habitat.
- Assess effects of fire and suppression action to habitat improvements.
- Assess effects of proposed emergency stabilization actions to covered species and habitat.
- Initiate Emergency Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS) and NOAA's National Marine Fisheries Service (NMFS) if required by the ESA.

**II. ISSUES**

- 16 State and/or Federally-listed wildlife species occur within the fire area, most of which are dependent on the shrub-steppe plant community.
- Potential effects to these species from the fire, suppression actions and potential post fire effects to shrub-steppe obligate species.
- Potential effects to these species from proposed emergency stabilization actions.

**III. OBSERVATIONS**

**A. Background**

The purpose of this Burn Area Emergency Stabilization (ES) Wildlife Assessment is to assess the effects of the Milepost 17 Fire, suppression actions, proposed emergency stabilization work, and potential post fire erosion, to all Federally-listed, State-listed, agency-sensitive, and culturally-significant species and their habitats which may be directly or indirectly-affected by the fire. This assessment also includes documentation of Emergency Section 7 Consultation, if required by the ESA, with U.S. Fish and Wildlife Service and NMFS. The species list is included in Appendix IV of this report. The species list for the fire area was developed with the assistance of Heidi Newsome, Wildlife Biologist and Kevin Goldie of the U.S. Fish and Wildlife Service, Hanford Reach National Monument (the Monument)/Saddle Mountain National Wildlife Refuge (SMNWR). Species presence is based on formal surveys and habitat inventories conducted on Arid Lands Ecologic Reserve (ALE) lands prior to the Milepost 17 Fire, and post fire reconnaissance. Documents, inventory data, sighting records, vegetation maps and other species-specific information used in this report are on file at the Monument office.

The Monument was created on June 9, 2000. At that time, President Clinton directed the U.S. Fish and Wildlife Service to manage the Monument to protect all of the species associated with the shrub-steppe ecosystem. Included in the Memorandum of Understanding between U.S. Fish and Wildlife Service and DOE for management of the Monument, the primary objective of the U.S. Fish and Wildlife Service is to ensure that the Monument is operated and managed for the protection and preservation of the native shrub-steppe habitat and its associated wildlife species. The Federal agencies are also responsible for managing species of importance to the Native American Tribes.

The Monument is located in the Pacific Flyway. Habitats within the fire area serve as nesting and resting areas for many species of migratory birds. The Monument includes habitat for many wildlife species, including 44 mammals, 258 birds, 5 amphibians, 12 reptiles, 49 butterflies, 318 moths, and 151 taxa of aquatic macroinvertebrates (HRNM/SMNWR 2006). Species diversity on the Monument can be attributed to the size, diversity, and relatively undisturbed condition of the native shrub-steppe habitat and the proximity of the free-flowing Columbia River.

## **B. Reconnaissance Methodology**

Information used in this assessment is based on a review of relevant literature, agency management planning documents, agency wildlife sighting and habitat inventory data, communication with U.S. Fish and Wildlife Service, and reconnaissance of the fire area on August 28, 2007. The BAER team reconnaissance figure shows the location where the field assessment occurred on August 28. Habitat information and mapping for the various species is based on review of agency records and post fire reconnaissance. To assess effects to species and vegetation recovery, reconnaissance and analysis included review of BAER Plans from a 2000 fire (24 Command Fire) that encompassed the Milepost 17 Fire (USFWS 2000). Representative photos taken of burned areas during post-fire reconnaissance are located in the appendix.

## **C. Findings**

To better understand the species and habitat information discussed in this wildlife assessment, it is important to review the Milepost 17 Fire ES Vegetation and Watershed/Soil Resource Assessments. Those chapters contain more detailed descriptions of pre-fire vegetation, post-fire vegetative and soil stabilization measures, and effects to the watersheds.

The purpose of this assessment is to discuss the potential effects of the fire, suppression actions and proposed emergency stabilization activities to Federally-listed and State-listed and sensitive species which occur within the fire area (USFWS 2000). Effects to wildlife species without special Federal or State status are not discussed. This assessment is not intended to definitively answer the many questions about effects to specific species that are inevitably raised during an incident such as the Milepost 17 Fire. Rather, the focus of this assessment is to identify immediate, emergency actions that may be necessary to prevent further effects to these species. Because the species discussed in this assessment have

ranges or territories which extend beyond the fire area, the assessment includes information at a larger scale that crosses land ownership boundaries for species which may require assessment for long-term rehabilitation or restoration (USFWS 2000).

## BIOLOGICAL EVALUATION

Direct effects as described in this report refer to mortality or disturbances that result in flushing, displacement, or harassment of the subject animal. Indirect effects refer to modification of habitat and/or effects to prey species.

### SHRUB-STEPPE DEPENDENT WILDLIFE SPECIES

The community of plants and animals found in this area represents one of the largest remaining examples of the shrub-steppe ecosystem that once covered the Columbia River Basin (USFWS 2000). Termed a biological treasure, the Monument contains rare, rich, and diverse shrub steppe ecosystem flora and fauna that have been lost elsewhere due to habitat conversion, fragmentation, and application of pesticides. The shrub-steppe ecosystem supports an unusually high diversity of native plant and animal species, including significant breeding populations of nearly all steppe and shrub-steppe dependent wildlife native to the area, and provides rare and unique habitat that is critical for meeting USFWS regional, national and ecosystem goals and objectives. This area serves a critical role in contributing to the local, regional, national, and international ecological integrity of the shrub-steppe ecosystem (USFWS 2000).

While fire has played an integral role in the history of the shrub-steppe environment, the region's historical fire regime has been greatly altered by socio-political and economic factors (USFWS 2000). Coupled with the arrival of invasive species and noxious weeds, these mechanisms have weakened the natural recovery processes of the shrub-steppe ecosystem from disturbance events such as fire. Managing for biological integrity in this area necessitates that actions be taken to mitigate the ecological effects increasing fire frequency and intensity, and invasion of exotic species (USFWS 2000).

The Milepost 17 Fire eliminated plant communities that survived the 24 Command Fire or were planted following the 24 Command Fire. A total of 4,096 acres of shrub-steppe habitat was damaged. Damaged habitat consisted mainly of bunchgrass and winterfat/bunchgrass mosaics. Furthermore, the Milepost 17 Fire eliminated areas of big sagebrush and big sagebrush-rabbitbrush complexes that were rehabilitated following the 24 Command Fire. In addition, fire suppression activities (establishment of a disk/blade line primarily on the Milepost 17 Fire perimeter) impacted approximately 35.4 acres of habitat (primarily bunchgrass).

Bunchgrass is a food source and/or provides nesting, resting, thermal, and escape cover for a wide variety of species. Wildlife species recorded in or adjacent to the Milepost 17 Fire area that are dependent on bunchgrass and have special Federal or State listing status or Tribal importance include: Ferruginous hawk, burrowing owl, golden eagle, loggerhead shrike, sage sparrow, sage thrasher, western sage grouse, Townsend's ground squirrel,

Merriam's shrew, pygmy rabbit, black tailed jackrabbit, white-tailed jackrabbit, elk, mule deer, sagebrush lizard, and striped whipsnake.

**CUMULATIVE FIRE IMPACTS ON THE MONUMENT:** The Milepost 17 wildlife assessment follows several other assessments conducted because of large wildfires within the Monument area. These fires encompassed formerly burned areas that have not had time to regenerate to the point of supporting some species that depend on mature bunchgrass. The cumulative effect of many large fires over a short time frame within the Monument area has exacerbated the impact to shrub-steppe dependent wildlife (see section on Cumulative Impacts of Fire on HRNM in Executive Summary).

**Wildlife Species of Concern:**

**Overlook Fire Species List**

On August 20, 2007, an inventory of currently listed or special status Federal species that could potentially occur in Benton County was obtained from U.S. Fish and Wildlife Service, Ecological Services Field Office in Wenatchee Washington ([http://www.fws.gov/easternwashington/county\\_percent20species\\_percent20lists.htm](http://www.fws.gov/easternwashington/county_percent20species_percent20lists.htm)). Concurrently, an up-to-date list was obtained of similar species likely to occur in the Columbia River Basin and under the jurisdiction of NMFS (<http://www.nwr.noaa.gov/ESA-Salmon-Listings>). From this broad inventory, a list of species more specific to the Milepost 17 Fire area and adjacent lands was obtained through consultation with Heidi Newsome and Kevin Goldie of the U.S. Fish and Wildlife Service on 29 August 2007.

The following species list summarizes all wildlife species under the jurisdiction of the Monument that could have been affected by the Milepost 17 Fire, suppression efforts, and post-fire stabilization measures. For plant species of concern see the Vegetation Assessment.

<u>SPECIES</u>	<u>LISTING STATUS</u>
Ferruginous hawk, <i>Buteo regalis</i>	FSC/ST
Golden eagle, <i>Aquila chrysaetos</i>	SC
Loggerhead shrike, <i>Lanius ludovicianus</i>	FSC/SC
Sage sparrow, <i>Amphispiza belli</i>	FSC/SC
Sage thrasher, <i>Oreoscoptes montanus</i>	FSC/SC
Greater sage grouse, <i>Centrocercus urophasianus</i>	C/ST
Burrowing owl, <i>Athene cunicularia</i>	FSC/SC
Merriam's shrew, <i>Sorex merriami</i>	SC
Townsend's ground squirrel, <i>Spermophilus townsendii townsendii</i>	SC
Pygmy rabbit, <i>Brachylagus idahoensis</i>	E/SE
Black-tailed jackrabbit, <i>Lepus californicus</i>	SC
White-tailed jackrabbit, <i>Lepus townsendii</i>	SC
Long-eared myotis, <i>Myotis evotis</i>	FSC
Townsend's big-eared bat, <i>Corynorhinus townsendii</i>	SC

Sagebrush lizard, <i>Sceloporus graciosus</i>	FSC/SC
Striped whipsnake, <i>Masticophis taeniatus</i>	SC
Elk, <i>Cervus elaphus</i>	TI
Mule deer, <i>Odocoileus hemionus</i>	TI

The following list of species was identified as occurring, or having habitat, within Benton County. Through post fire-reconnaissance and consultation with local experts, it was determined that these species were likely not affected by the Milepost 17 Fire because they have no habitat within or adjacent to the Milepost 17 Fire area, and/or inventories prior to the Milepost 17 Fire determined absence, or the fire-affected area is outside of the species range or season of use, or the species is migratory through the area affected by the fire. Therefore, the following species will not be covered in great detail in the balance of the assessment.

Upper Columbia River spring Chinook salmon, <i>Onchorynchus tshawytscha</i>	E/SC
Middle Columbia River steelhead, <i>Onchorynchus mykiss</i>	T/SC
Upper Columbia River steelhead, <i>Onchorynchus mykiss</i>	E/SC
Bull trout, <i>Salvelinus confluentus</i> <i>Columbia River distinct population segment</i>	T/SC
California floater, <i>Anodonta californiensis</i> , mussel	FSC/SC
Giant Columbia spire snail, <i>Fluminicola columbiana</i>	FSC/SC
Bald eagle, <i>Haliaeetus leucocephalus</i>	FM/ST
Peregrine falcon, <i>Falco peregrinus</i>	FSC/SS
Northern goshawk, <i>Accipiter gentiles</i>	FSC/SC
Sandhill crane, <i>Grus canadensis</i>	SE
Great blue heron, <i>Ardea herodias</i>	TI
Lewis' woodpecker, <i>Melanerpes lewis</i>	SC
Yellow-billed cuckoo, <i>Coccyzus americanus</i>	C/SC
Pallid Townsend's big-eared bat, <i>Corynorhinus townsendii pallescens</i> FSC/SC	
Pacific lamprey, <i>Lampetra tridentata</i>	FSC
Redband trout, <i>Oncorhynchus mykiss</i>	FSC
River lamprey, <i>Lampetra ayresi</i>	FSC
Western brook lamprey, <i>Lampetra richardsoni</i>	FSC
Margined sculpin ( <i>Cottus marginatus</i> )	FSC/SS
Columbia clubtail ( <i>Gomphus lynnae</i> ), dragonfly	FSC

#### KEY TO LISTING STATUS:

E	FEDERAL ENDANGERED
T	FEDERAL THREATENED
C	FEDERAL CANDIDATE
FSC	FEDERAL SPECIES OF CONCERN
FM	FEDERAL MONITOR

SC	STATE CANDIDATE
SE	STATE ENDANGERED
ST	STATE THREATENED
SS	STATE SENSITIVE
TI	TRIBAL IMPORTANCE

## **FERRUGINOUS HAWK**

Ferruginous hawks are a Federal species of concern, a Federal Migratory bird of Conservation Concern (USFWS 2002) and a State threatened species. Ferruginous hawks are migratory raptors that occur on the Monument during the breeding season from early March through August (USFWS 2000). The incubation period is 28 to 33 days with fledging at 44 to 48 days from the date the egg is laid. There are 7 historical nests on the ALE lands in steep exposed basalt canyons associated with Rattlesnake Mountain. (see Wildlife Species of Concern Map). Additional nests are located on Rattlesnake Mountain, but outside the burn perimeter. Ferruginous hawks forage widely both on the site and in surrounding areas. The Milepost 17 Fire area is well within the foraging area for these active nesting territories. It should be noted, however, that nesting raptors are not monitored every year on the Monument, and historic nest locations may be re-used in later years. Ferruginous hawks demonstrate nest site fidelity, returning to the same nesting territories in subsequent years. The fact that some territories within and adjacent to the Milepost 17 Fire area were not used during this season does not mean they would not be viable in future years. Many territories in Eastern Washington are unoccupied due to the current decline in the State-wide population of ferruginous hawks. Available nesting territories are not currently thought to be limiting the population and, if the population rebounds, currently unoccupied areas may become occupied (Watson 2003). Ferruginous hawks are sensitive to human presence, and will abandon their nests if subject to human encroachment. Activities (especially those that are noisy) near nesting sites should be limited during the breeding and fledging season (USFWS 2000).

Ferruginous hawks prey on a variety of mammals, birds, reptiles, and insects, depending upon local area and prey abundance. These hawks may forage up to 15 km (approximately 9 miles) from their nest site; however, nest success may be greater in areas where abundant forage is in close proximity to the nest location. Areas where prey densities are high generally have more successful nesting attempts. The average home range size of ferruginous hawk in Washington may be as large as 7,660 acres (31 sq. km = 11 sq. miles), based on hawks traveling considerable distances to forage (WDFW 1996).

