United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Elko Field Office
3900 East Idaho Street
Elko, Nevada 89801-4611

In Reply Refer To:
9211 (NV-014)
USFWS File No. 1-5-03-TA-075

/s/ September 3, 2003

Robert Williams
U.S. Fish and Wildlife Service
1340 Financial Blvd. #234
Reno, NV 89502

Dear Mr. Williams:

Attached please find three copies of the Final Biological Assessment (BA) for the Elko/Wells Resource Management Plan Fire Management Amendment. This Final BA incorporates comments received from your office to the draft BA dated February 19, 2003.

Due to delays in the development and issuance of the Proposed Fire Management Amendment, the dates listed in the timeline described in our consultation agreement are no longer accurate. Originally, the timeline proposed to complete a streamlined formal Section 7 consultation process prior to issuance of the Proposed Fire Management Amendment. The high degree of coordination with your staff throughout this amendment process has resulted in very specific standard operating procedures for species protection which tier from National Guidelines for Aerial Application of Fire Retardant and Foams in Aquatic Environments. Therefore, based on our discussions at the meeting held with your staff on January 24, 2003, we feel very comfortable with issuing the Final BA and completing the informal consultation process concurrent with issuance of the Proposed Fire Management Plan Amendment and subsequent 30-day protest period. We anticipate that the Proposed Amendment will be issued to the public September 15, 2003, if not sooner, with the protest period ending thirty days following issuance.

Therefore, we are requesting, through informal consultation, that the Fish and Wildlife Service concur with our determination, as outlined in the attached final BA, that the proposed action for the Elko/Wells Resource Management Plan Fire Management Amendment may affect the continued existence of the threatened Lahontan cutthroat trout, and the endangered Clover Valley and Independence Valley speckled dace, but is not likely to adversely affect these species or their habitat.

The Memorandum of Agreement between the Fish and Wildlife Service, Forest Service, Bureau of Land Management, and the National Marine Fisheries Service, dated August 30, 2000, established procedures to improve the efficiency and effectiveness of plan and programmatic level section 7 consultation processes. Consistent with this memorandum of agreement, the Columbia spotted frog, a candidate species, was included in the BA for this Fire Management Plan Amendment. Therefore, we are also requesting concurrence with our determination that the proposed action may affect the continued existence of the Columbia spotted frog, but is not likely to adversely affect this candidate species or its habitat.

Once again, we hope to complete the informal section 7 consultation process for this Fire Management Plan Amendment concurrent with the issuance of the Proposed Plan Amendment and subsequent 30-day protest period, which is expected to end October 15, 2003. If this date needs to be adjusted, please contact myself or Ray Lister of my staff.

Sincerely,

/s/

HELEN HANKINS
Elko Field Office Manager

August 2003

Elko / Wells Resource Management Plans

FINAL

Fire Management Amendment
Biological Assessment

(Actual cover and table of contents not available for posting on our public website)

1.0 INTRODUCTION

A. Purpose of the Biological Assessment

The Bureau of Land Management (BLM) Elko Field Office is proposing to complete an environmental assessment level amendment to the Elko and Wells Resource Management Plans (RMP) to address fire management issues within the BLM Elko District. The current RMP's do not specifically address fire management issues in a comprehensive way, which has created many challenges for managing the recent increase in fire activity and its impacts to natural resources and public land users. This Biological Assessment (BA) will accompany the Environmental Assessment and will address threatened, endangered, proposed and candidate species and the effects the proposed amendment action will have on them as required under Section 7(C) of the Endangered Species Act.

B. Species Evaluated

The BLM Elko Field Office sent a letter to Robert Williams of the U.S. Fish and Wildlife Service (FWS) on December 14, 2001 requesting an updated threatened, endangered, or candidate species list for the Elko Field Office area of administration. A memorandum response from FWS went out on December 26, 2001 that included a species list, an enclosure on Federal Agencies' Responsibilities under Sections 7 (a) and (c) of the Endangered Species Act, and management guidelines for sage grouse. FWS listed the following endangered, threatened, proposed threatened, or candidate species as having the potential to occur in the proposed action area: mountain plover (*Charadrius montanus*); western yellow-billed cuckoo (*Coccyzus americanus*); bald eagle (*Haliaeetus leucocephalus*); Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*); Independence Valley speckled dace (*Rhinichthys osculus lethoporus*); Clover Valley speckled dace (*Rhinichthys osculus oligoporus*); bull trout (*Salvelinus confluentus*); and Columbia spotted frog (*Rana luteiventris*). An additional list of Species of Concern was initially included by the FWS for consideration; however, through informal consultation between BLM and FWS, it was determined that these species did not need to be covered by the BA. The complete FWS memorandum and list of species can be found in Appendix 1.

FWS recommended that sage grouse (a Species of Concern), their leks and other sage grouse habitats be considered for potential impacts. The Western States Sage Grouse and Columbia Sharp-tailed Grouse Technical Committee, under the direction of the Western Association of Fish and Wildlife Agencies (WAFWA), developed guidelines in 2000 to manage and protect sage grouse and their habitats. Sage grouse are not considered in this BA, however, fire management impacts to this species will be addressed in the environmental assessment prepared for the fire management amendment. An interagency Memorandum of Understanding was developed in 2000 for the conservation and management of sage grouse and their sagebrush habitats. As per this MOU, BLM will provide for habitat protection, conservation and restoration, as appropriate, consistent with the NEPA and other applicable laws, regulations, directives and policies. In doing so, the BLM will consider the 2000 WAFWA guidelines and other appropriate information in their respective planning processes. This would include all fire management activities.

A meeting between BLM and FWS was held on 20 November 2001. At this meeting it was agreed that the following endangered, threatened, proposed and/or candidate species would be included in the BA: bald eagle, Lahontan cutthroat trout, Independence Valley speckled dace, Clover Valley speckled dace, and Columbia spotted frog. The Columbia spotted frog (candidate species) will be addressed in this BA, consistent with the August 30, 2000 agency Memorandum of Agreement that established procedures for plan and programmatic level section 7 consultation processes. Although bull trout are known to exist on public lands in Elko County, these public lands are administered by the BLM Boise District and are not affected by the proposed action. Potential habitat for the mountain plover and western yellow-billed cuckoo may exist within the District; however there are no recent documented sightings. Therefore, the BA will not address impacts from the proposed action to these species. A consultation agreement has been developed to define the process, products, actions, and timeframes and to serve as the guiding document for both BLM and the FWS throughout the consultation process.

1. Species Considered But Not Affected

The bald eagle winters at low density in northeastern and north central Nevada. This species would not be directly affected by the fire management amendment because they are not known to nest within the project area. Therefore, fire management activities during the summer/fall would not impact nesting activities. If a fire occurs during fall migration, there is a low potential for indirect effects to occur to this species. Indirect effects could include a reduction of prey base, roosting trees and other habitat features due to fire. However, this species would be able to move to an area of appropriate habitat away from the effects of the Proposed Action. Due to the low probability of significant effects to bald eagles, this species is not considered further in this BA.

C. Consultation to Date

Federal agency consultation regarding threatened and endangered species is addressed in Section 7 of the Federal Endangered Species Act of 1973, as amended. For this project, the federal agency initiating this process is the BLM. In particular, Section 7(a)(3) requires a federal agency to consult with the FWS if the agency has reason to believe that any proposed federal action could directly or indirectly affect an endangered or threatened species. The FWS developed regulations that implement the provisions of Section 7 and detail the methods for implementation. Two types of consultations are described in these regulations, informal and formal.

An informal consultation is an optional process that includes all discussions and correspondence between the FWS and the federal agency to determine whether a formal consultation or conference is required. In practice, informal consultations also include discussions in which the FWS provides advice, or recommends mitigation measures, that could result in avoidance/minimization of adverse effects on endangered or threatened species.

A formal consultation is a process between the FWS and the federal agency that commences with the federal agency's written request for consultation under Section 7(a)(2) of the Act and concludes with the FWS's issuance of a BO under Section 7(a)(3). This written request is called "initiation of formal consultation." A formal consultation is required when the federal agency determines through a BA or informal consultation that the Proposed Action "may affect" a listed species or its critical habitat. Formal consultation is required based on the ongoing informal project consultation and the findings of the Environmental Assessment (EA) that listed species may be affected by project implementation.

In response to the 9th Circuit Court of Appeals ruling in Pacific Rivers Council vs. Thomas, the Federal land management agencies entered into a Memorandum of Agreement on August 30, 2000, establishing procedures to improve the efficiency and effectiveness of plan and programmatic level section 7 consultation processes. This MOA established a 90-day time line for formal consultations. Specifically, the FWS shall provide the BLM with a draft BO within 75 days after delivery of all agreed-upon consultation information. The BLM shall review and comment to the draft BO within 10 days of receipt and the FWS shall prepare a final BO within 5 days of receiving BLM comments on the draft BO. A BO includes:

- A summary of the information on which the opinion was based (the information is to be provided by the federal agency)

- A detailed discussion of the effects of the action on the listed species or critical habitat, and

- The FWS's opinion on whether the action is likely to jeopardize the continued existence of a listed species.

The BO may include an incidental take statement that specifies: 1) the amount of "take" that is allowed, 2) reasonable and prudent measures that the FWS considers necessary or appropriate to minimize such "take," and 3) compliance terms and conditions for implementing reasonable and prudent measures.

Fire-control chemicals are an important tool in fighting fires on lands subject to federal wildfire suppression activities. The two most commonly used types of fire control chemicals are long-term fire retardants and short-term fire-suppressant foams. Since most fire-control chemicals are applied using aircraft, aquatic habitats near the drop zone are subject to accidental inputs. At the request of the Forest Service, the United States Geological Service (USGS), Columbia Environmental Research Center, undertook a laboratory analysis of the anti-corrosive agent used in fire retardants to determine whether it had an adverse effect on aquatic species and their habitat. On 28 March, 2000 federal wildland fire management agencies suspended use of some fire retardant products because of concerns about their effects on aquatic environments.

Through informal expedited consultations, the Federal agencies responsible for wildland fire suppression and the Fish and Wildlife Service (FWS) developed interim guidelines for the use of aerial application of fire retardants and foams to address an unforeseen emergency under the Endangered Species Act. In addition to the implementation of interim guidelines, the federal wildland fire suppression agencies agreed to undertake follow-up field studies to monitor residual effects of fire retardants in the environment from the 1999 and 2000 fire seasons. The federal wildland fire suppression agencies requested concurrence with these guidelines from the FWS on 19 April 2000 (Appendix 2). The FWS concurred with these guidelines on 20 April 2000 (Appendix 3). It was agreed that these guidelines would remain in effect until 31 December 2000 with possible extension through 2001. In addition, the federal agencies would be required to complete a programmatic consultation on the use of fire retardant chemicals utilizing the results of these studies. On 20 April 2000 the BLM National Office of Fire and Aviation issued Instruction Memorandum No. OF&A 2000-011 (Appendix 4) requiring the use of these guidelines.

On 27 February 2001 the federal wildland fire suppression agencies submitted a Biological Assessment/Evaluation of Aerially Delivered Fire Retardant Guidelines to FWS (Appendix 5). Since the results of studies to evaluate the effects of retardants would not be available until early 2003, the federal agencies requested that the guidelines remain in effect through the 2003 fire season. In their letter dated 6 June, 2001 the FWS agreed that the guidelines provide appropriate measures to protect aquatic species, further stating that if the guidelines are followed, adverse effects to listed aquatic species are not likely to occur. The FWS further agreed that in those situations where the guidelines cannot be fully implemented, it is possible that retardants could reach waterways where threatened or endangered species are present and adverse effects could occur. In such situations, the emergency consultation procedures described at 50 CFR 402.05 should be used. The FWS agreed with the determination of effect stated in the biological assessment/evaluation that implementing the guidelines may affect, but is not likely to adversely affect, federally threatened or endangered species. The FWS agreed to extend their concurrence on the use of the guidelines through 31 December 2002 (Appendix 6).

A meeting was held on 20 November 2001 between BLM Elko Field Office and FWS Reno Field Office to initiate early coordination/informal consultation for the proposed Fire Management Amendment. FWS responded to BLM's 14 December 2001 request for a species list on 26 December 2001. In accordance with the August 30, 2000 interagency Memorandum of Agreement for Programmatic Section 7 Consultations and Coordination, a consultation agreement was developed to define the process, products, actions, and timeframes and to serve as the guiding document for both BLM and the USFWS throughout the consultation process. This consultation agreement was approved on 9 September 2002 (Appendix 7).

As part of the early coordination process, the Elko BLM also developed draft Standard Operating Procedures (SOP) for species protection to be included as part of the proposed action for the Fire Management Amendment. BLM incorporated FWS comments to the draft SOPs in January 2002. These SOPs are designed to be consistent with the national guidelines issued in April 2000, as amended, with respect to application and use of fire retardants and suppressant foams. They will be referred to for species management in initial attack agreements between the Elko District and adjoining BLM districts or other State or federal agencies. The SOPs for the listed species addressed in the BA can be found in Section 6.

A meeting was held on 24 January 2003 at the Reno Field Office of the US Fish and Wildlife Service to discuss the ongoing Section 7 Consultation action for the FMP. Discussions focused around various issues in the preliminary draft BA. It was agreed that the BA determination (implementation of the FMP proposed action and the SOPs for species protection may affect, but is not likely to adversely affect the listed species evaluated) was consistent with the National Biological Assessment and USFWS concurrence for the use of fire retardants.

D. Current Fire Management

The current fire management in the District follows the general guidance of the current Fire Plan and other existing guiding documents to protect and maximize the safety of fire operational personnel and the public and achieve resource management objectives. The current fire management consists of fire suppression, prevention, and rehabilitation.

The fire response strategy focuses primarily on full suppression of almost all fires. A Wildland Fire Situation Analysis (WFSA) is prepared by all Federal land management agencies for fire incidents which are expected to go beyond one burning period (i.e. beyond the first 24 hours). The WFSA describes critical resources (including threatened, endangered, candidate, and special status species and habitats) to be protected and managed for by the fire management team. In addition, a local resource advisor is assigned to work with the fire team to advise them of critical resource issues such as threatened, endangered or candidate species and habitat in the wildland fire area.

Current direction for retardant application is contained in the April 2000 interim Guidelines for Aerial Application of Retardants and Foams in Aquatic Environments (Appendix 4). Under these Guidelines, aerial application of retardant beyond 300 feet of a waterway is presumed to avoid adverse effects to aquatic threatened, endangered, proposed and sensitive species (TEPS) or their habitats (Russell 2000). However, there are exceptions included in the guidelines that provide for applying retardants closer to waterways. In cases where retardants are applied closer than 300 feet from waterways (either purposefully or accidentally), the line officer for the wildland fire suppression effort is required to determine if the deviation resulted in any adverse effects to listed species. If there are no adverse effects to aquatic TEPS or their habitats, additional consultation with the FWS is deemed unnecessary. If adverse effects to aquatic TEPS or their habitats are observed, then emergency consultation with FWS as described at 50 CFR 402.05 would be necessary.

Fire prevention in the District has included an extensive system of fuel breaks and green strips and the reduction of fuel-loads through the use of prescribed fire and mechanical treatments. Efforts to rectify the fuel-loading hazard and use other fire prevention measures in the District have been successful, although limited in their extent. The Elko Field Office had conducted an average of one prescribed fire project each year, with acreage totals ranging from 100 to 1,500 acres. Between the period from 1979 to 2001, 17 prescribed fires have been conducted totaling 13,000 acres.

The Elko District first prepared a Fire Management Plan in 1998. This plan identified 240,000 acres for fuel reduction activities, with 25,000 acres being targeted annually. Fuel reduction activities have typically included burning or mechanical treatment of rangeland (crested wheatgrass) seedlings to restore productivity, vegetation enhancement in sagebrush communities, wildlife habitat treatments in pinyon-juniper, and burning in mixed conifer forests to reduce fuel loads and create uneven aged stand classes.

Historically, fire impacts to riparian habitat important to one of the listed species covered in this BA, Lahontan cutthroat trout (LCT), have been limited. There are 512 stream miles of LCT habitat in the Elko District (238 miles of public streams and 274 miles of private stream), with approximately 318 miles occupied by LCT (100 public, 218 private).

As shown in Table 1-1, a 20-year fire history from 1980-2001 has resulted in direct wildfire impacts to 14.84 miles of public occupied LCT habitat. These impacts occurred in 1999-2001, which were the years of highest recorded fire occurrence during the 20 history. This might also suggest that implementation of a balanced approach to fire management in the Elko District; designed to reduce wildfire occurrence and severity could result in a significant reduction of potential impacts to LCT habitat.

Table 1-1. Summary of LCT Stream Miles Affected by Fire in the Elko District.

Year	Fire	Stream	Public Miles	Private Miles	Total Miles
1980-1998	N/A	N/A	0	0	0
1999	Sadler	Dixie Creek	0.5	3.0	3.5
1999	Sadler	Trout Creek	3.9	3.5	7.4
2000	Camp Creek	Wildcat Creek	0.43	2.32	2.75
2001	Stag	Conners Creek	5.71	0.0	5.71
2001	Coyote	Beaver Creek	3.3	11.7	15.0
2001	Buffalo	Frazier Creek	1.0	2.8	3.8
Total Miles Impacted			**14.84**	**23.32**	**38.16**

Under the current fire management plan, rehabilitation activities are conducted to emulate historic or pre-fire ecosystem structure, function, and diversity and/or to restore a healthy stable ecosystem. It is suggested that long term implications resulting from the current fire management components described above may result in an increase in rehabilitation activities as fuel load and fire intensity increase.

E. BLM Endangered Species Act Policy

BLM's 6840 Special Status Species Management Manual (revised 19 January 2001) addresses the policies for the following sensitive species status: 1) species proposed for listing, officially listed as threatened or endangered, or candidates for listing as threatened or endangered under the provisions of the ESA; 2) those listed by a state in a category such as threatened or endangered implying potential endangerment or extinction; and 3) those designated by each State Director as sensitive. In summary, the objectives of this policy are to conserve listed species and their ecosystems, and to ensure that actions requiring BLM approval are consistent with the conservation needs of the special status species and do not contribute to the need to list any sensitive species.

2.0 DESCRIPTION OF PROPOSED ACTION

A. Purpose and Need

The purpose and need for the proposed action is to develop a Fire Management Amendment (FMA) to the Elko/Wells Resource Management Plans (RMP) in an effort to better manage fire occurrence and severity within the Elko Field Office area of administration. Severe fire seasons over the last several years have affected not only the number of acres burned, but also the number of firefighters mobilized, amount of tax dollars spent on emergency suppression, and damage to private property. Much like the 1995 Review and Update of the Federal Wildland Fire Management Policy (FWFMP), the 2001 Review repeatedly emphasized the critical importance of "… the development and implementation of high-quality Fire Management Plans by all land managing agencies." Because of the recent fire patterns and reviews of FWFMPs, developing a high quality FMA for the District has become a priority. An additional need for the FMA is that the Elko/Wells RMP does not specifically address fire management.

The FMA incorporates four components: general fire management, fire prevention, fire response, and fire rehabilitation. General fire management covers maximizing the safety of fire operational personnel and the public and meeting the management objectives outlined in the Fire Management Categories (FMC). FMC's are further subdivided into smaller management units called polygons (refer to the EA for a complete description of these categories). Fire prevention includes fire/access roads, prescribed burns, fuel breaks and other modifications of existing fuel loads. Fire response covers the descriptions of FMC's and polygons. Fire rehabilitation measures include standard policies for rehabilitation of burned areas. These components do not work in isolation, but are connected or based on existing SOPs and other guiding documents. The planning framework for the FMA began with the guidance document, Elko and Wells Resource Management Plan. This was followed by a number of environmental documents that formed the foundation for the four components of the Fire Management Plan:

1. General Fire Management is guided by all documents.

2. Fire Prevention is guided by the Vegetation Treatment on BLM Lands in Thirteen Western States Environmental Impact Statement (1991), which analyzes the general impact of prescribed burning and manual fuels treatments on public lands.

3. Fire Suppression is guided by the Elko District Field Office Fire Management Plan developed by the BLM Elko Fire Management Officer.

4. Fire Rehabilitation is guided by the Guidelines for Rangeland Health, and the Interagency Burned Area Emergency Fire Rehabilitation Handbook.

B. Project Location

The area included within the Fire Management Plan is the BLM Elko Field Office area of administration in northeastern Nevada (Figure 1-1). The District is located in Elko, Eureka, and Lander Counties. It is bisected by Interstate 80, which runs west to east. The City of Elko is located in the center of this District. Adjacent counties include White

Pine, Eureka and Lander. The Elko District covers the area encompassed by Township 26 North to Township 47 North and from Range 44 East to Range 70 East, Mount Diablo Base and Meridian.

C. Timing of Actions

Although wildland fires may occur year-round, the accepted length of the fire season is from May 11 to September 27. Fire response activities typically occur more heavily during this time period. Fire prevention activities would occur both during the fire season and other times of the year (i.e., spring and fall). Fire rehabilitation would occur as soon as necessary to complete the treatment prior to the onset of wet winter weather (BLM Supplemental Emergency Stabilization and Rehabilitation Guidance (SESRG)). Congress has determined that "it is in the best interest of the Nation to take swift action to rehabilitate burned lands". Additionally, treatment must occur at a time that will insure a maximum probability of success. Therefore, the BLM SESRG requires that Emergency Stabilization and Rehabilitation Plans (ESRPs) and Normal Fire Rehabilitation Plans (NFRPs) should be submitted to management review or approval within 21 calendar days of wildland fire control.

D. Implementing Agencies

The BLM is responsible for the protection of approximately 48 million acres of public land in the state of Nevada, with six field offices and two field stations. The Elko Field Office encompasses approximately 12.5 million acres within northeastern Nevada, of which the Elko Field Office manages 7.5 million acres. This office is considered to be one of the highest fire load field offices within the BLM nationwide.

Fire response is based on a cooperative effort between BLM, the Nevada Division of Forestry (NDF), Humboldt-Toiyabe National Forest, Bureau of Indian Affairs, U. S. Fish and Wildlife Service and other agencies. The Elko Interagency Dispatch Center (EIDC) is staffed by the BLM, NDF and the USFS, and works as an "all risk" dispatch center. There are cooperative initial attack agreements with the NDF, the Battle Mountain, Winnemucca, Ely, Salt Lake and Upper Snake River Field Offices of the BLM to streamline initial attack and reduce duplication of effort.

E. Project Actions

1. Fire Management

The Elko Field Office proposes a balanced approach to fire management, providing a range of appropriate strategies for fire management. The proposed action assumes wildfire can have a positive or negative influence on resources in the District, depending on geographic location, fire size, desired vegetative goals, weather and existing fuel conditions.

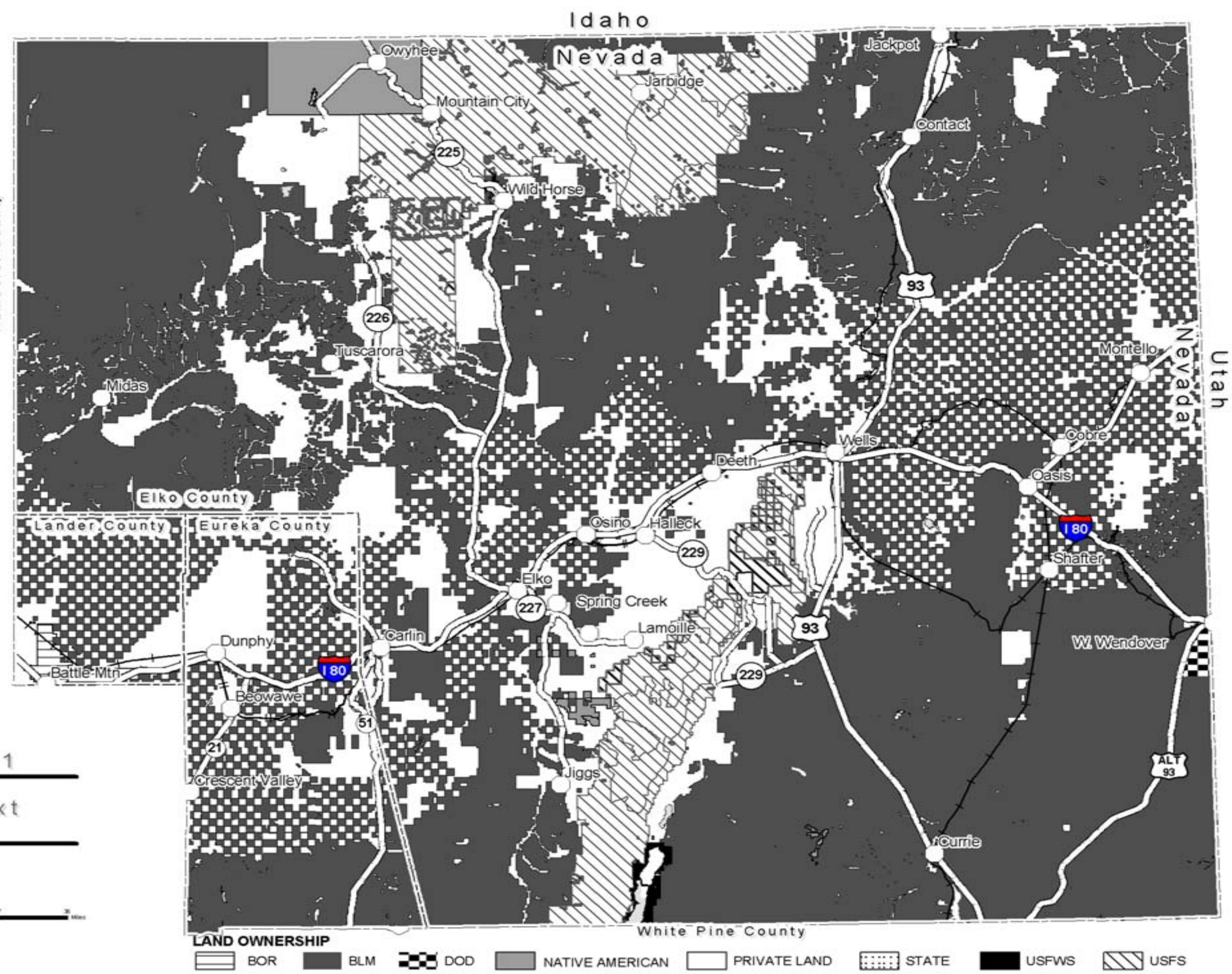

Figure 1 - 1

Site Context

The proposed action uses a number of strategies to address fire prevention, fire management and fire rehabilitation on public lands in the District. Since the occurrence of fire is variable and unpredictable, it is difficult to estimate what strategies will be necessary and the acreage that would be affected. The amount and types of strategies would be continually reevaluated based on existing and future guidelines and standard operating procedures developed for resource management and protection.

The proposed action uses a balanced and comprehensive approach to fire management that includes:

1. General Fire Management: Follow general guidance of the Fire Plan RMP Amendment and other guiding documents to protect and maximize the safety of fire operational personnel and the public, achieve resource management objectives and improve the long-term management of fire.

2. Fire Prevention: Vegetative manipulation and fuels reduction should be maximized through the use of prescribed burns, fuel breaks, mechanical treatments, herbicide, green strips and thinning to reduce wildfire fuel hazards.

3. Fire Response: Fire response should be maximized in most areas. The top-down FMA gives guidance and flexibility to managers and provides a full range of options for appropriate management responses to wildland fires.

4. Fire Rehabilitation: Repair or improve land damaged directly by wildland fire that is unlikely to recover naturally. Rehabilitation would be minimized if fire prevention and fire suppression strategies are achieved.

By using a balanced approach focusing on all elements of fire management, the size and severity of future fires may be reduced and critical resources protected. If the Proposed Action is implemented, site-specific project plans and NEPA documents will be developed with public participation, for each location or group of locations, under the criteria listed in the Fire Management Implementation Procedures of the EA. The activity plans, including site-specific environmental analysis by an interdisciplinary team, will identify issues at the ecological or vegetative site level. Specific measures that could be taken for the three types of fire management are briefly described below. For further detail refer to Chapter 2 in the EA.