**FIRE IMPACTS:** The entire 4,708 acres of the Milepost 17 Fire can be considered Ferruginous hawk habitat. Because the Milepost 17 Fire occurred in mid-August, ferruginous hawks were likely present during the fire, but adults and fledglings are mobile enough to escape the burn area and suppression activity. Furthermore, nest sites are far removed from the burn area and thus no disturbance to nesting activity likely occurred.

Other impacts to Ferruginous hawks from the Milepost 17 Fire and suppression activity are

indirect and include a reduction of habitat diversity that supports prey for ferruginous hawks and decrease of habitat for foraging. The WDFW considers the ferruginous hawk a Priority Species for management and recognizes that the species benefits from land-use practices that ensure an adequate prey base. WDFW recommends that landowners/managers should protect shrub-steppe and grassland habitats that harbor significant populations of small mammals and other prey (Richardson et. al. 2004). Further, to promote habitat stability and to benefit ferruginous hawk prey populations, WDFW recommends reseeding of native plant species after chaining or burning (Richardson et al. 2004, Olendorff 1993). Therefore, stabilization and rehabilitation of the habitat lost in the Milepost 17 Fire is essential to support an abundance of prey species and to develop critical foraging habitat for the ferruginous hawk.

### **LOGGERHEAD SHRIKE**

Loggerhead shrikes are a Federal species of concern, listed as a Migratory bird of Conservation Concern (USFWS 2002), and are a State candidate for listing as a threatened species. The Loggerhead shrike is a neo-tropical migrant species that breeds on the Monument (USFWS). During the breeding season, there were documented sightings of shrike in the Milepost 17 Fire area, within remaining big sagebrush habitat on the northwest section of ALE lands (see Vegetation and Wildlife Species of Concern Maps).

Loggerhead shrikes are common on the Hanford site from early March until the end of August (USFWS). After August, numbers are reduced, but individuals have been sighted through early November. Loggerhead shrikes require mature sagebrush, or other shrubs, for breeding and foraging habitat. Shrikes are most abundant in habitats of relatively-high horizontal and vertical structural diversity (Poole 1992). This species builds its nest within shrubs, and requires some sort of shrub or other habitat feature when foraging for and impaling its prey. The species is well-known for its unusual and complex behavior of impaling prey on sharp objects in conspicuous places or wedging prey in narrow V-shaped forks (Yosef 1996). The primary prey items of this species are insects (e.g., beetles and grasshoppers), although small mammals, small birds, and lizards are also taken as prey (Yosef 1996). Loggerhead shrikes are highly territorial, and they exhibit a high level of nest site/territory fidelity. Poole (1992) found that shrikes defended territories averaging 34.4 acres ( $\pm 4.9$  ac) on the Hanford Site in Washington. Also on the Hanford Site, of 113 territories studied, 96 percent were reoccupied the following season (Poole 1992). Shrikes remain in breeding territories as fledglings for 3 to 4 weeks after leaving the nest. This post-fledging period is the time of highest mortality for shrikes, when young birds are weak fliers and are vulnerable to predation (Poole 1992).

The loggerhead shrike is one of the few North American passerines whose populations have declined continent wide in recent decades (Yosef 1996), and Washington Breeding Bird Survey data for the Columbia River Basin show a significant decline in the shrike population over the last 26 years (Vander Haegen 2004). Burning and wildfires may create the greatest risk to local shrike populations because the damage is immediate and regeneration to pre-burn condition may take up to 30 years (Harniss and Murray 1973).

**FIRE IMPACTS:** Loggerhead shrikes were likely present in habitat adjacent to the Milepost

17 Fire. Adults and fledglings that were present in adjacent lands were far enough removed to avoid fire and suppression impacts. The 4,096 acres of bunchgrass mosaic that was burned in the Milepost 17 Fire is apparently not used by Loggerhead shrike (see Wildlife Species of Concern map). Impacts from the Milepost 17 Fire to the shrikes are indirect and include temporary loss of prey base in the burn area. Individual loggerhead shrikes were observed during post-fire reconnaissance in adjacent habitats.

The WDFW considers the shrike a Priority Species for management and provides the following management recommendations for loggerhead shrike habitat: retain shrub-steppe communities, especially big sagebrush and mixed shrub communities, avoid wildfires and activities that may increase invasion by exotic vegetation, and avoid management activities that increase cheatgrass (*Bromus tectorum*) invasion or increase risk of wildfire (Vander Haegen 2004, Leu and Manuwal 1996). Stabilization the habitat within the Milepost 17 Fire area is critical for Monument management of this declining species.

### **SAGE SPARROW**

Sage sparrows are a Federal Migratory bird of Conservation Concern (USFWS 2002), and a State candidate for listing as a threatened species. Sage sparrows are a migratory sparrow present in the Columbia Basin during the breeding season from early February until the end of September (USFWS 2000). Sage sparrows prefer semi-open habitat with evenly-spaced shrubs 1 to 2 meters high (Martin and Carlson 1998). This species is associated with sagebrush throughout its range. Sage sparrows forage on the ground for seeds and invertebrates. On the Monument/ SMNWR, sage sparrows are abundant in areas that retain big sagebrush communities. The Hanford Site, along with the Yakima Training Center to the west, supports the largest contiguous habitat patches in Washington. Exceptional habitats with apparent high densities of sage sparrows are found in big sagebrush stands along the base of the Saddle Mountains, throughout sagebrush habitats on the Columbia River plains, and within Central Hanford. Sage sparrows are confirmed breeders on the site, and they frequently raise more than one brood per season. They are territorial and exhibit site fidelity to nesting territories. Flocks of juveniles are frequently observed along roadsides from late May throughout the beginning of August (USFWS 2000).

**FIRE IMPACTS:** Sage sparrows were present during the Milepost 17 Fire, but in adjacent habitat. Adults and juveniles were far enough removed from the Milepost 17 burn area to avoid fire and suppression-related impacts, The 4,708 acres of bunchgrass mosaic that was burned in the Milepost 17 Fire was not used by sage sparrow (see Vegetation and Wildlife Species of Concern Maps). Indirect impacts to sage sparrow include loss of forage habitat and concomitant temporary loss of prey.

The increasing frequency and intensity of range fires in Great Basin pose significant threat to native grasses and shrubs. Historically, fires were infrequent, and perennial grasses and shrubs were not adversely affected. With increased fire frequency, native plants are killed and seed reservoirs of grasses and shrubs are depleted and replaced with exotic annuals, such as cheatgrass. Sage sparrows abandon former habitats once invaded by cheatgrass (Martin and Carlson 1998). Thus, replacement of native vegetation by cheatgrass in areas

disturbed by the Milepost 17 Fire will decrease the available habitat for sage sparrows. Because sage sparrows require open areas and bare ground for foraging, changes in vegetation structure and loss of sagebrush due to the Milepost 17 Fire will impact foraging by sage sparrows. Stabilization of this area to prevent the spread of cheatgrass is essential to maintain foraging habitat for sage sparrows.

### **SAGE THRASHER**

A State candidate species, the sage thrasher is found on the Monument primarily in patches of big sagebrush and three-tip sagebrush (see Vegetation and Wildlife Species of Concern Maps). Sage thrashers are a neotropical migratory bird species present at the Monument in low numbers from early April through September (USFWS 2000). The sage thrasher is a species that is highly dependent on healthy shrub-steppe communities comprised of tall, dense sagebrush. Sage thrashers are closely associated with sagebrush and are considered obligates of sagebrush communities (Vander Hagen 2003).

To maintain sage thrasher populations, shrub-steppe communities should be left in reasonably undisturbed condition and fragmentation should be minimized. Management activities that increase cheatgrass invasion or increase risk of wildfire also must be avoided (Vander Hagen 2003). Burning may lead to serious negative impacts to local sage thrasher populations because the damage is immediate and habitat regeneration to pre-burn condition may take up to 30 years (Harniss and Murray 1973).

**FIRE IMPACTS:** Sage thrashers were present in suitable habitat removed from the Milepost 17 Fire and thus were not directly impacted by the fire or suppression actions. The Milepost 17 Fire did not damage habitat suitable for sage thrasher. Indirect effects include a loss of foraging habitat and a temporary decrease in prey abundance.

### **GREATER SAGE GROUSE**

Greater sage grouse are listed as a State-threatened and the Columbia Basin distinct population segment is a candidate for Federal listing as threatened. Two small, disjunct remnant populations of sage grouse occur in Washington (USFWS 2000). One population is in Douglas County approximately 75 miles north of Hanford, and the second is on the Army's Yakima Training Center (YTC) in Yakima and Kittitas Counties just northwest of the Hanford Site. The Douglas County population is estimated at approximately 600 birds and the YTC population at approximately 200 birds. As recently as 1999 the YTC population appears to have begun to expand into that portion of the Monument included in the ALE Unit. Several sage grouse sightings were made in 1999 and 2000 in the vicinity of Rattlesnake Springs and Benson Ranch (USFWS 2000). However, no more recent sightings have been recorded (see Wildlife Species of Concern Map).

Greater sage grouse nesting habitat in southeastern Washington is primarily sagebrush-steppe vegetation that is of relatively high quality (dominated by native species) (USFWS 2000). Sagebrush intermixed with tall bunch grasses provides cover required for successful nesting. Brood-rearing habitat includes the shrubs and tall grasses for escape cover, but also must include a mix of native forbs that provide both insects and high protein vegetation. Sagebrush is an essential element for sage grouse during the late fall, winter

and early spring, when the leaves of sagebrush make up as much as 99 percent of the birds' diet (USFWS 2000).

An interagency working group was established in 1998 to assist with the recovery of the sage grouse in Washington (USFWS 2000). Several agencies (U.S. Army, USFWS, WDFW, DOE, and the Yakama Nation) are working to preserve and restore sage grouse in eastern Washington. It is noteworthy that the Hanford Site property (Monument area) was identified as one of the few large land areas having contiguous and high quality habitat suitable for sage grouse recovery and expansion (USFWS 2000).

**FIRE IMPACTS:** Because no sage grouse were apparently present during the fire and none of their preferred habitat was disturbed, no direct impacts to sage grouse resulted from the Milepost 17 Fire or fire suppression. The burned area is susceptible to cheatgrass invasion if such nuisance species are not controlled. If cheatgrass becomes established, big sagebrush may take longer to return to these areas and delay recovery of the western sage grouse. Within the big sagebrush community, the forbs and invertebrates which are the preferred food for this species were effectively eliminated throughout most of the fire area.

Due to the significant amount of habitat cumulatively lost, and because any remaining sagebrush on ALE lands does not occur in the large segments apparently needed for community survival, it is expected that this area will not support sage grouse for 30 or more years (USFWS 2000). Because germination and growth of shrub species depends upon amount and timing of available moisture, the arid nature of the site may further delay recovery.

## **BURROWING OWL**

Western burrowing owls are a Federal species of concern, a Migratory bird of Conservation Concern (USFWS 2002), a State candidate species, and a State priority species. Burrowing owls are small ground-dwelling species associated with dry, open, short grass, or desert and are often linked with burrowing mammals (USFWS 2000). Foraging areas are typically short grass dominated habitats; food items include predominately invertebrates and small mammals, and occasionally small birds and reptiles. Within the Columbia Basin, burrowing owls are primarily migratory and are present from February through early August, although a few individuals over-winter. The Western burrowing owl is thought to be declining throughout central Washington and much of its range in North America. It is also apparently declining at the Hanford Site. Once thought relatively common, burrowing owls are now rarely observed. The regional decline of ground squirrels, which provide nesting sites for these burrowing owls, is possibly linked with the apparent decline in burrowing owl populations. The potential decline in population is not unique to the Monument and may be characteristic of the species population trend throughout eastern Washington. Loss and degradation of habitat throughout the Columbia Basin from a variety of factors, including wildfire, has likely contributed to the decline of this species (USFWS 2000).

There are some currently-active burrows along the perimeter of the fire area and approximately 9 historic burrows in adjacent lands (see Wildlife Species of Concern Map). Several patches of land adjacent to the fire area serve as potential habitat for burrowing

owls, because the denning and foraging activity of larger mammals has created burrows of suitable size for the owl.

**FIRE IMPACTS:** Given the mid-August timing of the Milepost 17 Fire, it is possible that some adult or juvenile burrowing owls were directly affected by the fire. Although burrowing owls are mobile and can fly, their habit is to run and/or hop along the ground (USFWS 2000). During the breeding cycle, the owls are tied to their nest burrow locations and retreat to the burrow for protection from avian predators. If they were present in the area of the fire, burrowing owls may have been killed during the fire due to this nest-centered behavior. Seeking refuge within the burrow may have exposed individual owls to extreme heat and/or asphyxiation by smoke. More probable impacts to burrowing owls from the Milepost 17 Fire and suppression measures are indirect and include; impacts to invertebrate and small mammal prey populations, a reduction of habitat diversity that supports prey for burrowing owls, and reduction of habitat for foraging burrowing owls. The elimination of shrubs effectively reduces almost all natural perch locations for burrowing owls. Shrubs are also important to burrowing owls as thermal cover, since adults and juvenile owls seek the shade of shrubs during mid-day periods. Further, elimination of shrub cover may expose small mammals to higher predation rates and consequently may reduce the local abundance of small mammal prey species. Burrowing owls are also prey for other raptor species. Reduced plant biomass, and loss of cover could result in a higher predation rate on individual burrowing owls within the burn area (USFWS 2000). Loss of approximately 4,096 acres of bunchgrass mosaic in addition to the removal of small native shrubs from the landscape will impact burrowing owls. This loss is combined with cumulative losses due to repeated fires on the Monument area (see section on Cumulative Impacts of Fire on HRNM in Executive Summary). Clearly, stabilization of the grassland and shrubland habitat on ALE lands that supports burrowing owls will make this area more viable as burrowing owl habitat in the future. Without stabilization and rehabilitation, it is unlikely that burrowing owls would use this area in the future.

### **GOLDEN EAGLE**

The golden eagle is a State candidate species. Golden eagles have been observed in the fire area in the past and are considered to be a year round, uncommon species. Because the habitat is unsuitable, there are no records of nest sites within the burned area (USFWS 2000).

**FIRE IMPACTS:** If golden eagles were present during the fire, they would have been temporarily displaced due to the fire and suppression actions, including use of helicopters and airplanes. Prey species that were dependent on the bunchgrass plant community were reduced. However, remaining prey species will have less vegetation to use for hiding cover, therefore hunting for prey items may be easier for Golden eagles in the short-term (USFWS 2000).