2. Fire Prevention

Reduction of fuel load can be achieved through prescribe fire, mechanical methods (chaining, brush aerator, dixie harrow), chemical treatments (herbicides such as tebuthiron), and biological treatments (grazing). These options would be chosen based on consideration of fire management objectives and resource goals for the area (See Table 2B-5 in the EA).

Prescribed burning is one of the primary methods of reducing fuel loads. Prescribed burns are the planned and controlled burning of an area and could include managing some naturally occurring wildland fires to achieve resource management objectives. Ignitions, including those that are naturally occurring (i.e., lightening), would be managed within prescription parameters set within individual burn plans. Prescribed fires could be conducted during the period from spring to winter, except for mixed conifer habitats. For mixed conifer stands, prescribed fires would primarily be conducted mid-July to mid-September when these fuels are dry enough to burn.

Another method of reducing fuel load is a fuel-break/green-strip, a strategically located wide block or strip of land, on which a cover of dense, heavy, or flammable vegetation has been permanently changed to one of lower fuel volume or reduced flammability as an aid to fire control. Fuel breaks also have an access road through the middle of them, which provides fire suppression access.

3. Fire Response

Fire response strategies are described for each FMC polygon (See Table 2B-6 in the EA). They provide a full range of fire response measures ranging from aerial monitoring to low-impact confinement to full-scale containment and control strategies. Containment and control strategies may include the use of mechanized equipment, fire retardant or foam chemicals, or minimal impact suppression tactics (MIST). Management objectives vary for unplanned ignitions according to the different habitat types and areas within the District. Under the Proposed Alternative, fire response in threatened and endangered species habitats would require certain operating procedures mandated by the FMC polygons and SOPs for species protection as appropriate (See Section 6). This would also be the case for species of concern and critical winter ranges of big-game species.

4. Post Fire Emergency Stabilization and Rehabilitation

The purpose of rehabilitation is to either emulate historic or pre-fire ecosystem structure, functionality, diversity, and dynamics consistent with approved land management plans, or if that is not feasible, to restore a healthy stable ecosystem in which native species are well represented. The Interagency Burn Area Emergency Stabilization & Rehabilitation (ESR) Handbook provides general guidance and standards for burned area emergency stabilization and rehabilitation activities. Other documents, such as the Standards for Rangeland Health and Guidelines for Grazing Management (43 CFR 4180.1), provide additional guidelines concerning post fire rehabilitation. Rehabilitation alternatives do not vary among project alternatives because rehabilitation activities are currently guided by these existing documents and are dependent on other fire management components (i.e. an assessment of site specific resource impacts and objectives). There are various implementations and treatment standards to follow in the ESR Handbook that describe the appropriate measures to take in consideration of general wildlife, as well as listed species habitats.

F. Temporary and Permanent Impacts

Biological resources may be either directly or indirectly impacted by a wildland fire, prescribed burn or other fire prevention method, fire suppression, or fire rehabilitation. Furthermore, direct and indirect impacts may be either permanent or temporary in nature. These impacts are defined below.

Direct: Any alteration, disturbance, or destruction of biological resources that would result from the proposed action and occur at the same time and place as the action. Examples include clearing of vegetation, encroaching into wetlands, diverting of surface water flows, releasing of toxic fire suppression chemicals into the environment, and loss of individual species and/or their habitats.

Indirect: As a result of the proposed action, biological resources may also be affected in a manner that is not direct but which occurs at a later time, and is reasonably certain to occur. Examples include soil compaction, increased human activity, decreased water quality, and the introduction of invasive plants following fire.

Interrelated: Those actions that are a part of a larger action and depend on the larger action for their justification.

Interdependent: Those actions that have no significant independent utility apart from the action under consideration.

Permanent: All impacts that result in the irreversible and irretrievable commitment removal of biological resources are considered permanent. Examples may include constructing a permanent road, fire chemical spills, or fire suppressant drops that cause direct mortality to wildlife.

Temporary: Any impacts considered to have reversible effects on biological resources can be viewed as temporary. Examples include the generation of fugitive dust or ash, removal of vegetation for fire prevention or suppression, or removal of vegetation through prescribed fires. Allowing vegetation to naturally re-colonize or rehabilitating the disturbed area allows for these types of impacts to be temporary.

Cumulative: Cumulative impacts as defined under the Endangered Species Act (50 CFR 402.02) "are those effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal action subject to consultation".

Considering that stabilization and rehabilitation measures are required following fires, most fire related activities (both direct and indirect) would be considered temporary impacts, except for actions that result in permanent roads or take of a listed species. Impacts to the four listed species that potentially could occur from the proposed action, along with cumulative impacts to threatened, endangered, and candidate species are addressed in Section 5 of this BA.

3.0 ACTION AREA

A. Climate and Topography

Average annual precipitation for this area ranges from 6 inches in the lower elevations to 30 inches in the mountains, mostly from winter snows and late spring rains. Very little precipitation falls in the summer months, but thunderstorm events often result in intense, short-duration rainfall. January temperatures range from an average minimum temperature of 13° F to an average maximum temperature of 34° F. July temperatures typically average from 60° F (minimum) to 90° F (maximum). The growing season is approximately 90 days, with the first frost typically occurring around September 1 and the last frost about June 7.

The region (northeastern Nevada) is a complex topographic basin, the surface of which is broken by numerous fault-block mountains, trending mostly north south and rising sharply in places to more than 10,000 ft (3,048 m) above dry, sediment-floored basins. The Great Basin, at an elevation of 4,000 feet, encompasses 75 percent of the land in the northern portion of the state. The rivers of the region have no outlet to the sea; they either dry up as they cross the parched terrain, like the Humboldt, or empty into large lakes or into playas that temporarily fill with water after heavy rain.

The Elko District is located in the northeastern corner of Nevada and encompasses four hydrographic basins (Snake River, Humboldt River, Central Region, and Great Salt Lake). Runoff and infiltration vary with slope, amount of vegetative cover, and soil or rock cover. The major rivers of this area include the Humboldt, flowing through the southwest portion of the District, the Owyhee and Bruneau in the northwest, and Salmon Falls Creek in the northeast. Peak flows typically occur during April, May, and June. Humboldt National Forest occurs in this district as well, with the Independence Mountains in the west portion of the District and the Ruby Mountains in the southern portion.

Water availability varies greatly in the northeastern part of Nevada. Some mountainous areas have abundant water in springs, streams, and ponds with many man-made reservoirs occurring downstream for water storage. The landscape is characterized mostly by intermittent and ephemeral drainages. Surface water is used for irrigation, watering stock, wildlife, recreation, domestic, and municipal use, as well as for in-stream flows and riparian habitat. The surface water supply can be extremely scarce in other areas due to soil impermeability, low precipitation, and evapo-transpiration from seasonal playas.

There is one eligible Wild and Scenic River in the Elko District, 23.6 miles of the South Fork Owyhee River meet the wild river criteria and 1.0 mile meets the scenic river criteria. Also, 2.2 miles of Fourmile Creek were found eligible for Wild River status. The eligible river corridors extend for one-half mile on either side of the river. These river segments are within the South Fork Owyhee River and Owyhee Canyon Wilderness Study Areas. The Interim Management Policy guides management of this eligible Wild and Scenic River for Lands under Wilderness Review.

The soil texture and chemistry of typical soils in the District includes fine, large amounts of clay and small amounts of organic matter with high pH and salinity levels.

B. Land Use

The Elko District consists of 7.5 million acres of public lands administered by the BLM. A forty-mile wide strip along the railroad consists of a checkerboard of private and public lands. Land use within the District includes power lines, gas pipelines, oil and gas wells, mining operations, development, cultural and historic sites, municipal watersheds, Wilderness Study Areas, livestock grazing, recreation, wild horses, and wildlife habitat.

Fire Management Categories (FMCs) represent the general fire management framework and strategies for the District. FMCs are further subdivided into smaller management units called polygons. Polygons further refine the general strategy by area based on resource values, vegetation response, potential for invasion of weeds, and public safety. The following is a summary of the polygons. Please refer to the EA for a detailed description of each polygon.

Polygon A-1 (urban interface, mining areas, and areas of development), A-2 (cultural sites, historic and prehistoric sites), and A-3 (municipal watersheds) make up Fire Management Category A, which are areas of maximum suppression activity. Fuels reduction activities are acceptable, yet prescribed fire opportunities may be limited due to close proximity to structures.

Polygon B-1 (District wide areas of exotic vegetation invasion), B-2 (Ruby Marshes, Franklin Lake and Snow Water Lake), B-3 (low sagebrush and desert shrub), B-4 (areas of primarily private land), B-5 (aspen areas), B-6 (Dixie – sagebrush and perennial grasses with cheat grass intrusion), B-7 (Badlands allotment), B-8 (early seral sagebrush grasslands), and B-9 (crucial mule deer winter range) make up FMC-B, which are areas requiring a less strict acreage guideline than FMC-A and include prescribed fire as a management technique. Unplanned wildfire is likely to cause a negative effect in this FMC, but the effects could be mitigated or avoided through fuels management.

Polygon C-1 (woodlands), C-2 (Owyhee desert), C-3 (sage, mountain brush, perennial grass), and C-4 (intermixed woodlands in the northeast corner) make up FMC-C, which are areas where fire may be desirable to manage ecosystems, but where various factors place constraints on fire use for resource benefit. These polygons can include increased use of fuels/vegetation manipulation.

Polygon D-1 (Little Humboldt Wilderness Study Area (WSA)), D-2 (Owyhee Canyon WSA), D-3 (mixed conifer), D-4 (Goshute, South Pequop, and Bluebell WSA), and D-5 (Cedar Ridge and Red Springs WSA) make up FMC-D, which includes areas where fire is desired under various environmental conditions and there are few constraints associated with resource conditions or social, economic or political considerations. These areas will receive the least level of suppression, some level of fire use for resource benefit, and can include the extensive use of prescribed fire. These areas would be limited to Wilderness Study Areas and the Cherry Creek Range.

C. Vegetation Communities

Wetland and Riparian Habitat

There are approximately 30,000 acres of wetlands and riparian habitats within the Elko District. These areas are at times inundated by water and normally have saturated or seasonably saturated soil conditions within 10 feet of the ground surface. Their width varies from a few feet along small streams, ponds and within spring meadows, to several hundred feet along major rivers, lakeshores, and within large meadow basins. Many of the riparian areas do not have a surface flow, but are maintained by the high soil moisture. The presence of moisture and abundant nutrients makes the wetlands and riparian areas the most vegetatively diverse communities within the Elko District. Stream bank stability and cover are important for stream shading, which contributes to lower (below 70° F) water temperatures that are critical for fisheries. Wetlands and riparian habitats are valuable for terrestrial wildlife and aquatic species.

Typical wetland and riparian vegetation species includes Pacific willow (*Salix lasiandra*), sandbar willow (*Salix exigua*), chokecherry (*Prunus virginiana*), spikerush (*Eleocharus* spp.), sedge (*Carex* spp.), American bulrush (*Scirpus americanus*), Baltic rush (*Juncus balticus*), bent grass (*Agrostis stolonifera*), and Kentucky bluegrass (*Poa pratensis*).

Sagebrush

The sagebrush/perennial grassland is the most extensive community in the District covering approximately 4,500,000 acres. This habitat type occurs from clay pan valley bottoms, to well drained deep soils in valley bottoms, to alluvial fans, and up to ridge tops on all exposures. Slopes range from 2 to 75 percent, but 4 to 25 percent is the most typical. Elevations range from 4,000 to 9,000 feet.

Sagebrush species include: Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*), Basin big sagebrush (*Artemisia tridentata* spp. *tridentata*), mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*), and black sagebrush (*Artemisia nova*). Associated with the sagebrush communities are various perennial grass species. The dominant grass species include: Thurber needlegrass (*Stipa thurberiana*), bluebunch wheatgrass (*Pseudorogneria spicata*), Indian ricegrass (*Oryzopsis hymenoides*), Great Basin wildrye (*Elymus cinereus*), bottlebrush squirreltail (*Elymus elymoides*), Sandberg bluegrass (*Poa secunda*), and pine bluegrass (*Poa scrabrella*). Forb species include arrowleaf balsamroot (*Balsamorhiza sagittata*) and taper hawksbeard (*Crepis acuminata*). The potential vegetative composition within sagebrush communities is about 50 percent grasses, 15 percent forbs, and 35 percent shrubs.

The black sagebrush communities range from low arid foothills to high mountain ridges. The perennial grasses associated with these communities are Idaho fescue (*Festuca idahoensis*), Webber ricegrass (*Oryzopsis webberi*), bottlebrush squirreltail, Cusick bluegrass (*Poa cusickii*), Sandberg bluegrass, and pine bluegrass. Potential vegetative composition is about 50 percent grasses, 15 percent forbs, and 35 percent shrubs.

Mountain Brush

This habitat type occurs on upland terraces and in mountain valleys and slopes of all aspects. Areas of this community occur throughout the District, often in association with mountain big sagebrush. Slopes range from 4 to 50 percent, but are mostly about 30 percent. Elevations are 6,000 to 9,000 feet. The primary species present are serviceberry (*Almelanchier utahensis*), antelope bitterbrush, curlleaf mountain mahogany (*Cercocarpus ledifolius*), oceanspray (*Holodiscus discolor*), and snowberry (*Symphoricarpos* spp.).

The grasses in this plant community are characterized by Idaho fescue, bluebunch wheatgrass, and mountain brome (*Bromus marainatus*), with mountain big sagebrush being an important species associated with this type. Brush species dominate the area. Potential vegetative composition is about 55 percent grasses, 15 percent forbs, and 30 percent shrubs.

Pinyon-Juniper

This habitat type occurs in mountainous regions. Closed and open stands of pinyon-juniper cover approximately 1,100,000 acres within the District. Slopes range from 30 to 50 percent, but slope gradients of around 30 percent are most typical. Elevations are 5,500 to 9,000 feet. The pinyon, juniper and mahogany types may be roughly divided into three altitudinal belts. On low, dry fans juniper occurs in nearly pure stands. Pinyon pine (*Pinus monophylla*) and curleaf mountain mahogany occur at the higher elevations where the annual precipitation is greater, while in between is a transition zone where the three species mix. The pinyon pine, Utah juniper (*Juniperus osteosperma*) and inclusions of curleaf mountain mahogany forest types are distinct ecosystems, which are managed and perpetuated for the production of multiple resource values. These values include: wildlife habitat, recreation uses, watershed protection, and wood products including firewood, Christmas trees, posts, pine nuts and wildings.

On the Elko District, most of the woodland sites are dominated by Utah juniper. The understory consists primarily of bluebunch wheatgrass and black sagebrush. Thurber needlegrass, Sandberg bluegrass, Great Basin wildrye, and needle and thread grass (*Stipa comata*) are dominant species associated with these sites. Juniper and pinyon trees are prevalent enough to dominate these areas; however, antelope bitterbrush (*Purshia tridentata*) and mahogany can be located within the understory. Potential vegetative composition is about 40 percent grasses, 15 percent forbs, and 45 percent shrubs.

Aspen

Many areas in the mountains have small stands of aspen (*Populus tremuloides*) and/or cottonwood (*Populus* spp.). It is estimated that approximately 17,000 acres of aspen are found on the District. The understory consists of forbs such as aster (*Aster* spp.), lupine (*Lupinus* spp.), fireweed (*Epolobium* spp.), and geranium (*Geranium* spp.) but is often dominated by snowberry (*Symphocarpus* spp.). Some common grasses that may be present are smooth brome (*Bromus marginatus*), slender wheatgrass (*Agropyron trachycaulum*), and blue wildrye (*Elymus glaucus*).

Mixed Conifer

The mixed conifer community occupies approximately 47,000 acres on the District. Tree species include limber (*Pinus flexilis*) and whitebark (*Pinus albicaulis*) pines, white fir

(*Abies concolor*), subalpine fir (*Abies lasiocarpa*), Englemann spruce (*Picea englemannii*), and at the highest elevations bristlecone pine (*Pinus longaeva*)

All age classes of the various conifer species are represented, with the majority being mature (100 to 300 years old). These forests are found from 5,000 to over 10,000 feet in elevation, where precipitation is the greatest, however, they will extend down mountains to lower elevations (in areas such as drainages or north slopes) where moisture is adequate.

A species historically present, but now probably missing from this community is the inland Douglas fir (*Pseudotsuga menziesii* var. *glauca*). This lack may be due to successional change to more shade tolerant species coupled with its highly desirable wood characteristics that led to it being harvested. The last known stands of Douglas fir were harvested in the 1970's from the Ruby Mountains. Douglas fir has existed in this area and still may be found in an occasional isolated area.

D. Wildlife

With the tremendous variation of terrestrial habitats on the Elko District, there is a comparable diversity of wildlife species, which include big game, small game, and non-game species. There are approximately 81 species of mammals, 246 species of birds, 28 species of reptiles and amphibians, and 53 endemic fish species. The complete species lists can be found at the BLM Elko Field Office. Several rare species of fish live in Nevada. These fish evolved separately from more common fish when they were isolated as prehistoric lakes dried up. Thirty-two fish species are classified as protected, threatened, or endangered by Nevada state law. In addition, 11 fishes are designated sensitive by state law. Over half of the federally threatened and endangered species listed in Nevada are fish (http://nevadafwo.fws.gov/esoffice/fisheries.htm). That makes protection, restoration and enhancement of streams and riparian habitat an important issue in Nevada.

Typical wildlife species that are likely to occur in the habitat types described above include the following. In wetland and riparian habitats, mammal species that may occur include vagrant shrew (*Sorex vagrans monticola*), Myotis bat species (*Myotis* spp.), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), river otter (*Lutra canadensis*), and striped skunk (*Mephitis mephitis*). Bird species that occur in wetland and riparian habitats in the District include long-billed curlews (*Numenius americanus*), killdeer (*Charadrius vociferus*), common snipe (*Gallinago gallinago*), great blue herons (*Ardea herodias*), American bitterns (*Botaurus lentiginosus*), black-crowned night herons (*Nycticorax nycticorax*), and red-winged blackbird (*Agelaius phoeniceus*). Fish species that may occur in associated aquatic habitats within the District may include Lahontan cutthroat (*Oncorhynchus clarki henshawi*), rainbow trout (*O. mykiss*), brook trout (*S. fontinalis*) brown trout (*Salmo trutta*), among others.

Mammals that occur in the sagebrush habitats include least chipmunk (*Eutamias minimus*), sagebrush vole (*Lagurus curtatus*), Richardson ground squirrel (*Citellus richardsonii nevadensis*), Botta pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), pronghorn (*Antilocapra Americana*), and mule deer (*Odocoileus hemionus*). Bird species that occur in sagebrush habitats in the District include sage grouse (*Centrocercus urophasianus*), horned larks (*Eremophila alpestris*), black- billed magpies (*Pica pica*), bushtits (*Psaltriparus minimus*), red-tailed hawks

(*Buteo jamaicensis*), golden eagles (*Aquila chrysaetos*), great horned owls (*Bubo virginianus*), and prairie falcons (*Falco mexicanus*).

Mammals that occur in the mountain brush habitats include Great Basin pocket mouse (*Perognathus parvus*), badger (*Taxidea taxus*), mule deer, elk (*Cervus canadensis*), and coyote (*Canis latrans*). Birds that may occur in this habitat include blue-gray gnatcatcher (*Polioptila caerulea*), rufous-sided towhee (*Pipilo erythropthalmus*), and white-crowned sparrow (*Zonotrichia leucophrys*).

Mammals that occur in the pinyon-juniper habitats include golden-mantled ground squirrel (*Citellus lateralis*), mule deer, elk, and mountain lion (*Felis concolor*). Birds that may occur in pinyon-juniper habitats include ruby crowned kinglet (*Regulus calendula*), western screech owl (*Otus kennicottii*), and scrub jay (*Aphelocoma coerulescens*).

Mammals that occur in the aspen forest habitats include montane meadow mouse (*Microtus montanus*), Great Basin pocket mouse, yellow-bellied marmot (*Marmota flaviventris*), mule deer, elk, and coyote. Birds that may occur in aspen forests include sharp-shinned hawk (*Accipiter striatus*), northern oriole (*Icterus galbula*), Red-naped Sapsucker (*Sphyrapicus nuchalis*), warbling vireo (*Vireo gilvus*), and American robin (*Turdus migratorius*).

Mammals that occur in the mixed conifer forests include Belding's ground squirrel (*Citellus beldingi*), yellow-bellied marmot, long-tailed weasel, mule deer, elk, coyote, and mountain lion. Birds that may occur in this habitat type include great horned owls, northern flicker (*Colaptes auratus*), yellow-rumped warbler (*Dendroica coronata*), and fox sparrow (*Passerella iliaca*).

E. Wild Horses

Approximately 3,600 wild horses are currently found in eight (8) herd management areas (HMA) in the Elko District. The HMAs encompass approximately 22 different grazing allotments and is dispersed throughout the entire District. Wild horses typically inhabit the mountains during the summer months and can be found on the valley floors during the winter. Their habitat ranges from the pinyon-juniper woodlands to the desert shrub/salt brush vegetation communities.

4.0 SPECIES ACCOUNTS AND STATUS

As discussed in Section 1(B), the federally listed species addressed in this BA are aquatic species. Therefore, the remainder of the BA will be focused on riparian and aquatic resources and the impacts the Proposed Alternative in the FMA will have on them. Below are the listed species and a summary of their status, distribution, natural history and recovery planning efforts.

A. Lahontan Cutthroat Trout *(Oncorhynchus clarki henshawi)*

Listing Data: The Lahontan cutthroat trout (LCT) was originally listed as endangered by the FWS in 1970. The species was reclassified as threatened in 1975 to allow for management and limited harvest (Federal Register 40:29864). FWS developed a recovery plan and proposed activities to restore LCT populations in January 1995 (FWS 1995). The recovery plan states that LCT will be considered for delisting when enough habitat has been managed to secure all existing LCT populations, 148 self-sustaining fluvial populations are established within its native range, and appropriate numbers of lacustrine LCT populations are established within its native range. One of the three distinct population segments described by FWS, the Humboldt River Basin segment, occurs within the District.

Distribution: At the beginning of the 19th century, Lahontan cutthroat trout were apparently abundant and widespread (Vinyard 1996). LCT is the only trout native to the Lahontan sub-basin of the American Great Basin of west central Nevada. It was historically found in the Carson, Humboldt, Truckee, and Walker Rivers, and their tributary lakes and streams. This range is thought to reflect their likely dispersal through Pleistocene lakes that occupied many of the interior valleys of the region nearly 12,000 years ago. Today, LCT exists in less than 11% of its historic stream habitat and less than 1% of its historic lake habitat (Coffin 1981, Coffin and Cowan 1995). In the last century, loss of habitat, overfishing, and introductions of non-native fishes have reduced fluvial and lacustrine populations of LCT (Vinyard 1996). The LCT in the Humboldt Basin is thought to be a distinct subspecies, which has been supported by electrophoretic and mitochondrial DNA studies (Williams 1991, Williams et al. 1992), but they have not been granted formal recognition as a separate subspecies (FWS 1995, Fee et al. 1999). The Humboldt River Basin supports the greatest number of fluvial populations of LCT today, with LCT occurring in 83 to 93 streams and 318 miles of habitat in eight sub-basins (FWS 1995, Fee et al. 1999). Figure 4-1 depicts the Humboldt River Basin population in public streams overlain on the Proposed Action. See Section III Land Use for a description of the fire management activities that would occur in each polygon.

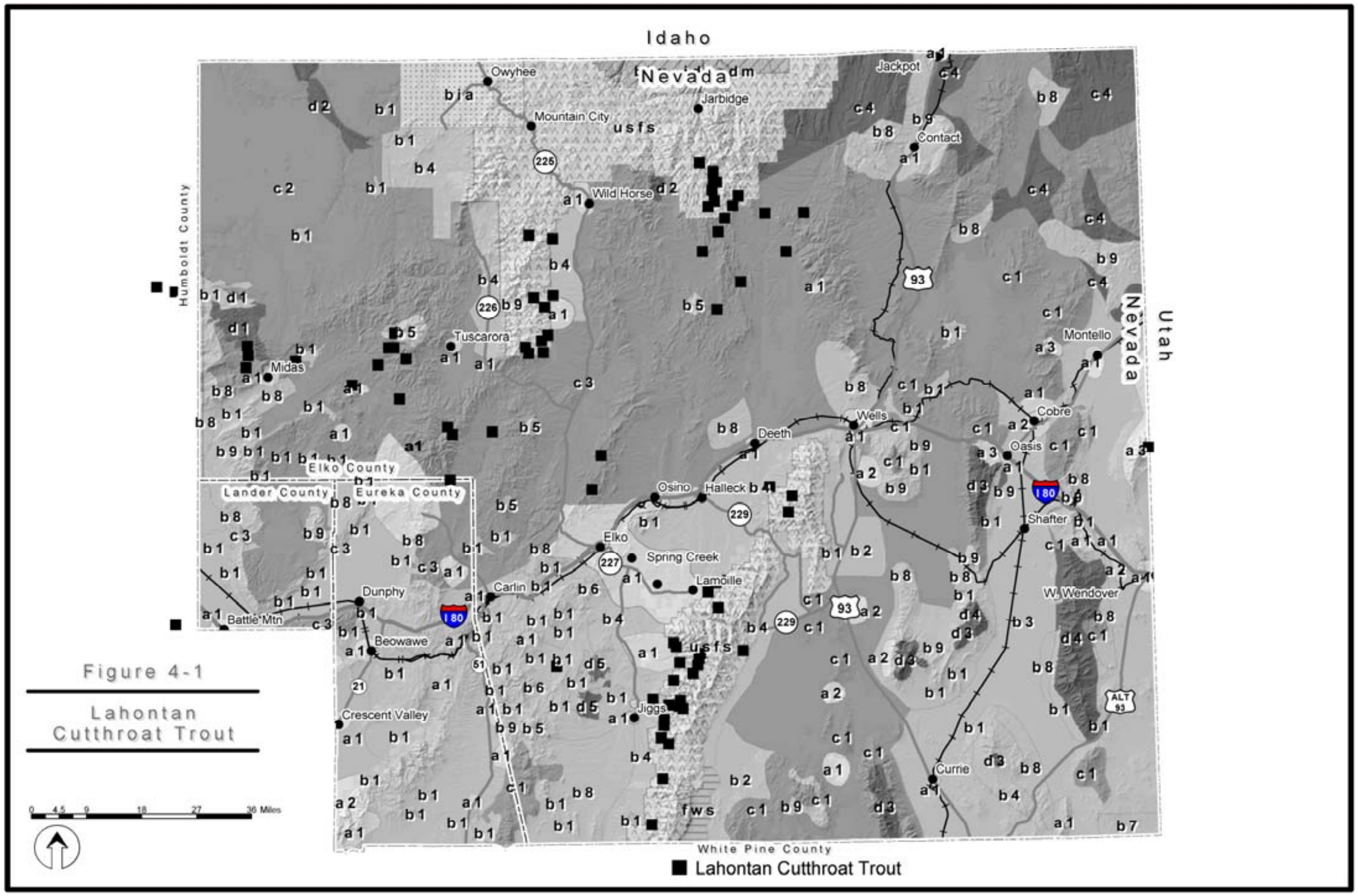

Figure 4-1

Lahontan Cutthroat Trout

Habitat: Lahontan cutthroat trout occupy a great variety of habitats, including large rivers, lakes, and small tributary streams. These fish are unusually tolerant of both high temperatures (>27°C) and large daily fluctuations (up to 20°C) (Vinyard 1996). They are also quite tolerant of high alkalinity (>3000 mg/l) and dissolved solids (>10000 mg/l). They are apparently intolerant of competition or predation by non-native salmonids, and rarely coexist with them (Behnke 1992, LaRivers 1962, Trotter 1987). Fluvial populations of LCT, like those in the Humboldt River Basin, inhabit cool water, pools in close proximity to cover, stable and well vegetated banks, and relatively silt free, rocky substrate in riffle-run areas (FWS 1995).

Natural History: Lahontan cutthroat trout are obligate but opportunistic stream spawners. Typically, spawning occurs April through July (though sometimes later), depending on water temperature and flow characteristics. Autumn spawning runs have been reported from some populations (Vinyard 1996). Lake residents migrate into streams to spawn on clean gravel in riffles. Their behavior is typical of stream spawning trout.