### **TOWNSEND'S GROUND SQUIRREL**

Townsend's ground squirrel, a State candidate species, has been observed in the area burned by the Milepost 17 Fire and adjacent habitat. The Townsend's ground squirrel has recently been recognized as a species that only occurs in Washington

(<http://www.washington.edu/burkemuseum/collections/mammalogy>). It forms large colonies and groups are restricted to the area north of the Yakima River and west and south of the Columbia River. It prefers arid desert with open sagebrush and grassland habitats, but is also found associated with greasewood. Several colonies near the Milepost 17 Fire have been inventoried as recently as 2006 (see Wildlife Species of Concern Map). The Townsend's ground squirrel is gray colored with no spots and a short tail that is reddish below. In June or July, aestivation begins and continues until winter hibernation. The species breeds soon after hibernation ends in late January to early February and young are born by mid-March. Townsend's ground squirrel forage on sagebrush flats and eat seeds and green plant parts-often climbing bushes to reach them. Adults dig two burrows, the larger of which serves as the home burrow. The home burrow can be at least 50 feet long and up to 6 feet deep (<http://www.washington.edu/burkemuseum/collections/mammalogy>). This species is often preyed upon by badger. The fire damaged approximately 4,096 acres of potential habitat for Townsend's ground squirrel based on the presence of colonies prior to the Milepost 17 Fire.

**FIRE IMPACTS:** Any Townsend's ground squirrels present in the burned area would have been hibernating during the fire. However, depending upon heat and fire intensity, animals may have suffered mortality within their burrows. Because they require shrub habitat for hiding cover as well as protection from predation, the fire and suppression activity indirectly impacts Townsend's ground squirrels through shrub removal. Further, the potential conversion of native bunchgrass areas to annual grasses (cheatgrass) will impact the habitat for Townsend's ground squirrels.

Regionally, the loss of 4,096 acres of potential habitat represents a significant decrease of suitable habitat for this species. The cumulative loss, however, due to repeated fires on the Monument area is even more substantial (see section on Cumulative Impacts of Fire on HRNM in Executive Summary). The habitat loss on ALE lands may delay or prohibit recovery of the Townsend's ground squirrel in Washington. If the areas could be stabilized, these acres represent potential habitat on ALE lands.

### **COLUMBIA BASIN PYGMY RABBIT**

The Columbia Basin pygmy rabbit was emergency listed as a Federally endangered species in November of 2001. This species is extremely rare in Washington, occurring only in the Great Basin portion of the Lower Columbia Basin (USFWS 2000). Prior to 1984, a small population was recorded with the burn area on Rattlesnake Mountain above Snively Springs (see Wildlife Species of Concern Map). The pygmy rabbit is limited to habitat types which contain tall dense sagebrush and specific soils for constructing its burrows (limited sand content). Field observations of the pygmy rabbit indicate heavy reliance on sagebrush, primarily on the seed heads and vegetative leaders. Pygmy rabbit diet is comprised of 99 percent sagebrush in winter and 51 percent in summer (USFWS 2000).

**FIRE IMPACTS:** Because they were not present on ALE lands during the Milepost 17 Fire and no suitable habitat was burned, no direct impacts to pygmy rabbit were likely to have occurred. The stabilization of sagebrush cover in this area is critical for developing potential habitat and reintroduction areas for pygmy rabbit, as well as the eventual recovery of

pygmy rabbit in Washington (see section on Cumulative Impacts of Fire on HRNM in Executive Summary). Continued habitat loss or delayed recovery of suitable habitat may prohibit recovery of the pygmy rabbit in the State (USFWS 2000).

**PROPOSED EMERGENCY STABILIZATION IMPACTS:** Emergency stabilization measures proposed for dust abatement and invasive plant species control on ALE lands burned in the Milepost 17 Fire will not adversely affect pygmy rabbits or suitable habitat. In fact, pygmy rabbits may benefit from such stabilization measures in the long-term.

### **MERRIAM'S SHREW**

Merriam's shrew is a State candidate species. It prefers dry habitats and is generally found in sagebrush and grasslands of Western North America (USFWS 2000). On the Hanford site, this species has been documented to occur in association with three-tip sagebrush at the higher elevations on the ALE. The Merriam's shrew uses burrows created by the sagebrush vole and other burrowing mammals. The diet of this shrew includes caterpillars, beetles, crickets, and wasps.

Shrews have exceedingly-high metabolism and must feed frequently both day and night. Shrews are generally solitary except for short periods during the breeding season (spring). Shrews are preyed upon by owls, snakes and some mammals (USFWS 2000).

**FIRE IMPACTS:** The Merriam's shrew occupies habitat at higher elevations that was not impacted by the Milepost 17 Fire. Therefore, no direct or indirect impacts to Merriam's shrew likely occurred.

### **BLACK-TAILED JACKRABBIT**

Black-tailed jackrabbit is a State candidate species. A sighting has been documented in adjacent habitat (see Wildlife Species of Concern Map). The black-tailed jackrabbit was once abundant throughout the Columbia Basin (USFWS 2000). Recent precipitous declines in populations of these hares have raised concerns regarding their distribution and status throughout the region. This species is closely associated with the sagebrush steppe ecosystem. Black-tailed jackrabbits rely on sagebrush vegetative structure for breeding sites and hiding cover, and require sagebrush vegetation as forage during winter months. Black-tailed jackrabbits breed from late February to mid-July, with gestation lasting 41 to 47 days (Flinders and Chapman 2003). They can have two to six litters per year, with local populations likely trending towards the low end of this scale (Flinders and Chapman 2003).

Hares, unlike rabbits, do not use burrows. They place their young in shallow depressions in the soil called *forms*. Jackrabbits are generally solitary and primarily nocturnal. They are vulnerable to predators including, coyotes, bobcats, foxes, hawks, owls, and snakes. Loss of habitat due to agricultural and human development has impacted jackrabbit populations.

The fragmentation and isolation of populations residing within remnant habitat areas has probably increased their vulnerability to stochastic events (e.g. severe weather, disease, and fire) and has limited the re-colonization of areas that could potentially support jackrabbit populations (USFWS 2000).

**FIRE IMPACTS:** No direct impacts to the black-tailed jackrabbit resulted from the fire. Black-tailed jackrabbits are known to be relatively fast-moving animals. Because these

animals are highly mobile, at the time of the fire it is anticipated that adults and the season's juveniles would have been swift enough to avoid the fire and suppression activity. Black-tailed jackrabbits are primarily nocturnal and some individuals were observed during fire suppression operations. Some indirect impact occurred due to loss of native foraging habitat, potentially forcing jackrabbits to forage in other habitat. Being a very mobile species, all of the 4,096 acres of the Milepost 17 Fire area are potential black-tailed jackrabbit habitat. Impacts to the local jackrabbit population will also affect those animals that prey on jackrabbits; as jackrabbit numbers decrease, there will be less forage for other animals that prey upon jackrabbits. When combined with cumulative losses due to repeated fires on the Monument area, the habitat lost due to the Milepost 17 Fire represents a notable impact to black-tailed jackrabbit habitats (see section on Cumulative Impacts of Fire on HRNM in Executive Summary), and may impact their continued persistence within the Monument area. Ecological stabilization of burned areas is critical to maintaining viable black-tailed jackrabbit habitat on the Monument.

### **WHITE-TAILED JACKRABBIT**

White-tailed is a State candidate species. Sighting has been recorded in adjacent habitat (see Wildlife Species of Concern Map). This species is closely associated with the sagebrush-steppe ecosystem. White-tailed jackrabbits rely on sagebrush vegetation structure for breeding sites and hiding cover, and require sagebrush as forage during winter months. White-tailed jackrabbits breed from late April to September (<http://www.washington.edu/burkemuseum/collections/mammalogy>). Often solitary, they come together in small groups to breed. They can have up to 4 litters per year, but Washington populations are at the northern part of their range, where one is the more common litter frequency. Similar to black-tailed jackrabbits, white-tailed jackrabbits place their young in *forms*. Jackrabbits are generally solitary and primarily nocturnal. They are vulnerable to predators including, coyotes, bobcats, foxes, hawks, owls, and snakes. Loss of habitat due to agricultural and human development has impacted jackrabbit populations.

The fragmentation and isolation of populations residing within remnant habitat areas has probably increased their vulnerability to stochastic events (e.g. severe weather, disease, and fire) and has limited the re-colonization of areas that could potentially support jackrabbit populations.

**FIRE IMPACTS:** White-tailed jackrabbits experienced no direct impacts from the Milepost 17 Fire. White-tailed jackrabbits are known to be relatively fast moving animals. Because these animals are highly mobile, it is anticipated that at the time of the fire, adults and the season's juveniles would have been swift enough to avoid the fire and suppression measures. Although white-tailed jackrabbits are primarily nocturnal, one individual was observed during the day in habitat adjacent to the burned area during post-fire reconnaissance on 28 August 2007. Some indirect impact occurred due to loss of foraging habitat. Due to its large size and mobility, the 4,708 acres affected by the Milepost 17 Fire are potential white-tailed jackrabbit habitat. Impacts to the local jackrabbit population will also affect those animals that prey on jackrabbits; as jackrabbit numbers decrease there will be less forage for other animals that prey upon jackrabbits.

When combined with cumulative losses from repeated fires on the Monument area, the habitat lost due to the Milepost 17 Fire (see section on Cumulative Impacts of Fire on

HRNM in Executive Summary) represents a substantial impact to white-tailed jackrabbit habitats. The indirect impacts from the Milepost 17 Fire may depress their population within the Monument area. Ecological stabilization of burned areas is critical to maintaining viable habitat on the Monument for this species.

### **LONG-EARED MYOTIS**

Long-eared myotis is a Federal species of concern. This bat species is found in a wide range of habitats from arid grasslands to moist coastal forests; they appear to be widespread throughout the western states, but not abundant (USFWS 2007). The species is a generalist in its eating habits; it feeds heavily on small moths, but also eats flies, beetles, and other insects. During the day, long-eared myotis may roost under bark, and in rock crevices and hollow trees. The females will form small maternity colonies and seem to prefer buildings when they bear and care for their young. It has been noted that occasionally a male will join the colony. But in general, little is known about the behavior, biology, and the specific location or type of preferred roost sites of this species. There is no information on hibernation sites for long-eared myotis. Lack of adequate information on both behavior and populations of this species have led to its special Federal status (USFWS 2007).

**FIRE IMACTS:** Direct and indirect impacts to long-eared myotis from the Milepost 17 Fire and associated fire suppression efforts are discountable given the bats mobility and the lack of suitable day or maternity/nursery roosting habitat within the burn area.

### **TOWNSEND'S WESTERN BIG-EARED BAT**

Townsend's western big-eared bat (Townsend's bat) is a Federal species of concern and State candidate species. This species occurs State-wide where there is suitable habitat. Suitable habitat in eastern Washington includes shrub-steppe and riparian wetlands (Johnson and Cassidy 1997; WDFW 2005). Townsend's bats prefer to eat moths, but consume a variety of insects when available. Townsend's bats can forage in many natural habitats, so the availability of roost sites, which they use during daylight, seems to influence its distribution (Woodruff and Ferguson 2005). Townsend's bats use caves, mines, and hollow trees for roosting (WDFW 2005). Because aquatic areas are a good source of insect prey, roost sites in riparian areas in arid lands may be especially valuable. During summer, females roost in communal maternity colonies, while males roost alone or in small groups. Cavities in snags and large trees may be important roost sites for males of this species (WDFW 2005). Since they have been found to use alternate roosts, Townsend's bats are believed to regularly survey their environment for new roost sites (Woodruff and Ferguson 2005). In general, little is known about the behavior, biology, and the specific location of preferred roost sites of this species. Potential roost sites on ALE lands include rock crevices and small caves on Rattlesnake Mountain and large trees in riparian areas. In Washington, the few known hibernacula are mostly in caves and mines (WDFW 2005). Since cavities of this volume probably do not exist on ALE lands, it is doubtful that bats hibernated in burned areas. Lack of information about behavior and populations of this species in Washington has led to its special State and Federal status.

**FIRE IMACTS:** Direct and indirect impacts to the Townsend's bat from the Milepost 17 Fire

and fire suppression are unlikely.

### **SAGEBRUSH LIZARD**

The sagebrush lizard is a Federal species of concern and a State candidate species. Sagebrush lizards emerge from hibernation in April (USFWS 2007). Mating occurs in April and May, and females lay their eggs in June, burying them in loose soils at the base of a shrub. Hatching normally occurs in August (Storm and Leonard 1995). Recent research in Oregon suggests that the sagebrush lizards are limited to habitats that have sandy soils. In Washington, all recently-confirmed sites are associated with sand dunes or other sandy habitats (Hallock and McAllister 2005). Approximately 500 acres of sandy soil where the fire originated is potential Sagebrush lizard habitat, although presence there has not been documented (see Soils and Wildlife Species of Concern Maps). The WDFW recommends that any activities that alter these habitats, such as conversion to agriculture and/or activities that promote the invasion of cheatgrass, are likely detrimental to sagebrush lizard populations (Hallock and McAllister 2005). Therefore, preventing post-fire encroachment by cheatgrass is important in maintaining the habitat for sagebrush lizards within the Milepost 17 Fire area. Use of native grasses to stabilize the fire area will be important for management of this species (USFWS 2007).

**FIRE IMPACTS:** The lack of shrub cover in suitable soils likely precluded use of the area by sagebrush lizards. Because they probably were not present during the fire, sagebrush lizards were probably not directly impacted by the Milepost 17 Fire and suppression measures. Sagebrush lizards likely experienced indirect impacts. This loss is additional to cumulative habitat losses due to repeated fires on the Monument area (see section on Cumulative Impacts of Fire on HRNM in Executive Summary). Because little detail is known about the life history and habitat requirements of this species, protecting the lizard's habitat (based on the few known requirements) is important to managing for the population on ALE lands. Post-fire prevention the invasion of cheatgrass so sagebrush shrubs can return to ALE lands is also essential for maintaining the population of Sagebrush lizards within the fire area.

**STRIPED WHIPSNAKE:** The striped whipsnake is a State candidate species. The species occurs in the Columbia Basin of Central Washington (USFWS 2007). The Striped whipsnake is a long slender snake that is dark above, with alternating light and dark stripes down the length of the body. Adults range in size from 90 to 180 cm total length. This species is rare throughout most of its range in Washington. Striped whipsnakes have been documented in Washington only 26 times. In the last decade, only 3 observations have been reported (USFWS 2007). One whipsnake sighting was recorded on ALE lands, but considerably north of the Milepost 17 Fire. This species occurs in low-elevation (up to 1985 feet) arid regions with scattered vegetation and open rocky areas (USFWS 2007). They require shrubs for cover and rock crevices or rodent burrows for egg laying and hibernation (Nordstrom and Whalen 1997). Mating occurs in the spring, and eggs are laid in June, and hatched in the late summer or early fall. This species has been documented to occur at the Hanford site. Areas where they are known to occur have relatively undisturbed shrub-steppe habitat with a low cover of cheatgrass (USFWS 2007).