Conservation: Habitat loss and the adverse impacts of non-native fishes continue to be the primary threats to these fish (Coffin and Cowan 1995, Gerstung 1988). The U.S. Fish and Wildlife Service (Coffin and Cowan 1995) has prepared a Species Recovery Plan that includes recommendations for the preservation of existing populations and the establishment of additional populations in secure areas. Protection of existing populations requires increased monitoring and assessment of population levels and exclusion of non-native fishes (Vinyard 1996).

Based on geographical, ecological, behavioral, and genetic factors, it has been determined that three distinct vertebrate population segments of Lahontan cutthroat trout exist: 1) Western Lahontan basin, comprising the Truckee, Carson and Walker River basins; 2) Northwestern Lahontan basin, comprising the Quinn River, Black Rock Desert, and Coyote Lake basins; and 3) Humboldt River basin. LCT populations within the Elko/Wells FMA area are located within the Humboldt River basin distinct population segment.

To implement recovery of LCT by distinct vertebrate population segments, an interactive process was established comprised of technical experts participating on either Recovery Implementation Teams (RIT) or Distinct Population Segment (DPS) teams, or management level representatives on a Management Oversight Group. RIT and DPS teams are composed of technical experts representing associated Federal, State, academic and professional interests and are responsible for coordinating and implementing recovery actions.

The Humboldt River basin DPS team was established in 1999. This DPS team is composed of Nevada Division of Wildlife, U.S. Forest Service, BLM, U.S. Fish and Wildlife Service, and University of Nevada-Reno personnel. The DPS team serves as a decision-making forum to identify, prioritize, and implement recovery activities. More specifically the team is responsible for prioritizing streams for LCT recovery activities, coordinating interagency roles and participation, developing protocols for recovery actions, and evaluating management actions for their effectiveness. The DPS team is also responsible for reviewing existing and draft LCT management plans to ensure their consistency with the objectives of the 1995 LCT Recovery Plan and to serve as the basis for delisting when fully implemented.

B. Columbia Spotted Frog *(Rana luteiventris)*

Listing Data: The FWS was petitioned to list the spotted frog (referred to as *Rana pretiosa)* under the Endangered Species Act in 1989 (Federal Register 54 [1989]:42529). FWS ruled on 23 April 1993 that the listing of the spotted frog was warranted as a priority 3 for the Great Basin population, but was precluded from listing due to higher priority species (Federal Register 58[887]:27260) (USFWS 2002). On 19 September 1997 (Federal Register 62[182]:49401), the FWS demoted the priority status for the Great Basin population of spotted frogs *(Rana luteiventris)* to a priority 9, to continue to allow efforts to develop and implement specific conservation measures without pressure to list the population. As of 8 January 2001, the priority ranking for the Great Basin population was raised to 3 (Federal Register: 66[5]:1295). Columbia Spotted Frogs (CSF) was formally classified as part of *Rana pretiosa*, or Spotted Frogs. Researchers at McGill University in Canada split the species into *Rana luteiventris* and the Oregon Spotted Frog (now called *Rana pretiosa*) in 1996 (Green et al., 1996, Leonard et al. 1996). The researchers found that while the two species are nearly identical morphologically, they differ genetically and occupy different ranges (Green et al. 1996, 1997).

Distribution: Spotted frogs are found from southeastern Alaska to central Nevada, and east to Saskatchewan, Montana, western Wyoming, and north-central Utah (Wright and Wright 1949, Stebbins 1985, Green et al. 1997). Columbia spotted frogs in southwest Idaho, eastern Oregon, and Nevada are part of the Great Basin Distinct Population Segment (DPS) of Columbia spotted frogs (USFWS 2002). Great Basin spotted frogs in Nevada are currently found in Nye County (central Nevada) and Elko and Eureka Counties (northeast Nevada), at elevations between 5600 and 8700 feet. This subpopulation has been recorded historically in a broader range then currently exists (Reaser, in prep.).

Columbia spotted frogs in Nevada can be grouped into three well defined subpopulations. One subpopulation of Great Basin CSF occurs in the Ruby Mountains in the South Fork of the Humboldt River drainage, specifically on USFS administered public land in the Green Mountain, Smith, Corral, and Rattlesnake Creek watersheds. This subpopulation is geographically isolated from the other two subpopulations in Nevada due to extensive irrigated agriculture and the recent completion of the South Fork Reservoir in the Humboldt River Valley. The second subpopulation is called Jarbridge-Independence and occurs in the Humboldt River and Snake River basins. This is the largest of Nevada's three subpopulation areas. At least eight conservation units are found on public lands administered by USFS and BLM and some private landowners within the Jarbridge-Independence subpopulation area. For conservation planning purposes, the Jarbridge-Independence and Ruby Mountains subpopulations have been grouped into the Northeastern Nevada subpopulation. Figure 4-2 depicts the known locations of the Northeastern Nevada subpopulation. The third subpopulation, Toiyabe, occurs outside the Elko District. Figure 4-2 depicts the three subpopulations in the District. For specific Conservation Units for each subpopulation and conservation measures, refer to the April 2002 Draft Conservation Agreement/Strategy.

Habitat: Great Basin spotted frogs are found closely associated with clear, slow-moving water or ponds, with little shade (Reaser et al., in press). Beaver ponds provide a specific habitat characteristic for CSF (Fee et al. 1999). They prefer areas with thick algae and vegetation for cover, but may also hide under decaying vegetation. They are most often found in non-woody wetland plant communities with species such as sedges, rushes and grasses. A deep silt or muck may be required for hibernation and torpor (Morris and Tanner 1969, USFWS 2002). In the Great Basin, spotted frogs are found in naturally fragmented habitats that are seasonally xeric, resource limited and often ephemeral (USFWS 2002). These habitats are sensitive to natural and human disturbances, thus increasing the chance of stochastic extirpation for its inhabitants (Lande and Barrowclough 1987)

Natural History: The timing of breeding is related to ice melt on lakes, ponds and marshes. Breeding occurs from March to April in lower elevations, and from May to June in higher elevations. Columbia Spotted Frogs lay their eggs in the shallows of a permanent water source. Adults exhibit a strong fidelity to breeding sites, with oviposition typically occurring in the same areas in successive years (AmphibiaWeb 2002). The water levels at breeding sites can often be so shallow that the upper portions of the egg masses protrude above the water surface. This habit often results in severe egg mortality from freeze-thaw damage or desiccation. After breeding is completed, adults often disperse into adjacent wetland, riverine and lacustrine habitats. Adults eat insects, mollusks, crustaceans, and arachnids. Larvae eat algae and organic debris. Predators of CSF adults include river otter, raccoon, heron and garter snake, and the introduced bullfrog (*Rana catesbeiana*).

Conservation: The range of the CSF has dramatically decreased in the last 50 years. Threats to this population include wetland loss and degradation (especially dewatering), and introduction of predators such as bullfrog and predatory freshwater fish species. A study conducted by the University of Michigan (Fee et al. 1999) analyzed the implementation of a multi-species approach to management of CSF and LCT. By managing for both species, federal managers can reduce the likelihood that CSF will be listed and improve populations of LCT. Priority areas were identified within the District where the two species overlap in their range, and recovery effort recommendations for managers were addressed in this report. The "Conservation Agreement and Strategy, Columbia Spotted Frog (*Rana luteiventris*), Great Basin Population Nevada, Northeastern Subpopulation" has not yet been finalized, but is anticipated to be signed in 2003. The purpose of this Strategy is to outline a framework for management actions that will provide for the goal of long-term conservation of this population and its habitat in Nevada. The actions addressed in this Strategy are necessary for reducing threats, improving degraded habitat, and restoring many natural functions of associated riparian systems. These actions need to be considered in fire management decisions on the District.

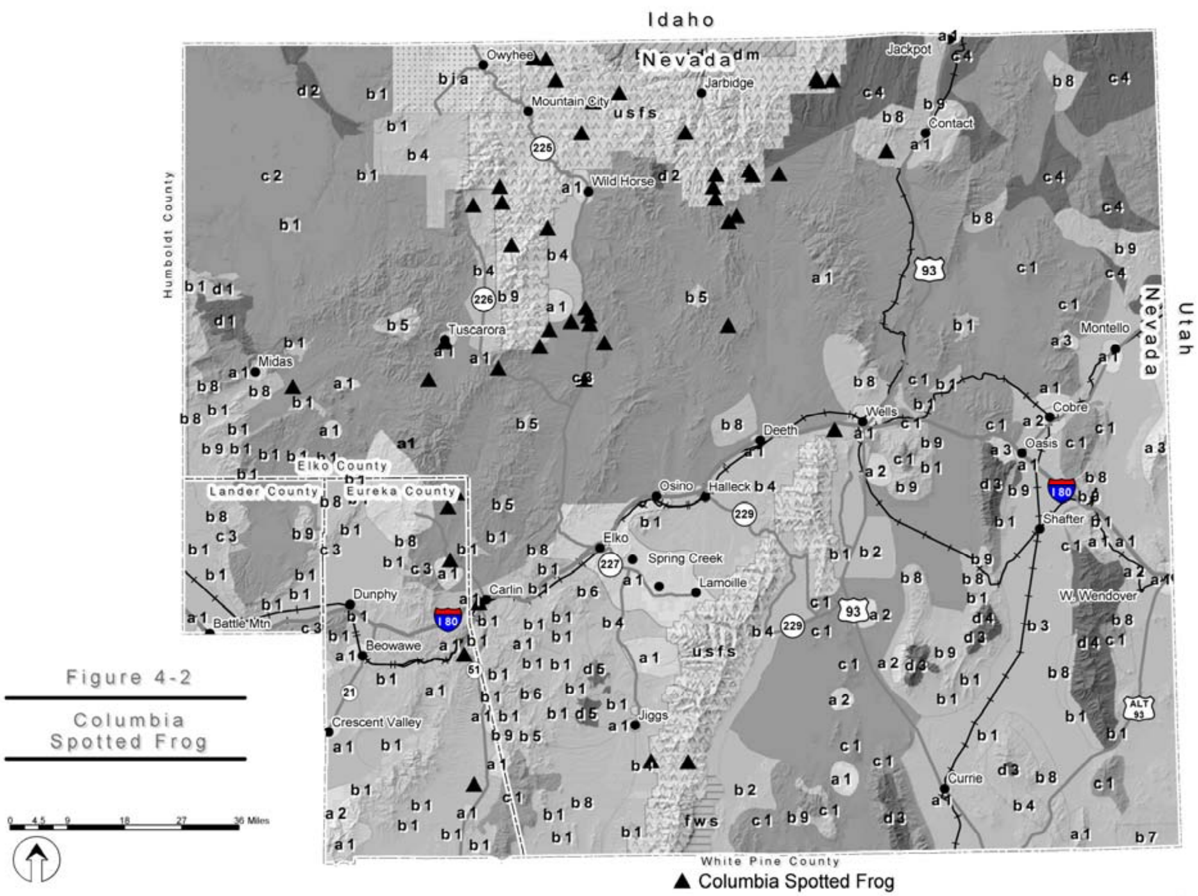

Figure 4-2

Columbia Spotted Frog

C. Independence Valley Speckled Dace *(Rhinichthys osculus lethoporus)*

Listing Data: FWS listed this species as endangered on 10 October 1989 (Federal Register 54:41448-41452). It has a recovery priority of 6C, indicating a high degree of threat, conflict with other resource uses, and a low recovery potential.

Distribution: Although historical ranges and current population numbers are unknown for this fish, it was considered rare when first collected (FWS 1998). This fish currently inhabits the Independence Valley Warm Springs system (the only system for which they are known) which is located on private lands in Elko County. Figure 4-3 depicts the known location of this species.

Habitat: Currently, the habitat requirements are unknown (FWS 1998). This subspecies of speckled dace is found only in the marsh of the largest spring system in the valley. Based on general habitat characteristics of other closely related dace species, this dace should be found throughout the Independence Valley Warm Springs system (FWS 1998). Similar species of dace are typically found in a temperate, permanent desert stream/marsh fed by numerous springs. In Independence Valley Warm Springs, the Independence Valley speckled dace is found primarily in the shallow water of the marsh in the sedges and grasses. It is believed they also once occupied the stream channel, but likely kept to covered areas due to predation by nonnative fish, such as rainbow trout *(Oncorhynchus mykiss)*, largemouth bass *(Micropterus salmoides)*, and bluegill *(Lepomis macrochirus)* (FWS 1998).

Natural History: Breeding is bimodal with peaks in early spring and late summer. The spawning site is referred to as the nest, is usually a few inches in diameter, and located in quiet areas of pools in depths of 2.5-10 cm (1-4 in.). During spawning the female enters the nest repeatedly, depositing a few eggs each time until she has finished spawning. Several males then deposit sperm on the eggs, and activity shifts to another nest. Females generally become sexually mature at 2 years. This fish is insectivorous and also eats plant matter.

Conservation: Loss of natural habitat has been the primary cause of depletion. Primary threats to this species at the time of listing were a limited distribution, habitat manipulation, small population size, and nonnative fish introductions (FWS 1998). The objectives of the Final Recovery Plan for the Endangered Speckled Dace of Clover and Independence Valleys (FWS 1998) are to stabilize and maintain the populations of both species and their habitats so that they can be removed from the federal list of endangered and threatened species. Recovery will require cooperation of landowners, habitat enhancement, and the control or removal of nonnative fish species. Because this subspecies is only found on private land, the landowners' cooperation in its recovery is being sought through voluntary programs developed by the FWS, BLM, and U.S Department of Agriculture. These programs provide technical and financial assistance for landowners to implement conservation activities.

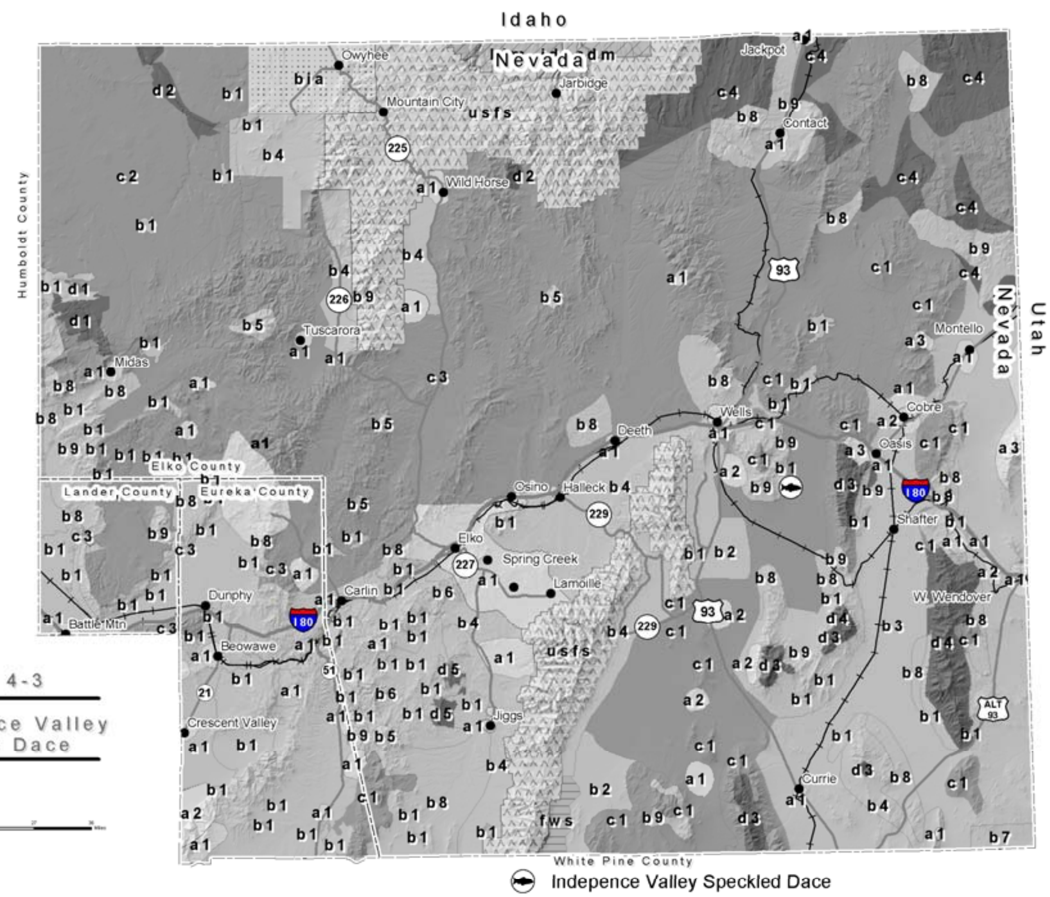

Figure 4-3

Independence Valley Speckled Dace

D. Clover Valley Speckled Dace *(Rhinichthys osculus oligoporus)*

Listing Data: FWS listed this species as endangered on 10 October 1989 (Federal Register 54:41448-41452) along with the Independence Valley speckled dace. The Clover Valley speckled dace was given a recovery priority of 9C, signifying a moderate degree of threat and conflict with other resource uses, but a high recovery potential.

Distribution: Clover Valley in Elko County is the only known location for this endangered subspecies. A comprehensive survey conducted in 1995 determined that this dace only occupies three spring systems in the valley: Clover Valley Warm Springs, Bradish Spring, and Wright Ranch Spring (Stein 1995) (Figure 4-4). All three spring systems are located on private lands.

Habitat: Currently, the habitat requirements are unknown (FWS 1998). They are found primarily in the reservoirs and outflows of the three springs, but do not appear to be associated with the marshes of these springs. The Clover Valley Warm springs aquatic vegetation consists mostly of watercress (*Rorippa nasturium-aquaticum*) and algae (*Chara* sp.). Wright Ranch Spring consists of algae and pondweed (*Potamogeton* sp.). Bradish Spring reservoirs contain a heavy growth of aquatic vegetation.

Natural History: Generally, speckled dace are capable of spawning throughout the summer, but peak activity occurs in June and July at water temperatures of 18 degrees Celsius (65°F) (Sigler and Sigler 1979, Moyle 1976).

Conservation: This species is adversely affected by habitat alterations (i.e., ditches and impoundments) to facilitate irrigation and by the introduction of non-native fishes (End. Sp. Tech. Bull. 14[11-12]:7). The objectives of the Final Recovery Plan for the Endangered Speckled Dace of Clover and Independence Valleys (FWS 1998) are to stabilize and maintain the populations of both species and their habitats so that they can be removed from the federal list of endangered and threatened species. Because this subspecies is only found on private land, the landowner's cooperation in its recovery is being sought through voluntary programs developed by the FWS, BLM, and U.S Department of Agriculture. These programs provide technical and financial assistance for landowners to implement conservation activities.

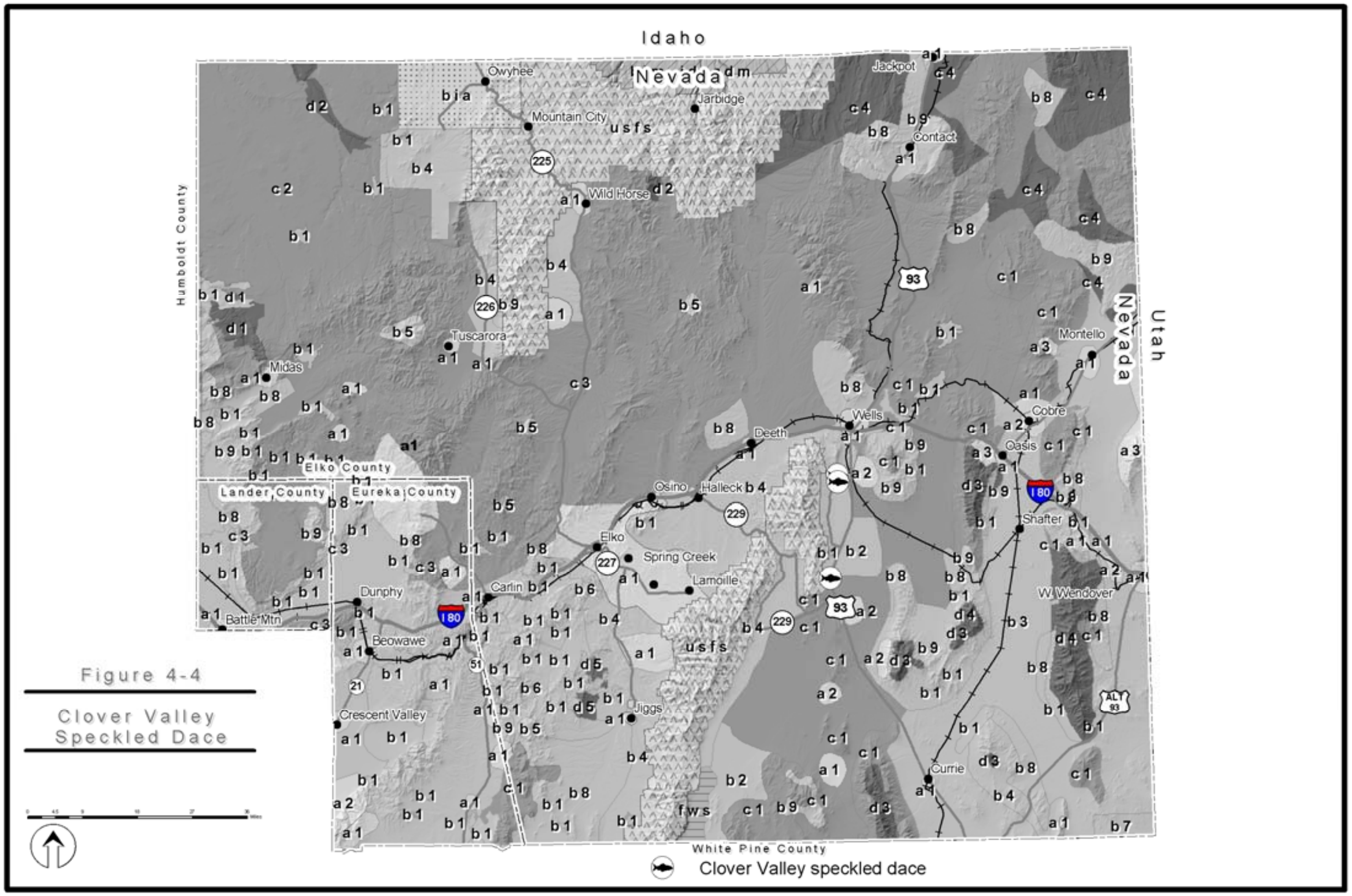

Figure 4-4

Clover Valley Speckled Dace

5.0 EFFECTS

As presented in Section 1(B) and 4.0, the federally listed species addressed in this BA are aquatic species. Therefore, the following analysis of the direct, indirect, and cumulative effects associated with implementation of the proposed action will focus on riparian and aquatic resources. Further analysis and discussion of the immediate-direct and long term-indirect effects of wildland fire on aquatic systems can be found in the October 2000 Biological Assessment/Evaluation of Aerially Delivered Fire Retardant Guidelines (Appendix 8). In addition to an analysis of the effects of fire suppression chemicals to aquatic species, the Biological Assessment/Evaluation also discusses the causes of fish mortality and the short-term and long-term impacts to aquatic species habitat due to wildland fire.

A. Direct Effects

Riparian zones constitute the interface between terrestrial and aquatic ecosystems (Swanson et al. 1982; Gregory et al. 1991), performing a number of vital functions that affect the quality of salmonid habitats as well as providing habitat for a variety of terrestrial plants and animals. While processes occurring throughout a watershed can influence aquatic habitats, the riparian area adjacent to the stream channel provides the most direct linkage between terrestrial and aquatic ecosystems. Consequently, the health of aquatic systems is inextricably tied to the integrity of the riparian zone (Gregory et al. 1991; Naiman et al. 1992). Riparian plant species possess adaptations to fluvial disturbances that facilitate survival and reestablishment following fires, thus contributing to the rapid recovery of many streamside habitats (Dwire and Kauffmann, in press). There are many influences on aquatic ecosystems, one of which is the topic of this report, the effects of wildfire. Because past land management is perceived as a primary cause of the disruption of aquatic ecosystems, proposals for aggressive management of forest vegetation and fuels to mitigate the increasing risks of severe fire have been viewed with skepticism and concern (Riemen et al. in press). Removal of fuel buildup requires heavy human intervention that in it can cause further degradation to riparian areas. On the other hand, large fires might be particularly destructive for already degraded aquatic ecosystems (Riemen et al. in press). In practice, protection of aquatic species and habitats has largely been an exercise in identifying the remnant populations and high quality or productive habitats and protecting them from further human disruption (Riemen et al. in press, Bisson 1995). Some have argued that managed disturbance, either to emulate or to restore the role of fire and other disturbance-related processes, could be key to sustaining landscapes over the longer term (Rieman et al., in press; Reeves et al., 1995; Poff et al., 1997; Cissel et al., 1999; Naiman et al., 2000).

The following two sections address the direct and indirect impacts fire and fire management activities can have on riparian zones and aquatic habitats.

1. Fire Retardant Chemicals

Fire retardant chemicals are widely used in the United States to suppress and control wildland fires. These chemicals are sometimes used to fight fires in environmentally sensitive areas potentially inhabited by endangered, threatened, or sensitive aquatic organisms. There are two types of fire retardants, long-term fire retardants (i.e., Phos-Chek D75-F, Phos-Chek D75-R, and Fire-Trol GTS-R) and short-term fire retardants or foams (i.e., Ansul Silv-Ex, Fire Quench, and Phos-chek WD-881). The long-term retardants contain combinations of several ingredients: water, fertilizer salts, thickeners that provide stability to the solution and make it cling to fuels (dry organic matter), corrosion inhibitors which minimize damage to equipment, viscosity stabilizers and bactericide to improve stability, and coloring agents. After the water has evaporated, the retardant remains effective until rain or erosion (USDA 1998) removes it.

Short-term retardants or foams contain surfactants, and foaming and wetting agents. They make water denser and help take oxygen out of the fire. The foaming agents affect the rate at which water drains from the foam and how well it adheres to the fuels (organic matter, such as, trees, logs, shrubs, leaf litter, etc.). The surfactants and wetting agents increase the ability of the drained water to penetrate fuels thus reducing their ability to ignite (Adams and Simmons 1999). Short-term retardants lose their effectiveness once the water has evaporated or drained away (USDA 1998).

Current studies on the effects these two types of fire suppression chemicals have on riparian environments and aquatic habitats are discussed below.

2. Toxicological Impacts to Vegetation

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, predictions can be made about their effects on vegetation based on studies of fertilizers (Larson et al. 1999). Like fertilizers, fire retardants may encourage growth of some plant species at the expense of others, resulting in changes in community composition and species diversity (James and Jurinak 1979, Larson and Duncan 1982, Wilson and Shay 1990, Tilman 1987, Wedin and Tilman 1996).

These types of affects from fire retardants may be dependent on vegetation type, annual and seasonal weather patterns, and soil moisture. In a study conducted in Northern Nevada examining the effects of fire retardant chemical and fire suppressant foam treatments on shrub-steppe vegetation, riparian habitat was marginally more sensitive to foam suppressant treatments than upland habitats (Larson et al. 1999). Change in stems/m2 and change in species richness both showed significant treatment effects in riparian habitat, which may be related to greater moisture availability. Because moisture is limiting in the Great Basin (West 1988), the capacity for response to chemical treatments may be greater in more mesic (i.e. riparian) compared to more xeric (i.e. upland) sites.

Larson et al (1999) also found that no changes in species richness occurred in the upland habitats for either type of treatment. However, this study was only conducted for one year and responses to burning in the sagebrush steppe are more appropriately measured over the course of several years (Young and Evans 1978), or even decades (Harniss and Murray 1973; Larson et al. 1999). They further suggested from the results of their study that the few effects detected from either Phos-Chek or Silv-Ex (fire suppressant foams) would allow them to be used, if applied as directed, to control wildland fire in this area of the Great Basin without major disruption to terrestrial vegetation. Managers intending to use these chemicals to control prescribed burns may wish to consider effects on species richness or on individual species of interest (Larson et al. 1999). The study showed that the most significant treatment effects on species richness occurred in the riparian zone. Therefore, care should be exercised in riparian areas (see also Gaikowski et al. 1996, McDonald et al. 1996), especially if they harbor particular species of concern.