**FIRE IMPACTS:** Striped whipsnakes were not likely to have been directly impacted by the Milepost 17 Fire or suppression activities because they were probably not present during the fire. The fire did not burn suitable habitat for striped whipsnakes.

Indirect effects are possible. Rodent burrows, canyons, and ravines are present on lands adjacent to the burn area and such habitat serves important functions in the life history of whipsnakes. Rodent burrows in sagebrush, near tallus slopes, canyons, or ravines are considered optimal striped whipsnake habitat (Nordstrom and Whalen 1997). Indirect impacts include loss of prey. Prey species are primarily lizards, but may include rodents, bats, frogs, birds, and other snakes. Habitat within the fire area for any of these species was reduced. Therefore, prey species may be less available for the striped whipsnake until the habitat recovers and is repopulated by the various prey species. If fast-growing cheatgrass invades the burned area and prevents sagebrush establishment, the likelihood is reduced that this area would recover into habitat that could support striped whipsnakes.

## **ELK**

Elk is a species of Tribal importance. Elk first appeared naturally on the ALE in 1972 (USFWS 2000). Those individuals using the ALE are a part of a larger population referred to as the Yakima Herd, which populates the Rattlesnake Hills from the ALE west to Yakima. Although elk are not traditionally found in sagebrush steppe habitats, zooarchaeological evidence suggests elk historically inhabited the arid Columbia Basin, but were hunted to extinction by 1850. The Rattlesnake hills elk have shown a consistently high level of productivity over the 17 years that data have been collected (USFWS 2000).

The long-term growth trend (1983-1993) for the Hanford elk herd averages a 20 percent increase annually, indicating that the sagebrush steppe ecosystem is excellent habitat for elk (USFWS 2000). The herd is attracted to ALE by high quality habitat and a lack of disturbance. Hunting has not been allowed on ALE, and there is only limited public use, mostly for research activities. As a result, when hunting begins outside ALE, all of the elk in the area move into the sanctuary provided by ALE. In 1998, the estimated calf production of approximately 150 brought ALE elk numbers to about 750. The increasing herd size has increased local concern regarding elk depredation of agricultural crops in areas surrounding ALE. During the winter of 1999/2000, 175 elk were removed from the herd and relocated to other areas within the State. From 2000-2006, the elk population has ranged from 450 to more than 800 animals (HRNM/SMNWR 2006). The population in July 2000 was assumed to be approximately 575 adult animals, with the potential presence of 130 calves (USFWS 2000).

The elk distribution during early summer has traditionally been in the higher elevation areas of ALE (USFWS 2000). The elk were using these upper elevation areas for calving during the two to three weeks prior to the fire.

**FIRE IMPACTS:** Elk are highly mobile animals, and it is anticipated that all were able to move out of the affected area during the fire and also avoid related suppression actions. The greatest impact to elk within the burn area is loss of available forage. Due to the timing of the fire, appreciable rainfall is unlikely, and therefore any regrowth of grasses will probably not occur until the fall rains begin.

Impacts of the elimination of above ground forage species within the burn area include: 1) Elk will forage on private lands outside the burn area. This will continue to exacerbate the problem of depredation of from conversion of elk forage items to agricultural crops (wheat, alfalfa, orchards, and vineyards); 2) Elk may experience nutritional stress related to the decrease in forage availability; and 3) Elk may forage exclusively on alternative ALE vegetation that have better growing conditions, notably riparian shrubs and young trees that are used by sensitive bird species, to the detriment of these plants.

Due to the energy demands that lactation produces, lactating cows may be at the greatest risk of nutritional stress (USFWS 2000). Additional indirect impacts to the elk include exposure to collisions with vehicles adjacent to the fire area. As the elk move into different areas seeking forage, they are likely to cross SR 240. Since private lands surrounding the ALE area are open to elk hunting, an additional indirect effect may be that if elk continue to remain on private lands during the late summer and fall seasons, this herd will experience greater vulnerability to hunting pressure during the upcoming hunting season. If elk move into Central Hanford, they will be a cause of concern for Hanford facilities operations, particularly if they move onto the BC-Cribs radiation control zone (USFWS 2000).

Stabilization of the fire area with native grass species will be important for management of elk. Native grasses will provide forage and dissuade them from foraging on crops on adjacent private land. Establishment of native grasses on ALE lands will also reduce the browsing pressure on riparian shrubs and trees.

## **MULE DEER**

Mule deer is a species of Tribal importance. Mule deer are a common resident ungulate of the Hanford Monument area (USFWS 2000). The area of highest density is along the Columbia River. The deer population in the Monument area is relatively stable. Mule deer are primarily browsers and rely on riparian vegetation and bitterbrush for browse (USFWS 2000). The mule deer tend to find shade for thermal cover in and around riparian areas (USFWS 2007).

**FIRE IMPACTS:** Most mule deer were not likely directly impacted by the Milepost 17 Fire or fire suppression. During post-fire reconnaissance on August 27, however, two females with spots of burned hair were observed. Mule deer are highly mobile animals, and it is anticipated that most were able to avoid flames and hot ash during the fire by migrating out of the affected area. Recently-born fawns, however, may not have been able to avoid the fire, although no mortality of deer fawns was documented during post fire reconnaissance. Indirect impacts include loss of habitat. The entire 4,096 acres within the Milepost 17 Fire footprint is potential mule deer habitat. The greatest impact to mule deer within the burn area is loss of available forage (USFWS 2000). Regrowth of grasses in upland areas is not anticipated until fall rains begin. Therefore, mule deer may forage exclusively on alternative ALE vegetation that experience better growing conditions, notably riparian shrubs and young trees, to the detriment of these plants. Mule deer may forage off of the burn area on private lands, however, because deer are more solitary than herding ungulates (e.g., elk), agricultural depredation is not usually an issue with deer (USFWS 2000). Additionally, deer may also experience some nutritional stress due to loss of forage due to the fire. Lactating females may be at the greatest risk of nutritional stress because of the energy demands

that lactation produces. Deer will be much more vulnerable during the coming fall hunting season, due to lack of suitable hiding cover on the Monument, and additional hunting pressure in areas where the deer have moved off of the Monument onto private lands (USFWS 2000).

#### IV. RECOMMENDATIONS

##### A. Fire Suppression:

Determinations of effect: The fire and suppression actions had no directly attributable affect to Federally listed species. Furthermore, proposed emergency stabilization will have no effect on Federally listed species. Therefore, there is no need for emergency ESA Section 7 Consultation for the Milepost 17 Fire stabilization and emergency rehabilitation. Indirect impacts, however, due to loss of habitat occurred to several Federal species of concern and State sensitive species. Stabilization treatments will mitigate habitat damages due to fire and benefit listed species. Supporting documentation is included in the environmental compliance section of this report.

##### B. Emergency Stabilization:

Recommendations with Specifications:

**#2 Non-native invasive species control- Integrated Pest Management.** Stabilize soil to prevent loss or degradation of productivity by direct treatment of invasive plants using integrated pest management techniques to minimize the establishment of non-native invasive species within the burned area. Use integrated pest management techniques (herbicides, biological, mechanical, and cultural control methods) as appropriate to prevent the spread and establishment of noxious weeds within the fire area. This specification is critical to prevent the degradation of productivity and to promote the recovery of critical natural resources in the shrub-steppe areas.

**#3 Ecological stabilization, native seeding.** Stabilize soil to prevent loss or degradation of productivity by seeding to prevent establishment of invasive plants. This specification is critical to stabilize the ecological integrity and condition of the burned area-including stream channels and banks that will eventually result in functional recovery of the shrub-steppe areas.

##### C. Management recommendations (Non-Specification Related):

- Permanent photo points and monitoring plots should be established in key wildlife habitat locations to monitor habitat recovery. This should be coordinated with the vegetation monitoring as recommended in the Milepost 17 Fire BAER Vegetation Damage Assessment.

#### V. Consultations

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**BURNED AREA EMERGENCY STABILIZATION PLAN  
MILEPOST 17 FIRE  
OPERATIONS ASSESSMENT**

**I. OBJECTIVES**

- Identify, inventory, and map fire suppression impacts on jurisdictions affected by the fire.
- Specify rehabilitation measures to mitigate fire suppression impacts.
- Ensure specification recommendations are consistent with agency objectives.
- Protect natural and cultural resource values during rehabilitation efforts.

**II. ISSUES**

- Extensive soil disturbance on highly erodible soils from fire suppression activities.
- Potential impacts to critical natural and cultural resources from suppression actions.

**III. OBSERVATIONS**

**A. Background**

Please refer to fire history summary, included in Executive Summary.

**B. Reconnaissance Methodology**

On August 15, 2007 Mid-Columbia River National Wildlife Refuge Complex (MCRNWRC) staff began evaluating resource impacts caused by the suppression effort on lands and physical improvements with the Milepost 17 Fire area. Additional evaluation was conducted on August 28, 2007 in conjunction with a BAER team from First Strike Environmental Company contracted to develop the BAER plan. Team members did reconnaissance from the ground and obtained information from suppression forces. Information was also gathered from interviews with engine crews assigned to the fire.

**C. Findings**

The Milepost 17 Fire burned approximately 4,708 acres on the Hanford Reach National Monument. Approximately 18.25 miles (35.4 acres based on 16 foot width) of dozer line and disk line was created to stop the fire.

Rehabilitation of suppression line is necessary to protect habitats from noxious weed infestation, and to minimize fragmentation of ecological areas. Monitoring of suppression lines is necessary to determine the need for future noxious weed mitigation needs. Dozer lines and disk lines within the burned area on lands managed by U.S. Fish and Wildlife Service will be treated according to methods described in the Hanford

Site Biological Resource Management Plan (HSBRMP, 2001). A cultural resource assessment has been initiated on all suppression lines within the fire (refer to Cultural Resources Assessment). Further field visits and assessments of cultural resource impacts due to suppression will be subsequent to this plan.

There are five types of suppression impacts to be considered:

- Dozer and disk line built on FWS which require restoration and revegetation. This will require adequate soil moisture to establish a firm seedbed prior to reseeding actions.
- Access roads to the fire area that were used for suppression actions are now impassible due do the amount of lose powdery soils resulting from the destruction of soil structure in the upper horizons. These roads will be rehabilitated as weather permits (accumulation of adequate moisture).

#### **IV. RECOMMENDATIONS**

##### **A. Fire Suppression- (non-specification related-charged to suppression account)**

- **Dozer, disk line and Road Rehabilitation.** Rehabilitate dozer lines, disk lines and other sites directly or indirectly impacted by fire suppression activities. Dozer line and disk line rehab should be done at a later date due to the degraded soil conditions at this time. This activity should take place in the late fall or early winter when soil moisture content is higher. Some areas will be rehabilitated and re-vegetated. The road 112, under the wooden powerline, will need to be re-contoured and re-graded.

##### **B. Management (non-specification related)**

- Continue to review rehabilitation specifications with operators and other personnel associated with implementation of the BAER Plan to insure suppression rehabilitation specifications are clearly understood for protection of sensitive resources and land productivity. Ensure proper accounting procedures are followed in the repair of suppression related impacts through suppression accounts.
- Guarantee safety of personnel assigned to rehab operational assignments in the fire area.
- Monitor suppression related damage on dirt roads following fall and winter moisture events to see if additional rehab measures are necessary.

#### **V. CONSULTATIONS**

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DOE, 2001. Hanford Site Biological Resource Management Plan

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**BURNED AREA EMERGENCY STABILIZATION PLAN  
MILEPOST 17 FIRE  
WATERSHED AND SOILS RESOURCE DAMAGE ASSESSMENT**

**I. OBJECTIVES**

- Assess overall watershed changes from the fire, particularly those that pose substantial threats to human life, property, and critical natural and cultural resources. This includes evaluating changes to soil conditions, hydrologic function, and watershed response to precipitation events, stream flow conditions, concentrated ungulate (elk and deer) grazing, and high winds.
- Identify the most critical soil and watershed areas and issues related to the Milepost 17 Fire based on increased flood potential and loss of soil resources from water and wind, and prescribe treatments to mitigate impacts and risks.
- Discuss burn severity.
- Identify future monitoring needs.
- Provide management recommendations to assist in vegetation recovery, watershed stabilization, site productivity and species habitat protection and rehabilitation.

**II. ISSUES**

- Protection of watershed stability and minimizing the impacts of watershed degradation and the associated wildlife and vegetation.
- Stabilization of watershed and riparian areas around springs, riparian corridors, and wetland areas.
- Threats to water quality of springs and riparian corridors.
- Develop management strategies that provide for the stabilization, natural regeneration and recovery of impacted areas.
- Threats to human life and property in and adjacent to the burned area from wind-blown dust.

**III. OBSERVATIONS**

**A. Background Information**

This report identifies and addresses known and potential impacts to soil and watershed function in the Milepost 17 Fire which burned an area of the Hanford Reach National Monument (Monument) identified during the field reconnaissance effort. This report provides detail on the observed damage to the soil resources and watershed function, will discuss mitigation measures to reduce significant degradation impacts caused by

changes to the watershed due to fire, as well as recommend future monitoring criteria, and management considerations for recovery of burned areas.

The background information described in this section also includes a discussion of the findings from the 24 Command Fire and how the system responded since the 2000 fire.

**Overview of the Milepost 17 Fire:** The Milepost 17 Fire burned area consists of approximately 4708 acres within the boundaries of the Monument.

**Geology/Physiography:** The Milepost 17 Fire occurred within the semi-arid Pasco Basin of the Columbia Plateau on the lower slopes of Rattlesnake Mountain. Elevations of the burn area range from approximately 450 feet above mean sea level (amsl) along the Highway 240 to 1200 feet amsl along the “1200” road. All burned watersheds drain northeast to the Cold Creek Valley. Slopes are generally moderate (approximately 5-percent (%)). The Pleistocene Hanford formation underlies much of the lower portions of the northeast flank of Rattlesnake Mountain below approximately 1000 feet amsl and consists of deposits from a series of cataclysmic floods.

The cataclysmic floods occurred when ice dams broke releasing water from glacial Lake Missoula. Two facies are recognized, the Pasco gravels and the Touchet Beds (Kasper and Glantz, 1987). The Pasco gravels consist of coarser sands and gravels that were deposited in high-energy environments of rapid currents. The Touchet Beds consist of finer sands and silts that represent a low energy (slack water) environment found on the basin margins and the flanks of the surrounding ridges. Holocene surficial deposits consisting of silt and sand form a thin veneer (less than five meters) across much of Cold Creek Valley. These deposits consist dominantly of laterally discontinuous sheets of wind-blown silt and fine-grained sand. Surficial geologic units in the area are shown on a map and described in a report by Hartman (2000).

**Precipitation:** The precipitation of the Milepost 17 Fire burn area is strongly influenced by a rain shadow extending eastward from the Cascade Mountain range. This region, classified as mid-latitude semi-arid, receives less than 8 inches of average annual precipitation and is the hottest and driest portion of the Columbia Basin. Most precipitation falls from October through April and is directly proportional to elevation. Within the burn area, precipitation can vary from as little as 5 inches within Cold Creek Valley (420 feet elevation) to over 14 inches on Rattlesnake Mountain (3,581 feet elevation). Snowfall during December to February accounts for approximately 38% of total precipitation, while the months of July and August typically are the driest. Prevailing winds are from the northwest but occasional strong winds from the southwest also occur. Thunderstorm cells associated with passage of strong cold fronts can produce high velocity winds and localized intense rainfalls. Table 1 indicates what probable rain occurrence and intensity may occur for this region.

**Table 1. Recurrence Intervals and Precipitation Amounts for Storm Events (Hanford Site Climatological Data Summary 1999 with Historical Data).**

Return Period (years)	1 Hour Duration (inches)	24 Hour Duration (inches)
2.0	.22	0.70
20	0.44	1.26
100	0.58	1.61

This table indicates that for most probable occurring rainfall events, precipitation would be relatively moderate to light. Rainfall amounts for different storm durations are prepared from the entire data record. Data collected from the last 8 years will most likely be similar to the ones calculated for the 1999 report and are adequate for preparing an evaluation of soil erosion potential relative to storm events.

**Soils:** Hajak (1966) describes 15 different soil types on the Hanford Site. Of these, 6 soil types occur within the burned area. Table 2 shows the extent of soils occurring within the burned portion of the Hanford Site. A soil map is included in Appendix III.

**Table 2. Soil types occurring within the Milepost 17 Fire burned area.**

Soil Name	Acres	% of Burn
Burbank Loamy Sand	10	2.1%
Dune Sand	0	0%
Ephrata Sandy Loam	0	0%
Hezel Sand	0	0%
Koehler Sand	0	0%
Kiona Silt Loam	0	0%
Lickskillet Silt Loam	0	0%
Esquatzel Silt Loam	0	0%
Quincy (Rupert) Sand	23	4.9%
Ritzville Silt Loam	1,044	22.2%
Scootney Stony Silt Loam	124	2.6%
Warden Silt Loam	2,867	60.9%
unsurveyed	0	0%

The fire primarily occurred in the Warden Silt Loam and Ritzville Silt Loam, and some minor amounts of Scootney Stony Silt Loam. The Ritzville soils occur on hill slopes and ridges and contain a loam or silt loam surface texture. These soils may be subject to sheet and rill erosion. The Ritzville soils are developed on fine-grained, aeolian sand and silt, referred to as loess. The Ritzville soil is shallow.

A map of soils susceptible to wind erosion is in Appendix III. The wind erosion risk can

be classified as high, moderate, or low. The primary distinction between the classes was created by overlaying the GIS layer showing the presence of cheat grass on the GIS layer showing the location of soils. The amount of each class is summarized in Table 3. Primarily the Milepost 17 Fire burned areas have low wind erosion risk, with only small area of moderate risk along Highway 240 near the origin of the fire.

**Table 3 Wind Erosion Risk**

<b>Risk</b>	<b>Acres</b>
High	25
Moderate	723
Low	3960

**Wind and Dust storms:** The predominant wind direction within the burn area is from the northwest. However, the strongest winds blow out of the southwest, although less frequently than from the northwest (Fayer et al., 1999). Winds capable of moving sand sized particles occur approximately 40 days per year. Seasonal changes in the average wind direction are not very large, but changes in the average wind speed can be fairly significant (U.S. Department of Energy, 1988).

Large scale erosion did not occur in the area of the Milepost 17 Fire after the 24 Command Fire. Soil and vegetation conditions as a result of the Milepost 17 Fire are similar to the conditions following the 24 Command Fire, therefore a similar wind erosion responses can be expected. The recommendations from the 24 Command Fire did not included dust mitigation measures along the portion of Highway 240 that have moderate wind erosion risk that was burned in the Milepost 17 Fire.

**Watershed:** The fire's hydrologic area can be described as lying within the Pasco Basin of the Columbia River Basin. Several other small springs (Doke, Ridge Spring and two unnamed springs (1 and 2) [near the former missile battery), occurring along the flanks of Rattlesnake Mountain do not contribute to any substantial surface water flows. Flow from these springs are typically subsurface and are not expected to overland flow therefore erosion potential from these springs is not anticipated

The steep upper slopes of Rattlesnake Mountain influence channel morphology, with the north side inducing steep incised channels and the south side generating more gentle, less discernable channels. On the lower flanks of the mountain, channels are less entrenched, allowing the channels to meander and braid, developing floodplains. Any transported flows or sediments along the eastern and northern areas infiltrate and deposit along the flood plains and valley bottom sands.

Groundwater of the region flows in a general west to east pattern toward the Columbia River. Little groundwater recharge from precipitation occurs in the Pasco Basin due to limited amount of the precipitation. Most precipitation is lost through evapotranspiration with less than 1% recharging groundwater. Studies suggest precipitation may contribute to groundwater recharge in areas where soils are coarse textured and bare of

vegetation. In areas of past wildfires, soil moisture measured at depths of 275 centimeters increased when vegetation types changed from sagebrush to grasses. Soil moisture was greatest in late winter. Throughout much of the shrub-steppe region, the microbiotic soil crust facilitates infiltration of precipitation into the soil. Runoff in the area of the burn is primarily generated by winter precipitation.

Warm Chinook winds have been known to cause rapid snowmelt during winter months, inducing runoff and minor flooding in the area. Flooding potential of Cold Creek was calculated by Skaggs and Walters, 1981, for probable maximum conditions. A 100 year flood would be about 3 feet deep, near the confluence of Cold Creek and its tributary Dry Creek. Dry Creek occasionally has crossed State Route 240 during past flood events.

Burn severity for the Milepost 17 Fire was characterized in the following three categories with percentages: 1) no or impacted on 2.9%, 2) low on 86.3%, and moderate on 10.7% of the entire burn area. Infiltration rates are not expected to decrease due to soil hydrophobicity. However, existing conditions prior to the fire already contributed to reduced infiltration rates. These conditions include sparse vegetation throughout the burn area, rocky slopes and shallow soils on Rattlesnake Mountain, and, on the southwest flank of Rattlesnake Mountain, compaction due to grazing. Prior runoff and flooding events have been recorded during winter months from snowmelt over frozen soils when vegetation has negligible effects to runoff. Therefore, the overall relative water yield increase due to the fire is expected to be minor and not exacerbate flooding events.

In areas where sagebrush cover was lost, minor increases in groundwater recharge may occur due to conversion to grasses which evapotranspire at lower rates and from shallower soil depths than sagebrush. Some rill erosion is expected on steep slopes of the northern and eastern flanks of Rattlesnake Mountain. These sediments may be transported down into the stream network of Dry Creek, Cold Creek, and their springs during runoff events. Most entrained sediments would be deposited along the lower gradient floodplains and sandy valley bottoms. Localized effects should be expected but overall effects to the watershed would be minor.

## **B. Reconnaissance Methodology**

Due to the focused nature of the reconnaissance methodology utilized by the First Strike-Shaw team, a through discussion of the entire burned area can not be prepared. However, personnel with the USFW provided a 1-day field reconnaissance trip of the Monument. The trip focused on the following areas: 1) along the 1200 road and 2) along Highway 240. Stops along the trip are shown on the map in Appendix III. This assessment is based on the observation made during the trip, discussion with USFW staff, and documents reviewed. During the site, Shaw made observations on:

- Burn severity
- Soil Conditions

- Hydrophobic Soils
- Watershed Response
- Properly Functioning Conditions

Table 4 describes terms commonly used in assessing soils and watersheds that have been burned.

**Table 4. Definitions of terms commonly used in soil and watershed assessments.**

<b>Term</b>	<b>Definition</b>
Fire Intensity	Based on temperature, flame length, heat of combustion and total amount and size of fuel consumed. Accounts for convective heat rising into the atmosphere and fire effects on the overstory.
Fire Severity	Based on temperature, moisture content of duff and fuels lying on the ground, heat of combustion and total amount of duff and ground vegetation consumed. Accounts for the amount of conductive and radiant heat that goes down into the soil, affecting soil characteristics.
Burn Severity	A relative measure of the degree of change in a watershed that relates to the severity of the effects of the fire on watershed conditions. Burn severity is delineated on topographic maps as polygons labeled high, moderate, and low/unburned.
Watershed Response	A qualitative degree and/or modeled measure of how a watershed will respond to precipitation. Parameters include pre-existing soil moisture; amount and duration of rainfall; lag time between initiation of storm and peak flow runoff; and peak flow discharge (maximum cfs generated by a storm) and sediment yield. Changes in the characteristics of a watershed brought about by a fire increase the efficiency with which a watershed yields runoff. Burned watersheds shed more water faster.

Riparian Corridor Properly Functioning Conditions	A visual assessment of the stream function and its relationship to the riparian area. Includes hydrogeomorphic, vegetation, erosion, deposition, soils, and water quality. The condition of the riparian corridors where assess using the “ <i>Riparian Area Management – A Users Guide to Assessing Proper Functioning Condition and Supporting Science for Lotic Areas</i> ” guidance document for assessing properly functioning conditions (Prichard, 1993).
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The condition of the riparian corridors where assess using the guidance document for assessing properly functioning conditions (Prichard, 1993).

### C. Findings

This section presents a summary of the significant findings as well and a discussion of the findings. The findings for this assessment include:

1. Minimal potential for channel erosion along dry drainages off Rattlesnake Mountain.
2. Minimal discharge from minor springs that do not have overland flow discharge.
3. Increased wind erosion potential and potential road hazard along the southeastern portion of Highway 240.

#### **Minimal potential for channel erosion along dry drainages off Rattlesnake ridge.**

Visual reconnaissance of the dry stream channels along the 1200 road did not reveal the evidence of excessive erosion. Some channels have varying amounts of sediments in the bottom. This is likely due to the low amounts of precipitation received annually, which results in little overland flow. The low precipitation in the area limits the amount of water available to the channels during normal rainfall events. It is likely that low rainfall amounts are readily absorbed in the soil profile with relatively little overland flow. In the event of a heavy snow pack melt or intense rainstorms, some erosion would be normal and expected.

#### **Minimal overland flow from minor springs that do not have overland flow discharge.**

There was no overland flow visible at the Ridge Spring. USFW personnel indicate that the other minor springs (Doke, and unnamed springs 1 and 2) do not have flow. Therefore, there is no riparian corridor or wetland area for increased deer and elk browsing to damage. Therefore these springs are not contributing to the channel flow or adding to scour potential.

#### **Increased wind erosion potential and potential road hazard along the**

**southeastern portion of Highway 240.** There is the potential for wind erosion from soils in the Milepost 17 Fire Burn area. However, this area of the Monument does not have the same wind conditions as the northern portion of the Monument where wind erosion control measures have been recommended for other fires. In previous fires wind erosion control measures have been limited to reestablishing vegetation.

#### **IV. RECOMMENDATIONS**

##### **A. Fire Suppression Rehabilitation:**

###### *1. Dozer, disk line and Road Rehabilitation.*

Rehabilitate dozer lines, disk lines and other sites directly or indirectly impacted by fire suppression activities. Dozer line and disk line rehab should be done at a later date due to the degraded soil conditions at this time. This activity should take place in the late fall or early winter when soil moisture content is higher. Some areas will be rehabilitated and re-vegetated, and some areas will be rehabilitated and maintained as fire break. A map of dozer and disk line damage is included in Appendix III. Recommendations for rehabilitation are contained in the Vegetation Damage Assessment Report. The recommendation of this damage assessment report is to implement the measures contained within the Vegetation Damage Assessment Report.

##### **B. Emergency Stabilization: (specification related)**

The following recommendations are offered to assist in the timely recovery of the Milepost 17 Fire:

###### *1. Implement the emergency stabilization measures recommended in the Vegetation Damage Assessment Report.*

##### **C. Rehabilitation (non-specification related treatments)**

Submit long-term rehabilitation plan as required to stabilize soils, control non-native invasive species and protect ecological integrity of the site.

##### **D. Monitoring (non-specification related)**

- *Monitor roadways maintained by Washington DOT to determine if drift fencing or other soil stabilization measures are needed to control blowing dust and sand.*

Wind may increase erosion of soils in the Milepost 17 area. This may cause dust and sand dunes to migrate in an east to northeast direction based on direction of past dune migration. Dunes may migrate onto roadways, increasing the risk of vehicular accidents in and adjacent to the burned area, including risk of human injury and/or fatalities.

## **E. Management Recommendations (non-specification related)**

- *Continue to review rehabilitation specifications with operators and other personnel associated with implementation of the BAER Plan to insure suppression rehabilitation specifications are clearly understood for protection of sensitive resources and land productivity. Ensure proper accounting procedures are followed in the repair of suppression related impacts through suppression accounts.*
- *Provide for the safety of personnel assigned to rehabilitation operational assignments in the fire area.*
- *Monitor suppression related damage on dirt roads following fall and winter moisture events to see if additional rehab measures are necessary.*
- *Coordinate emergency stabilization needs with the Department of Energy and The Washington Department of Transportation to ensure public safety is protected along county roads and state Highway 240. A meeting of USFWS and ODOE staff was conducted on August 29, 2007 to coordinate anticipated emergency stabilization activities including dust control.*

## **V. Consultations:**

Kevin Goldie, USFW

Heidi Newsome, USFW

## **VI. References:**

Chepil, W.S., 1957. *Erosion of Soil by Wind*. Soil, the Yearbook of Agriculture, 1957. The United States Department of Agriculture, Washington, D.C. The United States Government Printing Office.

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Prichard, Don, et al. *Riparian Area Management, Process for Assessing Properly Functioning Condition*. U.S. Department of the Interior, Bureau of Land Management, Proper Functioning Condition Work Group. Technical Reference

1737-9, 1993; Revised 1995, 1998

USDOE, 2000, *Hanford Site Climatological Data Summary 1999 with Historical Data*,  
*PNNL-13117 UC-603*, Richland, Washington.