3. Toxicological Impacts to Aquatic Species

There is relatively little information on the toxicity of fire retardant chemicals to aquatic organisms. The surfactant portion of foam suppressants has been studied and was determined to be detrimental to aquatic life because it decreases water tension, thereby decreasing the aquatic organism's ability to obtain life-sustaining oxygen (Sanchez et al. 1991, Lewis and Suprenant 1983, McDonald et al. 1997). The toxic component of retardant chemicals in aquatic systems is ammonia (McDonald et al. 1996), and fish are less tolerant than are macro invertebrates. The October 2000 Biological Assessment/Evaluation of Aerially Delivered Fire Retardant Guidelines described the toxic characteristics of fire retardants as follows:

> *Sodium ferrocyanide is commonly used as a corrosion inhibitor in some retardant formulations. When sodium ferrocyanide is mixed or dissolved in water and exposed to UV radiation, it breaks down to form hydrogen cyanide (HCN), which is extremely toxic to aquatic life, and cyanide ions (CN), which are less toxic (Norris, Lorz, and Gregory 1991).*

Ammonia (NH_3) is highly soluble and typically results when fertilizers or retardants are added to water. When ammonia dissolves in water, a chemical equilibrium is maintained between NH_3, which is the more toxic form, and ionized ammonia (NH_4^+). The chemical balance between these 2 forms of ammonia is determined by pH, temperature, and total ammonia concentration. In most streams, the pH is sufficiently low and NH_4^+predominates. However, in highly alkaline waters, NH_3 concentrations increase and can reach toxic levels. Many laboratory experiments have demonstrated that NH_3 in the range of 0.2 and 2.0 mg/L can be lethal to fish (Norris, Lorz, and Gregory 1991).

McDonald et al. (1997) found that the most toxic fire-retardant chemical to amphipods in soft and hard water (out of the five fire retardant and foam suppressants chemicals tested on Hyalella azteca) was Phos-Chek WD-881, fire suppressant foam. Disruption of ecosystem functions at lower trophic levels could, in turn, impair the health and well being of organisms at higher trophic levels such as fish (McDonald et al. 1997). Subsequently, studies conducted on three fish species found that two fire suppressant foams were more toxic for rainbow trout (*Oncorynchus mykiss*), fathead minnow (*Pimephales promelas*), and Chinook salmon (*Oncorhynchus tshawytscha*) than the fire retardants tested on the same species (Adams and Simmons 1999). Additionally, later life stages (swim-up fry) of the fish were more sensitive to the chemicals than the eggs (Gaikowski et al. 1996a, 1996b, Buhl and Hamilton 1998). The toxicity values resulting from these three fish studies suggest that entry of fire-fighting chemicals into aquatic environments could adversely affect fish populations, especially if the species affected is endangered and the contamination occurs during salmonid swim-up fry periods (Gaikowski et al. 1996).

In a study conducted on two fish species (rainbow trout and fathead minnow), two aquatic invertebrates (*Daphnia magna* and *Hyalella azteca*), and a green algae (*Selenastrum capricornutum*), the green algae was substantially more sensitive to three non-foam fire chemicals (Fire-Trol LCG-R, Fire-Trol GTS-R, Phos-Chek D-75-F), than the animals, and Daphnia were the most sensitive to the two foam-type chemicals (Silv-Ex and Phos-Chek WD-881) (Hamilton et al. 1996). These foams were also more toxic to the fish than the three non-foam chemicals.

Fire retardant chemicals cause toxicity to fish as well, but are less toxic than the foams. However, it is noted that exposure concentrations of fire retardant in a given stream may approach or exceed toxic concentrations for a short period immediately following a direct application to a stream (Buhl and Hamilton 1998). Although extensively used ammonium compounds found in long-term fire-retardants are essentially fertilizer formulations and are thought to have minimal toxicological or ecological impact, fish kills have occurred in streams accidentally contaminated by fire-retardant chemicals (Dodge 1970). In a 1995 incident of a fire-retardant drop across approximately 67 m of a creek in Oregon, an estimated 23,000 fish were killed along 2,740 m of the stream (rainbow and steelhead trout were among the species killed, McDonald et al. 1997).

Other variables can also affect the toxicity level and concentration in a given stream from fire fighting chemicals. The toxicity of some chemicals is known to be photoenhanced in the presence of natural solar ultraviolet light (UV) (Oris and Giesy, 1985, Pelletier et al., 1997). There is very little information on the interactive effects of fire retardant chemicals and UV. Toxicity of some chemicals used in fire retardants, such as, sodium ferrocyanide (a corrosion inhibitor), may increase with exposure to UV. A study of the interactive effects of UV and fire retardant chemicals on two aquatic species, juvenile rainbow trout and Southern leopard frog (*Rana sphenocephala*) tadpoles showed a significant increase in mortality when exposed to UV light and fire retardants in the laboratory (Little and Calfee 2000). Further data are needed to confirm the photoenhanced toxicity of the chemicals in laboratory and field tests to determine how rapidly the chemical transformation occurs in sunlight and if toxicity persists over time. Although chemical contamination has been shown to cause fish kills, the avoidance of affected areas by fish has also been observed (Little and Calfee 2000), which supports the need for more studies as the variability in site specific circumstances can alter the effects of fire fighting chemicals.

Fire retardant chemicals and suppressant foams are typically applied to ridge top vegetation and adjacent to natural fire barriers such as roads, meadows, and rock outcrops. In most instances, aquatic environments are located in canyon bottoms which are difficult to reach with large fixed-wing aircraft. Therefore, aquatic environments are not areas where fire chemicals are typically applied. Retardant is never intentionally dropped into surface waters. However, factors such as firefighter or public safety, or structure protection may require the use of retardant directly adjacent to aquatic areas. When this is necessary, the retardant is typically applied perpendicular to the stream channel.

Research studies have demonstrated that direct application of retardants onto the water surface was the primary source of retardant contamination (Norris and Webb 1989). One study found that only minor amounts of retardant entered streams from riparian areas and relatively narrow, untreated riparian strips as small as 3 meters virtually eliminated retardant entering stream waters (Norris, Lorz, and Gregory 1991). Applications of retardant that fall outside the riparian zone should have little or no effect on stream water quality (Norris and Webb 1989).

As pointed out in the Biological Assessment/Evaluation of Aerially Delivered Fire Retardant Guidelines, it is difficult to estimate the effects of a retardant spill on aquatic organisms. The toxic levels of ammonia or free cyanide can be determined under laboratory conditions. However, field situations are more complex and difficult to quantify. Factors that affect whether an aquatic organism will be exposed to toxic levels of either cyanide or ammonia are avoidance of the contaminated area, time exposed to the toxin, water quality, quantity of retardant input into freshwater, type and size of water body. Where accidental releases of retardant to surface waters (i.e. stream channels) occur, the magnitude of the mortality and the distance over which it occurs varies based on the characteristics of 1) the application (i.e. size, number, and timing of loads dropped), 2) the site (i.e. stream channel structure, vegetation canopy), and 3) the stream flow (Norris and Webb 1989).

Since the SOPs for species protection restrict retardant application within 300 feet or greater from surface waters, the risk of retardant harming aquatic species is significantly reduced. In addition, the implementation of the proposed action would further reduce the potential occurrence of fire and fire suppression activities within habitat of listed species. The twenty year history of fire occurrence in the Elko District shows 14.84 miles of public occupied LCT habitat impacted by fire. These impacts have occurred during the past three years of highest fire occurrence. Because SOPs restrict application of fire suppression chemicals within 300 feet of riparian areas (unless there is a threat to human life or property), there have been no instances where fire suppression chemicals have been applied in a manner that caused them to enter directly or indirectly into the water. Therefore, the potential for adverse impacts to listed species from fire retardant chemicals through implementation of the proposed action is extremely low.

4. Mechanical Impacts

Woody debris, shade (stream temperature), microclimate, streambank stability, litterfall, sediment filtration, and floodplain processes are all riparian functions that are provided for by riparian forests (FEMAT 1993, Chamberlin et al. 1991, FPAC 2001). The vegetative structure of a riparian system is an important factor in maintaining these processes. The root system of emergent vegetation helps to hold the bank soil together increasing overall bank stability. The stalks, stems, branches and foliage provide resistance to stream flow, absorbing flow energy rather than deflecting it as hardened structures do or allowing it to erode soil particles (BMP's to protect water quality March 2000). Vegetative cover above the waterline protects the banks from rainfall, runoff and trampling forces. Vegetation provides water quality benefits by causing settling of particulates and absorbed pollutants, by providing a substrate for sessile organisms that remove nutrients directly from the water column, and by assimilating nutrients from the soil. Riparian vegetation shades the water, which is important for controlling water temperatures. It provides vertical structure for nesting, foraging, and cover from predation. Mechanical removal of riparian vegetation can impact the balance of the riparian area.

Mechanical removal of vegetation is used on the District as a fire prevention measure to thin out or remove fuel loads. These activities are conducted in upland habitats, and the benefits and restrictions of such actions are discussed in the EA (Section 1). Mechanized clearing for fire prevention does not occur in riparian habitats on the District. However, mechanical impacts may occur in riparian areas during a fire when fire lines and firebreaks are needed to protect human life or property. Impacts of riparian vegetation removal may include: loss of threatened and endangered species habitat, direct loss of listed species, increases in water temperatures, and decreased water quality (temporary or long-term). In many cases, riparian vegetation removal would be avoided or impacts reduced by limiting traffic on the fire line to reduce erosion, avoiding occupied listed species habitats, limiting the fire line width to the minimum necessary, and rehabilitating the area following fire suppression.

5. Loss of Vegetative Cover

Wildland fires do occur in riparian areas, although the moisture present probably reduces fire occurrence and severity. Fires in riparian/wetland areas often only top-kill the plants, leaving the root systems in moist soil unharmed. Several riparian species are also at least moderately fire tolerant. Willows in all stages of vigor re-sprout from the root crown or stem base following fire. Their numerous wind-dispersed seeds are also important in re-vegetating areas following fire. Chokecherry is well adapted to disturbance by fire. Seed dispersed by mammals and birds, and germination of onsite buried seed can be significant modes of post fire regeneration. Wood's rose is typically top-killed by a fire. The plant regenerates by sprouting from the root crowns and underground rhizomes and survives low to moderate intensity fires. Sedges reproduce by both rhizomes and seed. Most sedges show a good resistance to low to moderate intensity fires as long as the organic layer of the soil is mostly left intact. Baltic rush survives fire by sprouting from its extensive rhizome system. Patchy, low to moderate intensity fires seem to allow regeneration of most riparian species. When fires become intense and large stand-replacing type fires, riparian areas on the District may be severely altered. In addition to direct fish mortalities due to increases in water temperatures to lethal levels, fire induced changes in pH, increased ammonium levels from smoke gases absorbed into surface waters, and increased phosphate levels leached from ash (Baker 1988, Brown 1989, Gresswell 1999, Norris, Lorz & Gregory 1991, Rinne 1996, Rieman & Clayton 1997, Spencer & Hauer 1991) can also affect fish populations.

6. Stream Flow Alterations

Fire suppression measures may involve the use of water from reservoirs, lakes, ponds, rivers, or streams. Extraction of water for fire suppression may cause stream flow alterations or affect static water levels, particularly in smaller streams or during drought conditions. The SOPs listed in Section 6 restrict the extraction of water from occupied habitats, whether during initial attack or extended fire suppression activities, during drought periods if extraction would lower existing pond or pool levels. Implementation of the SOPs for species protection would also require monitoring of water levels to ensure that water levels existing at the time of initial attack are maintained during extraction activities (except when the threat of human life or property exists).

The direct extraction of water from occupied habitat via helicopter bucket dipping is allowed only during initial attack operations (see SOPs – Section 6). This is designed to maximize opportunities for control of wildfires in sensitive habitats as quickly as possible. Based on Elko District fire records, 90% of all fire starts are controlled during initial attack (i.e. the first 24 hour period).

Although the potential exists for direct losses of listed species due to helicopter bucket dipping, it is difficult to accurately predict to what extent these losses might occur.

Typically, water extraction from helicopter bucket dipping is not possible if water depth is less than two feet. Terrain features limiting helicopter access, size and type of water source (i.e. stream pool, beaver pond, spring pond, etc), species occurrence, available escape cover, and species avoidance behavior are all variables affecting the potential for bucket dipping and the subsequent potential for direct species losses. Beyond initial attack operations, water extraction is limited to drafting via portable pumping equipment with screened intake hoses. This is designed to further reduce the potential for direct species losses due to water extraction operations.

It is expected that implementation of a balanced approach to fire management in the Elko District, together with the SOPs listed in Section 6 will help ensure listed species are not adversely impacted. Although the potential exists for direct species losses due to water extraction during initial attack operations, these losses are predicted to be significantly less than the direct and/or indirect impacts of habitat losses due to wildfire occurrences within sensitive habitat. Implementation of the proposed action is expected to reduce wildfire occurrence and severity within the Elko District, reducing the potential need for fire suppression activities and associated direct and indirect impacts within sensitive habitats.

B. Indirect Effects

Fires in upland areas and riparian zones can affect aquatic ecosystems by altering vegetation cover, which in turn influences erosion and sediment transport, water infiltration and routing, the quantity of nutrients reaching streams, the amount of shading, and the input of large woody debris into the system (Wissmar et al. 1994). The extent of impacts is generally related to the intensity of the burn. In high intensity fires, soil organic matter that helps hold soils together is consumed, increasing the susceptibility of soils to erosive forces. In addition, volatilization of certain compounds can cause the surface soil layer to become hydrophobic, thereby reducing infiltration of water and increasing surface runoff (Marcus et al. 1990). These indirect effects of fire are discussed below.