## **APPENDIX II - ENVIRONMENTAL COMPLIANCE**

- **Environmental Compliance Considerations and Documentation**
- **NEPA Environmental Screening Checklist and Categorical Exclusion**



## ENVIRONMENTAL COMPLIANCE CONSIDERATIONS, DOCUMENTATION, AND CONSULTATIONS

### Wautoma Fire Burned Area Emergency Stabilization Plan

#### A. FEDERAL, STATE, AND PRIVATE LANDS ENVIRONMENTAL COMPLIANCE RESPONSIBILITIES

All projects proposed in the Wautoma Fire Burned Area Emergency Stabilization (ES) Plan that are prescribed, funded, or implemented by federal agencies on federal, state, or private lands are subject to compliance with the National Environmental Policy Act (NEPA) in accordance with the guidelines provided by Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508); Department of the Interior (DOI) Manual, Part 516, U.S. Fish and Wildlife Service (FWS) NEPA Guidelines, Part 516 DM 6, Appendix 1; and Department of Energy (DOE) NEPA Regulations (10 CFR Part 1021). This Appendix documents the BAER Team considerations of NEPA compliance requirements for prescribed rehabilitation and monitoring actions described in this plan for all jurisdictions affected by the Wautoma Fire burned area emergency stabilization.

#### B. RELATED PLANS AND CUMULATIVE IMPACTS ANALYSIS

**Draft Hanford Reach National Monument Biological Resources Management Plan (DBRMP, FWS 1996), Final Hanford Comprehensive Land-Use Plan and Environmental Impact Statement (CLUP, DOE 1999), and Draft Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement (DCCP, FWS 2006):** The BAER Team Environmental Protection Specialist reviewed the DBRMP, CLUP and DCCP and determined that actions proposed in the Wautoma Fire BAER Plan within the boundary of the Hanford Reach National Monument are consistent with the management objectives established in those land use plans. The CLUP EIS incorporates the DBRMP by reference, and both specifically address bulldozer lines and provides NEPA compliance for bulldozer line rehabilitation.

**Cumulative Impact Analysis:** Cumulative effects are the environmental impacts resulting from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, both federal and non-federal. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The emergency protection and stabilization treatments for areas affected by the Wautoma Fire, as proposed in the Wautoma Fire ES Plan, do not result in an intensity of impact (i.e., major ground disturbance, etc.) that would cumulatively constitute a significant impact on the quality of the environment. No other actions are proposed or are reasonably foreseeable that would contribute to or enhance impacts related to rehabilitation under this BAER plan. The treatments are consistent with the above jurisdictional management plans and associated environmental compliance documents and categorical exclusions listed below.

## C. APPLICABLE AND RELEVANT CATEGORICAL EXCLUSIONS

U.S. Fish and Wildlife Service: The individual actions proposed in this plan for the Hanford Reach National Monument are categorically excluded from further environmental analysis as provided for in the DOI Manual Part 516 and FWS NEPA Guidelines, Part 516 DM 6, Appendix 1. All applicable and relevant Department and Agency categorical exclusions are listed below. Department exceptions—(516) DM 2.3—do not apply to any of the individual actions proposed. Categorical exclusion decisions are being made with consideration given to the results of required emergency consultations completed by the BAER Team and documented in Section E below.

### Applicable Department of the Interior Categorical Exclusions

- 516 DM2 App. 2, 1.6 Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research and monitoring activities.
- 516 DM 6 App. 4.4 A Operations, maintenance, and replacement of existing facilities (includes road maintenance).
- 516 DM 6 App. 4.4 L(5) Emergency road repairs under 23 U.S.C. 125.
- 516 DM 6 App. 7.4 C(3) Routine maintenance and repairs to non-historic structures, facilities, utilities, grounds and trails.
- 516 DM 6 App. 7.4 C(19) Landscaping and landscape maintenance in previously disturbed or developed areas.

### Applicable U.S. Fish and Wildlife Service Categorical Exclusions

- 516 DM 6 App. 1.4B (1) Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality of habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem.
- 516 DM 6 App. 1.4B (3) i The installation of fences.
- 516 DM 6 App. 1.4B (3)iii The planting of seeds or seedlings and other minor revegetation actions.
- 516 DM 6 App. 1.4B (3)v The development of limited access for routine maintenance and management purposes.
- 516 DM 6 App. 1.4B (5) Fire management activities, including prevention and restoration measures, when conducted in accordance with Departmental and Service procedures.
- 516 DM 6 App. 1.4B (6). The reintroduction or supplementation (e.g. stocking) of native, formerly native, or established species into suitable habitat within their historic or established range, where no or negligible environmental

disturbances are anticipated.

#### **D. STATEMENT OF COMPLIANCE FOR THE WAUTOMA FIRE BURNED AREA EMERGENCY STABILIZATION PLAN**

This section documents consideration given to the requirements of specific environmental laws in the development of the Wautoma Fire BAER ES Plan. Specific consultations (if required) initiated or planned to be completed during development and implementation of this plan are also documented. The following executive orders and legislative acts have been reviewed as they apply to the Wautoma Fire BAER ES Plan:

- 1) **National Historic Preservation Act (NHPA).** Upon approval of the BAER ES Plan by the USFW, the necessary consultations with the Washington State Historic Preservation Office (SHPO) and the Yakama, Umatilla, Nez Perce, and Wanapum Tribes regarding treatments proposed in the Wautoma Fire BAER ES Plan will be performed.
- 2) **Executive Order 11988 - Floodplain Management.** No treatments are proposed within the 100-year floodplain.
- 3) **Executive Order 11990 - Protection of Wetlands.** Treatments and actions proposed within wetland areas will “minimize the destruction, loss or degradation of wetlands, and preserve and enhance the natural and beneficial values of wetlands.”
- 4) **Executive Order 12372 - Intergovernmental Review. ).** Upon approval of the BAER ES Plan by the USFW, the necessary coordination and consultation with affected tribes, federal, state and local agencies will be performed. A copy of the final BAER ES Plan will be disseminated to all affected agencies.
- 5) **Executive Order 12892 - Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.** All federal actions must address and identify, as appropriate, disproportionately high and adverse human health or low-income populations, and Indian tribes in the United States. The BAER Team Environmental Protection Specialist has determined that the actions proposed in this plan will result in no likely adverse human health or environmental effects for minority or low-income populations and/or Native American tribal members.
- 6) **Endangered Species Act.** Upon approval of the BAER ES Plan by the USFW, as required, the BAER Team Wildlife Biologist and Vegetation Specialists will consult with the FWS and Washington Department of Fish and Wildlife regarding actions proposed in this plan and its potential effects on federal and state listed species. Individual agencies are responsible for continued consultations during plan implementation.

- 7) **Secretarial Order 3127.** Although contaminated sites are known to occur on properties owned by the DOE at the Hanford Site, no treatments are proposed that would affect contaminated sites. There are no known contaminated sites on other jurisdictions affected by the Wautoma Fire.
- 8) **Clean Water Act.** The BAER Team Environmental Protection Specialist has determined that treatments prescribed in the area burned by the Wautoma Fire will have no impacts to water quality within wetland areas or other water bodies. The wetland areas within the fire perimeter are associated with the discharge of surface springs. Treatments proposed in this plan would be expected to have a beneficial impact to water quality through stabilization of ash and soils and treatment of invasive species in the riparian zones within the area burned by the Wautoma Fire.
- 9) **Clean Air Act.** Federal Ambient Air Quality Primary and Secondary Standards are established by the U.S. Environmental Protection Agency (EPA, National Ambient Air Quality Standards) (Clean Air Act, 42 U.S.C. 7470, et seq., as amended). The BAER Team Environmental Protection Specialist has determined that treatments prescribed in the area burned by the Wautoma Fire will have short-term minor impacts to air quality that would not differ significantly from routine land use practices for the area. In the long-term, treatments proposed in this plan would be expected to have a beneficial impact to air quality through stabilization of ash and soils within the area burned by the Wautoma Fire.

**NEPA Checklist:** If any of the following exception applies, the ES Plan cannot be Categorically Excluded and an Environmental Assessment (EA) is required.

(Yes) (No)

- ( )  (X) Adversely affect public health and/or safety.
- ( )  (X) Adversely affect historic or cultural resources, wilderness, wild and scenic rivers aquifers, prime farmlands, wetlands, floodplains, ecologically critical areas, or national natural landmarks.
- ( )  (X) Have highly controversial environmental effects.
- ( )  (X) Have highly uncertain environmental effects or involve unique or unknown environmental risks.
- ( )  (X) Establish a precedent resulting in significant environmental effects.
- ( )  (X) Relates to other actions with individually insignificant but cumulatively significant environmental effects.
- ( )  (X) Adversely effects properties listed or eligible for listing in the National Register of Historic Places
- ( )  (X) Adversely affect a species listed, or proposed to be listed, as "threatened" or "endangered."
- ( )  (X) Threaten to violate any laws or requirements imposed for the "protection of the environment," such as Executive Order 11988 (Floodplain Management) or Executive Order 11990 (Protection of Wetlands).

**National Historic Preservation Act**

Ground Disturbance:

- ( ) None
- ( ) Ground disturbance did occur and an archeologist survey, required under section 110 of the NHPA has been prepared. Findings have been documented in Appendix I- Cultural Resources Assessment.
- (X) To be determined upon approval of ES Plan by USFW.

A NHPA Clearance Form:

- ( ) Is required because the project may have affected a site that is eligible or on the National Register of Historic Places. The clearance form will be attached. The SHPO has been consulted under Section 106 (see Cultural Resource Assessment, Appendix I).
- ( ) Is not required because the ES Plan has no potential to adversely affect cultural resources (initial of Cultural Resource Specialist).
- (X) To be determined upon approval of ES Plan by USFW.

Other Requirements

(Yes) (No)

- ( X ) ( ) Does the ES Plan have potential to affect any Native American uses? If so, consultation with affiliated tribes is needed.
- ( X ) ( ) Are any toxic chemicals, including pesticides or treated wood, proposed for use? If so, local agency integrated pest management specialists must be consulted.

I have reviewed the recommended actions in the Wautoma Fire Burned Area Emergency Stabilization Plan in accordance with the criteria above and have determined that the proposed actions would not involve any significant environmental effects. Therefore, this plan is categorically excluded from further environmental (NEPA) review and documentation. Upon approval of the ES Plan by the USFW, ES Team technical specialists will initiate requisite coordination and consultation to insure compliance with the National Historic Preservation Act, Endangered Species Act, Clean Water Act, Clean Air Act, and other federal, state and local environment review requirements.

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Robert Krueger  
ES Team Environmental Protection Specialist

Date

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Gregory M. Hughes, Project Leader  
Mid-Columbia River National Wildlife Refuge Complex,  
Hanford Reach National Monument

Date

## **APPENDIX V - SUPPORT DOCUMENTS**

- Cost/Risk Analysis
- Native-Non-native worksheet
- Section 7 Species List
- Washington State Species List

## Cost/Risk Analysis

### Part 1. Treatment Cost

Treatments	Cost
1. Determine whether known historic properties may be at risk of further degradation.	13,143.50
2. Non-native invasive species control- Integrated Pest Management.	180,045.70
3. Ecological Stabilization- Native Seeding.	1,412,430.48
4. Emergency Stabilization Plan Development	32,400.00
<b>Total Cost</b>	<b>1,638,019.68</b>

### Part 2. Probability of Rehabilitation Treatments Successfully Meeting EFR Objectives

Treatments	Units	%
1. Determine whether known historic properties may be at risk of further degradation.	12 sites	100
2. Non-native invasive species control- Integrated Pest Management.	4,708 acres	75
3. Ecological Stabilization- Native Seeding.	4,708 acres	75
4. Emergency Stabilization Plan Development	1 each	100

**Risk of Resource Value Loss or Damage**

Identify the risk (high, medium, low, none or not applicable (NA) of unacceptable impacts or loss of resources.

**No Action- Treatments Not Implemented (check one)**

Resource Value	None	Low	Mid	High
Lives		X		
Residential & Commercial Property		X		
Wildlife populations and Listed Species				X
Sensitive Plant Communities and rare plants				X
Ecological Stability				X
Site Productivity				X
Weed Invasion				X
Cultural Resources			X	

**Proposed Action - Treatments Successfully Implemented (check one)**

Resource Value	None	Low	Mid	High
Lives	X			
Residential & Commercial Property	X			
Wildlife populations and Listed Species		X		
Sensitive Plant Communities and rare plants		X		
Ecological Stability	X			
Site Productivity	X			
Weed Invasion	X			

Cultural Resources	X			
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**Part 3. SUMMARY**

The costs of the project and probability of success of the proposed treatments are compared with the risks to resource values if: 1) no action is taken, and 2) the proposed action is successfully implemented. Alternatives may be included in this analysis to assist in the selection of the treatments that will cost effectively achieve the EFR objectives. Answer the following questions to determine which proposed EFR treatments should be selected and implemented.

1. Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

**Proposed Action** Yes | \_\_\_ | No | X | Rationale for answer:

**Non-native invasive species control- Integrated Pest Management and Re-vegetation Invasive species control.** The detection, control and monitoring of non-native invasive species in burned areas and the prevention of the expansion of known populations into newly disturbed areas will present no risk to cultural resources and will prevent the spread of nonnative invasive species to private property.

**Ecological Stabilization- Native Seeding.** Stabilization of erosion prone soil will prevent traffic hazard along Highway 240 and county roads. Stabilization of soils will prevent erosion, dust storms, from delivering soils to private lands areas and will prevent health hazards (breathing difficulties or allergy symptoms) for local residents. This process will also help maintain site productivity and buffer sensitive plant communities to invasion of non-native species.

**Protective Fencing Replacement and Public Safety, Warning Signs.** The repair of existing fence to direct the public use and access and to exclude livestock from burned area is necessary until native vegetation can be reestablished, and for protection of Monument resources. Grazing was prohibited on the Monument through Presidential proclamation. Fence and signs will direct the public and reduce trespass into sensitive areas. Further, this will benefit cultural resources as fence will reduce trespass and reduce looting.

**Effectiveness Monitoring.** Documentation of the success of treatments is important in order to justify the costs associated with large projects that require public funds. It would be irresponsible to expend public funds without documenting the effectiveness and value of the stabilization treatments.

**No Action** Yes | \_\_\_ | No | X | Rationale for answer:

No the risks to cultural resources and private property are not acceptable. Non-native invasive plants and unacceptable soil erosion could significantly impact the Monument's resources and will likely affect private property. Ecological function will be reduced and sensitive plant communities and wildlife will be impacted. Cultural resources will incur additional damage if fences are not repaired. The public trust will be violated because the long-term management of this area was entrusted to the Department of Interior. Permanent site degradation will reduce the areas ability to support priority public uses.

**Alternative(s)** Yes  No  Rationale for answer: NONE

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

**Proposed Action** Yes  No  Rationale for answer:

The actions have been rated as having a high probability of success. Previous efforts to conduct similar post-fire stabilization on the Hanford Reach National Monument have been highly successful. The proposed treatments will not only protect public safety and private property by controlling erosion and weed spread, but will also protect site productivity, ecological function and cultural resources. Protection of sensitive shrub-steppe habitat and obligate wildlife species will not only benefit these resources but will improve their condition as re-growth occurs.

**No Action** Yes  No  Rationale for answer:

Failure to protect and stabilize this area would impact nationally significant resources and create a public safety hazard. Failure to stabilize highly mobile and erosion prone soils will cause wind borne dust storms to reduce visibility along major traffic routes and increase the health hazard due to breathing difficulties or allergies of local residents. Failure to prevent the spread of non-native plants will increase the long term costs of managing these lands, increase fire risks, reduce critical habitat for many wildlife species, and reduce potential management of listed species and reintroduction sites for listed species.

**Alternative(s)** Yes  No  Rationale for answer: None.

3. Which approach will most cost-effectively and successfully attain the EFR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action , Alternative(s) , or No Action

## Exhibit 6-1 NATIVE/NON-NATIVE PLANT WORKSHEET

The Native Seed Mix listed below has been requested by Heidi Newsome of the USFWS for use on the Wautoma Fire ES Plan on September 6, 2007 and is included in Part F this ES Plan.

**Mix 1:** 3,537 acres aerial application (1,435 ac. in Milepost 17; 2,102 ac. in Wautoma);  
5,107 acres drill seed application (452 ac. in MP17; 4,655 ac. in Wautoma)

### Grasses

Indian Ricegrass ( <i>Oryzopsis hymenoides</i> ) (Nez Par)	3 lbs./ac. PLS
Needle and thread grass ( <i>Stipa comata</i> )	0.2 lbs/acre
Sandberg's bluegrass ( <i>Poa sandbergii</i> ) (Hanford)	4 lbs./ac. PLS
Sand dropseed ( <i>Sporobolous cryptandrus</i> )	0.2 lb. /ac PLS
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	4 lbs./ac PLS
Thickspike Wheatgrass (Swindemar) ( <i>Elymus lanceolatus</i> )	4 lbs./ac PLS

### Forbs

Yarrow, ( <i>Achillea millefolium</i> )	0.2 lbs./ac PLS
Columbia Blue Flax ( <i>Linum</i> sp.)	0.2 lbs./ac PLS

**Mix 2:** 16,242 acres aerial application (2,822 ac. in MP17; 13,420 ac. in Wautoma);  
1,272 acres drill seed application (all in Wautoma)

### Grasses

Indian Ricegrass ( <i>Oryzopsis hymenoides</i> ) (Nez Par)	3 lbs./ac. PLS
Needle and thread grass ( <i>Stipa comata</i> )	0.2 lbs/acre
Sandberg's bluegrass ( <i>Poa sandbergii</i> ) (Hanford)	2 lbs./ac. PLS
Sand dropseed ( <i>Sporobolous cryptandrus</i> )	0.2 lb. /ac PLS
Bottlebrush squirreltail ( <i>Elymus elymoides</i> )	1.5 lbs./ac PLS
Bluebunch wheatgrass ( <i>Pseudoroegneria spicata</i> )	4 lbs./ac PLS

### Forbs

Yarrow, ( <i>Achillea millefolium</i> )	0.2 lbs./ac PLS
Columbia Blue Flax ( <i>Linum</i> sp.)	0.2 lbs./ac PLS

### Shrubs

Wyoming Big Sagebrush ( <i>Artemisia tridentate</i> ssp. <i>wyomingensis</i> )	0.1 lbs/ac PLS
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.1 lbs/ac PLS
Antelope bitterbrush ( <i>Purshia tridentata</i> )	0.1 lbs/ac PLS

**Mix 3:** Riparian areas: 50 acres (all Wautoma)

Seed Mix 2 plus:

Great Basin Wild Ryegrass seed ( <i>Elymus cinereus</i> )	4 lbs/acre
PLS	

**BENTON COUNTY**  
Updated 8/8/2007

**LISTED**

Endangered

Pygmy rabbit (*Brachylagus idahoensis*) – Columbia Basin distinct population segment

Threatened

Bull trout (*Salvelinus confluentus*) – Columbia River distinct population segment  
*Spiranthes diluvialis* (Ute ladies'-tresses), plant

**CANDIDATE**

Yellow-billed cuckoo (*Coccyzus americanus*)  
*Eriogonum codium* (Umtanum desert buckwheat), plant

**SPECIES OF CONCERN**

Animals

Bald eagle (*Haliaeetus leucocephalus*) (delisted, monitor status)  
Burrowing owl (*Athene cunicularia*)  
California floater (*Anodonta californiensis*), mussel  
Columbia clubtail (*Gomphus lynnae*), dragonfly  
Ferruginous hawk (*Buteo regalis*)  
Giant Columbia spire snail (*Fluminicola columbiana*)  
Loggerhead shrike (*Lanius ludovicianus*)  
Long-eared myotis (*Myotis evotis*)  
Margined sculpin (*Cottus marginatus*)  
Pacific lamprey (*Lampetra tridentata*)  
Pallid Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)  
Redband trout (*Oncorhynchus mykiss*)  
River lamprey (*Lampetra ayresi*)  
Sagebrush lizard (*Sceloporus graciosus*)  
Townsend's ground squirrel (*Spermophilus townsendii*)  
Western brook lamprey (*Lampetra richardsoni*)

## Vascular Plants

*Astragalus columbianus* (Columbia milk-vetch)

*Cryptantha leucophaea* (Gray cryptantha)

*Haplopappus liatriformis* (Palouse goldenweed)

*Lomatium tuberosum* (Hoover's desert-parsley)

*Mimulus jungermannioides* (Liverwort monkey-flower)

*Rorippa columbiae* (Persistent sepal yellowcress)



# Species of Concern

## State Species of Concern

Include those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.

### Search Species Lists

SORT RESULTS BY:

- Common Name
- Scientific Name
- Animal Type

[Search Listings](#)  
[Advanced Search](#)

### Species of Concern Lists

- [Endangered Species](#)
  - [Threatened Species](#)
  - [Sensitive Species](#)
  - [State Candidate Species](#)
- 
- [Complete SOC List](#)
  - [Main SOC Page](#)

### Status Codes:

**FE:** Federal Endangered  
**FT:** Federal Threatened  
**FC:** Federal Candidate  
**FCo:** Federal Species of Concern  
**SE:** State Endangered  
**ST:** State Threatened  
**SC:** State Candidate  
**SS:** State Sensitive

### Mapping Criteria Codes:

*(listed in order of decreasing specificity)*  
 B: Breeding Location (Nest or Den)  
 CR: Communal Roost  
 RC,RLC,RSC: Regular (Large or Small) Concentration  
 RI: Regular Individual  
 IO: Individual Occurrence  
*(If a less specific criterion is listed, then the more specific criteria are implied as well)*

### Related Links

- [State Monitor Species](#)

## Species of Concern in Washington State

Current through June 13, 2007

COMMON NAME	SCIENTIFIC NAME	ANIMAL TYPE	FEDERAL STATUS	STATE STATUS	MAPPING CRITERIA
WESTERN TOAD	<i>BUFO BOREAS</i>	Amphibian	FCo	SC	IO
NORTHERN LEOPARD FROG	<i>RANA PIPIENS</i>	Amphibian	FCo	SE	IO
OREGON SPOTTED FROG	<i>RANA PRETIOSA</i>	Amphibian	FC	SE	IO
COLUMBIA SPOTTED FROG	<i>RANA LUTEIVENTRIS</i>	Amphibian	none	SC	IO
CASCADE TORRENT SALAMANDER	<i>RHYACOTRITON CASCADAE</i>	Amphibian	none	SC	IO
DUNN'S SALAMANDER	<i>PLETHODON DUNNI</i>	Amphibian	none	SC	IO
LARCH MOUNTAIN SALAMANDER	<i>PLETHODON LARSELLI</i>	Amphibian	FCo	SS	IO
VAN DYKE'S SALAMANDER	<i>PLETHODON VANDYKEI</i>	Amphibian	FCo	SC	IO
ROCKY MOUNTAIN TAILED FROG	<i>ASCAPHUS MONTANUS</i>	Amphibian	none	SC	IO
COMMON LOON	<i>GAVIA IMMER</i>	Bird	none	SS	B
WESTERN GREBE	<i>AECHMOPHORUS OCCIDENTALIS</i>	Bird	none	SC	B
SHORT-TAILED ALBATROSS	<i>PHOEBASTRIA ALBATRUS</i>	Bird	FE	SC	IO
AMERICAN WHITE PELICAN	<i>PELECANUS ERYTHORHYNCHOS</i>	Bird	none	SE	B,RSC
BROWN PELICAN	<i>PELECANUS OCCIDENTALIS</i>	Bird	FE	SE	RSC
BRANDT'S CORMORANT	<i>PHALACROCORAX PENICILLATUS</i>	Bird	none	SC	B
GOLDEN EAGLE	<i>AQUILA CHRYSAETOS</i>	Bird	none	SC	B
BALD EAGLE	<i>HALIAEETUS LEUCOCEPHALUS</i>	Bird	FT	ST	B,RSC,CR
NORTHERN GOSHAWK	<i>ACCIPITER GENTILIS</i>	Bird	FCo	SC	B
FERRUGINOUS HAWK	<i>BUTEO REGALIS</i>	Bird	FCo	ST	B
MERLIN	<i>FALCO COLUMBARIUS</i>	Bird	none	SC	B
PEREGRINE FALCON	<i>FALCO PEREGRINUS</i>	Bird	FCo	SS	B,RI
AMERICAN PEREGRINE FALCON	<i>FALCO PEREGRINUS ANATUM</i>	Bird	FCo	SS	B,RI
ARCTIC PEREGRINE FALCON	<i>FALCO PEREGRINUS TUNDRIUS</i>	Bird	FCo	SS	RI
PEALE'S PEREGRINE FALCON	<i>FALCO PEREGRINUS PEALEI</i>	Bird	FCo	SS	B,RI
SHARP-TAILED GROUSE	<i>TYMPANUCHUS PHASIANELLUS</i>	Bird	FCo	ST	B,RSC
SAGE GROUSE	<i>CENTROCERCUS UROPHASIANUS</i>	Bird	FC	ST	B,RSC
SANDHILL CRANE	<i>GRUS CANADENSIS</i>	Bird	none	SE	B,RLC
SNOWY PLOVER	<i>CHARADRIUS ALEXANDRINUS</i>	Bird	FT	SE	B
UPLAND SANDPIPER	<i>BARTRAMIA LONGICAUDA</i>	Bird	none	SE	B,RI
COMMON MURRE	<i>URIA AALGE</i>	Bird	none	SC	B,RC
MARbled MURRELET	<i>BRACHYRAMPHUS MARMORATUS</i>	Bird	FT	ST	B
CASSIN'S AUKLET	<i>PTYCHORAMPHUS ALEUTICUS</i>	Bird	FCo	SC	B
TUFTED PUFFIN	<i>FRATERCULA CIRRHATA</i>	Bird	FCo	SC	RLC
YELLOW-BILLED CUCKOO	<i>COCCYZUS AMERICANUS</i>	Bird	FC	SC	B,RI
BURROWING OWL	<i>ATHENE CUNICULARIA</i>	Bird	FCo	SC	B
FLAMMULATED OWL	<i>OTUS FLAMMEOLUS</i>	Bird	none	SC	B,RI
SPOTTED OWL	<i>STRIX OCCIDENTALIS</i>	Bird	FT	SE	IO
VAUX'S SWIFT	<i>CHAETURA VAUXI</i>	Bird	none	SC	B,CR
LEWIS' WOODPECKER	<i>MELANERPES LEWIS</i>	Bird	none	SC	B
PILEATED WOODPECKER	<i>DRYOCOPUS PILEATUS</i>	Bird	none	SC	B
WHITE-HEADED WOODPECKER	<i>PICOIDES ALBOLARVATUS</i>	Bird	none	SC	B,RI
BLACK-BACKED WOODPECKER	<i>PICOIDES ARCTICUS</i>	Bird	none	SC	B,RI
PURPLE MARTIN	<i>PROGNE SUBIS</i>	Bird	none	SC	B
SLENDER-BILLED WHITE-BREADED NUTHATCH	<i>SITTA CAROLINENSIS ACULEATA</i>	Bird	FCo	SC	IO
LOGGERHEAD SHRIKE	<i>LANIUS LUDOVICIANUS</i>	Bird	FCo	SC	B
OREGON VESPER SPARROW	<i>POOECETES GRAMINEUS AFFINIS</i>	Bird	FCo	SC	B
SAGE SPARROW	<i>AMPHISPIZA BELLI</i>	Bird	none	SC	B

SAGE THRASHER	<i>OREOSCOPTES MONTANUS</i>	Bird	none	SC	B
STREAKED HORNED LARK	<i>EREMOPHILA ALPESTRIS STRIGATA</i>	Bird	FC	SE	B
ISLAND MARBLE	<i>EUCHLOE AUSONIDES INSULANUS</i>	Butterfly/Moth	FCo	SC	IO
MAKAH (QUEEN CHARLOTTE) COPPER	<i>LYCAENA MARIPOSA CHARLOTTENSIS</i>	Butterfly/Moth	FCo	SC	IO
PUGET BLUE	<i>PLEBEJUS ICARIOIDES BLACKMOREI</i>	Butterfly/Moth	none	SC	IO
VALLEY SILVERSPOT	<i>SPEYERIA ZERENE BREMNERII</i>	Butterfly/Moth	FCo	SC	IO
GREAT ARCTIC	<i>OENEIS NEVADENSIS GIGAS</i>	Butterfly/Moth	none	SC	IO
OREGON SILVERSPOT BUTTERFLY	<i>SPEYERIA ZERENE HIPPOLYTA</i>	Butterfly/Moth	FT	SE	IO
MARDON SKIPPER	<i>POLITES MARDON</i>	Butterfly/Moth	FC	SE	IO
SHEPARD'S PARNASSIAN	<i>PARNASSIUS CLODIUS SHEPARDI</i>	Butterfly/Moth	none	SC	IO
SILVER-BORDERED FRITILLARY	<i>BOLORIA SELENE ATROCOSTALIS</i>	Butterfly/Moth	none	SC	IO
JOHNSON'S HAIRSTREAK	<i>MITOURA JOHNSONI</i>	Butterfly/Moth	none	SC	IO
JUNIPER HAIRSTREAK	<i>MITOURA GRYNEA BARRYI</i>	Butterfly/Moth	none	SC	IO
CHINQUAPIN HAIRSTREAK	<i>HABRODAIS GRUNUS HERRI</i>	Butterfly/Moth	none	SC	IO
YUMA SKIPPER	<i>OCHLODES YUMA</i>	Butterfly/Moth	none	SC	IO
TAYLOR'S CHECKERSPOT	<i>EUPHYDRYAS EDITHA TAYLORI</i>	Butterfly/Moth	FC	SE	IO
SAND-VERBENA MOTH	<i>COPABLEPHARON FUSCUM</i>	Butterfly/Moth	none	SC	IO
RIVER LAMPREY	<i>LAMPETRA AYRESI</i>	Fish	FCo	SC	IO
PACIFIC HERRING (CHERRY POINT)	<i>CLUPEA PALLASI</i>	Fish	FC	SC	IO
PACIFIC HERRING (DISCOVERY BAY)	<i>CLUPEA PALLASI</i>	Fish	FC	SC	IO
CHUM SALMON (HOOD CANAL SU)	<i>ONCORHYNCHUS KETA</i>	Fish	FT	SC	none
CHUM SALMON (LOWER COLUMBIA)	<i>ONCORHYNCHUS KETA</i>	Fish	FT	SC	none
COHO SALMON (LOWER COLUMBIA/SW WA)	<i>ONCORHYNCHUS KISUTCH</i>	Fish	FC	none	none
SOCKEYE SALMON (SNAKE R.)	<i>ONCORHYNCHUS NERKA</i>	Fish	FE	SC	none
SOCKEYE SALMON (OZETTE LAKE)	<i>ONCORHYNCHUS NERKA</i>	Fish	FT	SC	none
CHINOOK SALMON (PUGET SOUND)	<i>ONCORHYNCHUS TSHAWYTSCHA</i>	Fish	FT	SC	none
CHINOOK SALMON (UPPER COLUMBIA SP)	<i>ONCORHYNCHUS TSHAWYTSCHA</i>	Fish	FE	SC	none
CHINOOK SALMON (LOWER COLUMBIA)	<i>ONCORHYNCHUS TSHAWYTSCHA</i>	Fish	FT	SC	none
CHINOOK SALMON (SNAKE R. SP/SU)	<i>ONCORHYNCHUS TSHAWYTSCHA</i>	Fish	FT	SC	none
CHINOOK SALMON (SNAKE R. FALL)	<i>ONCORHYNCHUS TSHAWYTSCHA</i>	Fish	FT	SC	none
STEELHEAD (SNAKE RIVER)	<i>ONCORHYNCHUS MYKISS</i>	Fish	FT	SC	none
STEELHEAD (MIDDLE COLUMBIA)	<i>ONCORHYNCHUS MYKISS</i>	Fish	FT	SC	none
STEELHEAD (UPPER COLUMBIA)	<i>ONCORHYNCHUS MYKISS</i>	Fish	FT	SC	none
STEELHEAD (PUGET SOUND)	<i>ONCORHYNCHUS MYKISS</i>	Fish	FT	.	none
STEELHEAD (LOWER COLUMBIA)	<i>ONCORHYNCHUS MYKISS</i>	Fish	FT	SC	none
BULL TROUT	<i>SALVELINUS CONFLUENTUS</i>	Fish	FT	SC	none
BULL TROUT (COLUMBIA BASIN)	<i>SALVELINUS CONFLUENTUS</i>	Fish	FT	SC	none
BULL TROUT (COASTAL/PUGET SOUND)	<i>SALVELINUS CONFLUENTUS</i>	Fish	FT	SC	none
EULACHON	<i>THALEICHTHYS PACIFICUS</i>	Fish	none	SC	RC
OLYMPIC MUDMINNOW	<i>NOVUMBRA HUBBSI</i>	Fish	none	SS	IO
PYGMY WHITEFISH	<i>PROSOPIUM COULTERI</i>	Fish	FCo	SS	IO
LAKE CHUB	<i>COUESIUS PLUMBEUS</i>	Fish	none	SC	IO
LEOPARD DACE	<i>RHINICHTHYS FALCATUS</i>	Fish	none	SC	IO
UMATILLA DACE	<i>RHINICHTHYS UMATILLA</i>	Fish	none	SC	IO
MOUNTAIN SUCKER	<i>CATOSTOMUS PLATYRHYNCHUS</i>	Fish	none	SC	IO
PACIFIC COD (S&C PUGET SOUND)	<i>GADUS MACROCEPHALUS</i>	Fish	FCo	SC	IO
PACIFIC HAKE (C. PUGET SOUND)	<i>MERLUCCIIUS PRODUCTUS</i>	Fish	FCo	SC	IO
WALLEYE POLLOCK (SO. PUGET SOUND)	<i>THERAGRA CHALCOGRAMMA</i>	Fish	FCo	SC	IO
BROWN ROCKFISH	<i>SEBASTES AURICULATUS</i>	Fish	FCo	SC	IO
COPPER ROCKFISH	<i>SEBASTES CAURINUS</i>	Fish	FCo	SC	IO

GREENSTRIPED ROCKFISH	<i>SEBASTES ELONGATUS</i>	Fish	none	SC	IO
WIDOW ROCKFISH	<i>SEBASTES ENTOMELAS</i>	Fish	none	SC	IO
YELLOWTAIL ROCKFISH	<i>SEBASTES FLAVIDUS</i>	Fish	none	SC	IO
QUILLBACK ROCKFISH	<i>SEBASTES MALIGER</i>	Fish	FCo	SC	IO
BLACK ROCKFISH	<i>SEBASTES MELANOPS</i>	Fish	none	SC	IO
CHINA ROCKFISH	<i>SEBASTES NEBULOSUS</i>	Fish	none	SC	IO
TIGER ROCKFISH	<i>SEBASTES NIGROCINCTUS</i>	Fish	none	SC	IO
BOCACCI ROCKFISH	<i>SEBASTES PAUCISPINIS</i>	Fish	none	SC	IO
CANARY ROCKFISH	<i>SEBASTES PINNIGER</i>	Fish	none	SC	IO
REDSTRIPE ROCKFISH	<i>SEBASTES PRORIGER</i>	Fish	none	SC	IO
YELLOWEYE ROCKFISH	<i>SEBASTES RUBERRIMUS</i>	Fish	none	SC	IO
MARGINED SCULPIN	<i>COTTUS MARGINATUS</i>	Fish	FCo	SS	IO
MERRIAM'S SHREW	<i>SOEX MERRIAMII</i>	Mammal	none	SC	IO
KEEN'S MYOTIS	<i>MYOTIS KEENII</i>	Mammal	none	SC	B,IO
TOWNSEND'S BIG-EARED BAT	<i>CORYNORHINUS TOWNSENDII</i>	Mammal	FCo	SC	B,CR
PACIFIC TOWNSEND'S BIG-EARED BAT	<i>CORYNORHINUS TOWNSENDII TOWNSENDII</i>	Mammal	FCo	SC	B,CR
PALLID TOWNSEND'S BIG-EARED BAT	<i>CORYNORHINUS TOWNSENDII PALLESCENS</i>	Mammal	FCo	SC	B,CR
PYGMY RABBIT	<i>BRACHYLAGUS IDAHOENSIS</i>	Mammal	FE	SE	IO
WHITE-TAILED JACKRABBIT	<i>LEPUS TOWNSENDII</i>	Mammal	none	SC	IO
BLACK-TAILED JACKRABBIT	<i>LEPUS CALIFORNICUS</i>	Mammal	none	SC	IO
WESTERN GRAY SQUIRREL	<i>SCIURUS GRISEUS</i>	Mammal	FCo	ST	IO
WASHINGTON GROUND SQUIRREL	<i>SPERMOPHILUS WASHINGTONI</i>	Mammal	FC	SC	IO
TOWNSEND'S GROUND SQUIRREL	<i>SPERMOPHILUS TOWNSENDII TOWNSENDII</i>	Mammal	none	SC	IO
MAZAMA (WESTERN) POCKET GOPHER	<i>THOMOMYS MAZAMA</i>	Mammal	FC	ST	IO
SHELTON POCKET GOPHER	<i>THOMOMYS MAZAMA COUCHI</i>	Mammal	FC	ST	IO
OREGON POCKET GOPHER	<i>THOMOMYS MAZAMA OREGONUS</i>	Mammal	none	ST	IO
CATHLAMET POCKET GOPHER	<i>THOMOMYS MAZAMA LOUIEI</i>	Mammal	FC	ST	IO
OLYMPIC POCKET GOPHER	<i>THOMOMYS MAZAMA MELANOPS</i>	Mammal	FC	ST	IO
YELM POCKET GOPHER	<i>THOMOMYS MAZAMA YELMENSIS</i>	Mammal	FC	ST	IO
GRAY-TAILED VOLE	<i>MICROTUS CANICAUDUS</i>	Mammal	none	SC	IO
GRAY WOLF	<i>CANIS LUPUS</i>	Mammal	FE	SE	IO
GRIZZLY BEAR	<i>URSUS ARCTOS</i>	Mammal	FT	SE	IO
FISHER	<i>MARTES PENNANTI</i>	Mammal	FC	SE	IO
WOLVERINE	<i>GULO GULO</i>	Mammal	FCo	SC	IO
SEA OTTER	<i>ENHYDRA LUTRIS</i>	Mammal	FCo	SE	B,RI,RSC
SEA OTTER	<i>ENHYDRA LUTRIS LUTRIS</i>	Mammal	none	SE	B,RI,RSC
LYNX	<i>LYNX CANADENSIS</i>	Mammal	FT	ST	IO
GRAY WHALE	<i>ESCHRICHTIUS ROBUSTUS</i>	Mammal	none	SS	IO
SEI WHALE	<i>BALAENOPTERA BOREALIS</i>	Mammal	FE	SE	IO
FIN WHALE	<i>BALAENOPTERA PHYSALUS</i>	Mammal	FE	SE	IO
BLUE WHALE	<i>BALAENOPTERA MUSCULUS</i>	Mammal	FE	SE	IO
HUMPBACK WHALE	<i>MEGAPTERA NOVAEANGLIAE</i>	Mammal	FE	SE	IO
BLACK RIGHT WHALE	<i>BALAENA GLACIALIS</i>	Mammal	FE	SE	IO
KILLER WHALE	<i>ORCINUS ORCA</i>	Mammal	FE	SE	IO
PACIFIC HARBOR PORPOISE	<i>PHOCOENA PHOCOENA</i>	Mammal	none	SC	RSC
SPERM WHALE	<i>PHYSETER MACROCEPHALUS</i>	Mammal	FE	SE	IO
COLUMBIAN WHITE-TAILED DEER	<i>ODOCOILEUS VIRGINIANUS LEUCURUS</i>	Mammal	FE	SE	IO
WOODLAND CARIBOU	<i>RANGIFER TARANDUS</i>	Mammal	FE	SE	IO
STELLER SEA LION	<i>EUMETOPIAS JUBATUS</i>	Mammal	FT	ST	RSC
PINTO ABALONE	<i>HALIOTIS KAMTSCHATKANA</i>	Mollusk	FCo	SC	IO
OLYMPIA OYSTER	<i>OSTREA LURIDA</i>	Mollusk	none	SC	IO
GIANT COLUMBIA RIVER LIMPET	<i>FISHEROLA NUTTALLI</i>	Mollusk	none	SC	IO
GREAT COLUMBIA SPIRE SNAIL	<i>FLUMINICOLA COLUMBIANA</i>	Mollusk	FCo	SC	IO
BLUE-GRAY TAILDROPPER	<i>PROPHYSAON COERULEUM</i>	Mollusk	none	SC	IO
COLUMBIA OREGONIAN	<i>CRYPTOMASTIX HENDERSONI</i>	Mollusk	none	SC	IO
POPLAR OREGONIAN	<i>CRYPTOMASTIX POPULI</i>	Mollusk	none	SC	IO

DALLES SIDEBAND	<i>MONADENIA FIDELIS MINOR</i>	Mollusk	none	SC	IO
NEWCOMB'S LITTORINE SNAIL	<i>ALGAMORDA SUBROTUNDATA</i>	Mollusk	FCo	SC	IO
CALIFORNIA FLOATER	<i>ANODONTA CALIFORNIENSIS</i>	Mollusk	FCo	SC	IO
COLUMBIA CLUBTAIL	<i>GOMPHUS LYNNAE</i>	Other Insect	FCo	SC	IO
COLUMBIA RIVER TIGER BEETLE	<i>CICINDELA COLUMBICA</i>	Other Insect	none	SC	IO
BOG IDOL LEAF BEETLE	<i>DONACIA IDOLA</i>	Other Insect	none	SC	IO
HATCH'S CLICK BEETLE	<i>EANUS HATCHI</i>	Other Insect	FCo	SC	IO
BELLER'S GROUND BEETLE	<i>AGONUM BELLERI</i>	Other Insect	FCo	SC	IO
MANN'S MOLLUSK-EATING GROUND BEETLE	<i>SCAPHINOTUS MANNII</i>	Other Insect	none	SC	IO
WESTERN POND TURTLE	<i>CLEMMYS MARMORATA</i>	Reptile	FCo	SE	IO
LEATHERBACK SEA TURTLE	<i>DERMOCHELYS CORIACEA</i>	Reptile	FE	SE	IO
GREEN SEA TURTLE	<i>CHELONIA MYDAS</i>	Reptile	FT	ST	IO
SAGEBRUSH LIZARD	<i>SCELOPORUS GRACIOSUS</i>	Reptile	FCo	SC	IO
LOGGERHEAD SEA TURTLE	<i>CARETTA CARETTA</i>	Reptile	FT	ST	IO
SHARPTAIL SNAKE	<i>CONTIA TENUIS</i>	Reptile	FCo	SC	IO
STRIPED WHIPSNAKE	<i>MASTICOPHIS TAENIATUS</i>	Reptile	none	SC	IO
CALIFORNIA MOUNTAIN KINGSNAKE	<i>LAMPROPELTIS ZONATA</i>	Reptile	none	SC	IO

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