1. Erosion

Soil degradation can result from accelerated soil erosion, loss of vegetative cover, oxidation of soil organic matter, and impairment of other soil physical, chemical, and biological properties. Stand replacement fires can contribute to soil degradation and erosion, particularly on slopes. Soil erosion reduces the chance of native regeneration because of loss of essential topsoil. Not only does this impact upland habitat through loss of cover and browse, but it also impacts riparian areas through indirect effects. Soil erosion on slopes can contribute to bank erosion in stream channels and siltation of riparian and aquatic plants. It also leads to sediment loading in streams, which can be detrimental to aquatic species. Post fire erosional processes that deliver sediment to streams over long periods of time due to roads, fire lines, or the lack of re-vegetation, can have long-term negative effects on aquatic ecosystems (Lotspeich et al. 1970; DeByle and Packer 1972). However, short-term pulses of sediment and large woody debris, often associated with functioning terrestrial and aquatic ecosystems during post-fire landslides and debris flows, may be beneficial. Over time, large woody debris and sediment are moved downstream by fluvial processes, which form productive aquatic habitats (Reeves et al. 1995, Benda et al. in press, Miller et al. in press; Minshall in press). The most effective way to reduce the negative effects of fires on aquatic systems is to protect the evolutionary capacity of these systems to disturbance (Bisson et al. in press). Restoring physical connections among aquatic habitats may be the most effective and efficient step in restoring or maintaining the productivity and resilience of many aquatic populations (Bisson et al. in press; Dunham et al. in press; Rieman et al. in press, Rieman and Clayton 1997, Pilliod et al. in press). The focus should be to protect aquatic communities in areas where they remain robust and restore habitat structure and life history complexity of native species where aquatic ecosystems have been degraded (Gresswell 1999). However, where restoring connectivity between aquatic populations is not feasible, active management to reduce the impacts of fires and fire suppression actions may be an important short-term conservation strategy (Brown et al. 2001; Rieman et al. in press). Immediate stabilization and rehabilitation following fire is essential to reducing the effects erosion can have on aquatic species. This is of particular concern in stream and aquatic habitats with Lahontan cutthroat trout, speckled dace, and Columbia spotted frog.

2. Sediment Loading

All streams under natural conditions receive sediment from terrestrial sources at varying levels depending upon soil, topography, vegetation and rainfall. Sediment enters water through various processes that include soil surface erosion, channel erosion and mass movements (landslides, debris flows), and these inputs can be either chronic or episodic. Percent embeddedness is the degree to which fine sediments such as sand, silt, and clay fill the interstitial spaces between rocks on a substrate. The biota of an aquatic system is thought to have evolved to cope with the natural percent embeddedness of a stream (WaterShedds 2002). Any increase above the natural levels may decrease the health of a system. Harvey (1989) found most fry would leave an area or die when embeddedness levels reach 50-60%.

Sediment loading can occur indirectly in streams from the effects of fire. When fire burns the majority of the vegetation adjacent to a stream or upslope from a stream, erosion is likely to occur from rain and snowmelt. Erosion leads to sediment loading in a stream or river. The series of sediment-induced changes that can occur in a water body may change the composition of an aquatic community (Wilber 1983). A large volume of suspended sediment will reduce light penetration, thereby suppressing photosynthetic activity of phytoplankton, algae, and macrophytes (WaterShedds 2002). This leads to fewer photosynthetic organisms available to serve as food sources for many invertebrates. As a result, overall invertebrate numbers may also decline, which may then lead to decreased fish populations.

Sediment may interfere with essential functions of organisms as well. The numbers of filter-feeding invertebrates will decline if their filter mechanisms are choked by suspended particles (James et al., 1979). Some zooplankton suffer decline due to clogged feeding mechanisms (McCabe et al., 1985). Likewise, fish may suffer clogging and abrasive damage to gills and other respiratory surfaces. Abrasion of gill tissues triggers excess mucous secretion, decreased resistance to disease, and a reduction or complete cessation of feeding (Wilber, 1983; McCabe et al., 1985). Depending on the concentration and duration of exposure, suspended sediment can induce physiological stress, reduce growth, and cause direct mortality in fish (Newcombe and MacDonald 1991). Suspended sediment may also affect predator-prey relationships by inhibiting predators' visual abilities or vice versa.

Reproductive success may decline with an increase in fine sediment. If spawning habitats are altered by sediment deposition (e.g., filling of pools and riffles or covering of a gravel bed), fish may be unable to lay eggs. If eggs are successfully produced, the incubation period may be in jeopardy because 1) a shifting-sediment environment is unstable, and 2) burial by fine sediment prevents circulation of water around the egg, decreasing oxygenation (WaterShedds 2002). The egg will suffocate and may be poisoned by its own metabolic waste. If eggs do hatch into fry, the young may be less likely to survive in less-than-optimum conditions (Morton, 1986; McCabe et al., 1985).

Increased sediment may impact plant communities. Primary production will decline because of a reduction in light penetration. Sediment may damage plants by abrasion, scouring, and burial. Finally, sediment deposition may encourage species shifts because of a change of substrate.

In natural waters fish avoid areas of high-suspended solids when possible by hiding in quieter pools or moving away from the source of sediment. Thus, although experimental studies may suggest certain degrees of injury to aquatic fauna in a given level of turbidity, the actual effects observed may be less pronounced because of the avoidance behavior. Extreme storm events may not allow for an avoidance behavior reaction from fish, in which case fish mortality or habitat alteration could occur. Proper rehabilitation of upland areas following fire will help reduce the potential for sediment loading effects.

3. Changes in Temperature and pH

The loss of riparian vegetation can increase exposure to solar radiation, causing streams to warm. Stream temperature is an important component of fish habitat and has a direct effect on the growth and survival of salmonids (FPAC 2001). The effect on fish from changes in stream temperature varies between species and within the life cycle of a given species. Critical life stages that occur during the warmest months in the summer are of particular concern when disturbances, such as, fire, indirectly affect stream temperatures. The various physiological and ecological processes of salmonids that are affected by temperature are well documented. Spence et al. (1996) has listed some of the more important processes affected by temperature: 1) decomposition rate of organic materials; 2) metabolism of aquatic organisms, including fishes; 3) food requirements, appetite, and digestion rates of fish; 4) growth rates of fish; 5) developmental rates of embryos and alevins; 6) timing of life-history events including migrations, fry emergence, and smoltification; 7) competitor and predator-prey interactions; 8) disease-host and parasite-host relationships; and 9) development rate and life history of aquatic invertebrates.

The historic condition of riparian habitats in which salmonids evolved and thrived was significantly influenced by natural disturbance (fire, insects, disease, windthrow, landslides, and floods). Fire disturbance has received increased attention in recent years, perhaps because it is arguably the disturbance-type that has been most influenced by human activities across the landscape (Agee 1998). In the present poor health of the Great Basin ecosystem (high fuel loads, increased invasion of exotic species, etc.), fires are burning much larger, more intensely and more frequently, resulting in loss of wildlife habitats, including riparian zones. Intense crown fires are capable of causing shifts from woodlands to non-native annual communities (Miller and Tausch 2001). Woodland expansion into shrub-steppe plant communities, in large part due to a history of fire suppression and grazing, has resulted in a dramatic increase in the length of fire return intervals (West 1984, Miller et al. 1999). Woodland expansion has also occurred in aspen and riparian communities (Miller et al. 2000, Miller and Tausch 2001). Pre-settlement fire regimes within and across these cover types were historically dynamic both temporally and spatially (Miller and Tausch 2001). Exposure to temperatures above optimum levels, which would occur during intense stand-replacing fires, has the potential to negatively affect salmonid survival and recovery. As stream temperature increases, the ability of water to hold dissolved oxygen decreases (MacDonald et al. 1991). Increases in stream temperature also increase the metabolic rate of salmonids, which can increase demands on the available food supply. However, decreased levels of dissolved oxygen may also lead to appetite suppression in salmonids (Jobling 1993).

The effects of fire on a water system is hard to predict because it is so closely linked to the topography, soil and plant life of each individual site. What happens to a watershed after a fire often depends on what was happening in the watershed before the fire. Where there is steep terrain and a fire burns hot, there is potential to substantially increase sediment runoff where erosion causes ash to flow into streams with the first rain after a fire. As nutrient-filled ash flows into streams, it changes the pH and nutrient level of the water (Karle 2000). Most ponds and streams are acidic. Adding ashes to water raises the pH, turning it more alkaline (Karle 2000). Species that had been living successfully in the water may die off. Minshall et al. (1989) speculated that chemical toxicity from smoke or ash would cause fish mortality in second and third order streams. Ammonia and phosphorus levels have been documented to be above lethal limits to fish during fires (Spencer and Hauer 1991). Algae on the other hand may grow better. Increased algae production results in a more diverse population of insect larvae, changing the balance of life in the water from what it was before the fire (Karle 2000). Macro invertebrates can also be affected by wildfires (Minshall et al. 1995, Minshall in press, Spencer et al. in press).

C. Cumulative Effects

Potential cumulative impacts on threatened, endangered, and candidate species as a result of the FMA activities could occur to riparian habitats where LCT, Columbia spotted frog, Independence Valley speckled dace, and Clover Valley speckled dace are located. Riparian habitats for these species may be affected by the addition of fire management activities (i.e., fire retardant drops, dewatering for water drops, vegetation removal, chemical treatments, and prescribed burns) to existing management influences. Other influences may include dewatering for mining projects and agriculture, building roads adjacent to streams, and livestock grazing in riparian areas. However, implementation of the proposed action (i.e. a balanced approach to fire management) could also reduce the long-term impacts of fire management activities, specifically the impacts of fire and fire suppression, to riparian habitats containing listed species.

An important issue in the western U.S. is the building of new roads to allow for harvest and prescribed fire to reduce fuel accumulation in ecosystems where past management (principally fire suppression and harvest) have increased the risk of large severe wildfires (Gucinski et al., 2001; Lehmkuhl et al., 1994). The principle concern is the trade-off between reducing the effects of wildfire and increasing the risks of road effects on aquatic habitat (Gucinski et al., 2001). Roads provide access that has increased the scale and efficiency of fire suppression and created linear firebreaks that affect fire spread. In addition, road access has undoubtedly contributed to increased frequency of human-caused ignitions (Gucinski et al., 2001). Roads modify natural drainage networks and accelerate erosion processes, which may lead to excessive sediment loading in streams occupied by sensitive fish and amphibian species. Roads may also facilitate invasion of exotic plant and animal species into and adjacent to aquatic habitats, which may have significant biological and ecological effects if native species are displaced (Gucinski et al., 2001) or exotic species increase competition for resources. At the landscape scale, increased road densities and their attendant effects are correlated with declines in the status of some non-anadromous salmonid species (Gucinski et al., 2001).

Cumulative impacts to such aquatic habitats from mining, recreation and fire access roads could cause increases in stream sediment thereby reducing the quality and/or quantity of critical habitat. Dewatering techniques for fire suppression in addition to dewatering for mining projects and agricultural uses in streams occupied by these sensitive species could impact the viability of local populations. Livestock grazing can adversely affect riparian habitats through trampling of riparian vegetation, contributing to bank erosion and sedimentation, and increasing nutrient, pH, and temperature levels in streams. Grazing activities in areas following fire could result in cumulative impacts of soil erosion and sedimentation and reduce the likelihood of riparian recovery. In addition, most studies find that plant communities grazed by domestic livestock contain a greater density, frequency, or cover of non-indigenous plants than ungrazed communities (Belsky and Gelbard 2000).

Cumulative impacts of human alterations to the landscape are likely to exert the most pronounced influence on fire behavior during periods of drought and under conditions of extreme fire weather (Dwire and Kauffmann, in press). Because riparian zones are critical resources for sustaining native fish populations and other important wildlife species, more data is needed to understand interactions between fire and riparian ecosystems, as well as, how riparian zones affect spatial and temporal patterns of fire at the landscape scale (Dwire and Kauffmann, in press).

The following section discusses measures that will be taken to avoid and minimize effects of the Proposed Action on the three listed and one candidate species of this BA.

6.0 STANDARD OPERATING PROCEDURES (SOPs) - MEASURES TO AVOID AND MINIMIZE SPECIES EFFECTS

A. <u>Unless a threat to human life or property exists</u>, the following standard operating procedures for species protection will apply to all streams occupied by Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) and native habitats identified as having recovery potential[1]:

<u>**SUPPRESSION ACTIVITIES:**</u>

1. Avoid the application of retardant or foam within 300 feet of the stream channel or waterway[2].

   <u>Exceptions</u>:

   - When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy air tanker).

   - Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.

   - When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines[3].

   <u>Emergency Consultation</u>:

   Aerial application of retardant or foam outside 300 ft of a waterway is presumed to avoid adverse effects to aquatic species. If it is determined appropriate to apply retardant or surfactant foam within 300 feet of a waterway or stream channel based on one or more of the exceptions listed above, the unit administrator shall determine whether there have been any adverse effects to LCT.

   If the action agency determines there were no adverse effects to LCT or their habitats, there is no additional requirement to consult with Fish and Wildlife Service (FWS).

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1 The Humboldt Distinct Population Segment (DPS) Team will use the 1995 LCT Recovery Plan and the most recent data to develop a list and/or map which specifically identifies stream segments currently occupied by LCT and native ranges identified as having recovery potential. This list and/or map will be reviewed and updated as necessary based on the most current species information.

2 Aerial application and use of retardants and foams will be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.

3 This determination will be made on a case-by-case basis by the Field Manager or the designated Field Manager representative in consultation with the Fire Management Officer, Incident Commander, Resource Advisor, and Elko Field Office Fisheries Biologist through development of the Wildfire Situation Analysis.

If the action agency determines that there were adverse effects on LCT or their habitats then the action agency must consult with FWS, as required by 50 CFR 402.05 (Emergencies).

In the case of a long duration incident, emergency consultation should be initiated as soon as practical during the event. Otherwise, post-event consultation is appropriate. The initiation of the consultation is the responsibility of the unit administrator.

2. Do not draft fill engines that have surfactant foam mixes in tanks, directly from the stream channel.

3. A containment barrier will be constructed around all pumps and fuel containers utilized within 100 feet of the stream channel to prevent petroleum products from entering the stream. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.

4. Do not dump engines filled with surfactant foam mixes within 600 feet of the stream channel.

5. Do not conduct retardant mixing operations within 300 feet of the stream channel.

6. Stream flow will not be impounded or diverted by mechanical or other means in order to facilitate extraction of water from the stream for fire suppression efforts.

7. The intake end of the draft hose will be screened to prevent entry of fish species. Screen opening size will be a maximum of 3/16 inch.

8. Before each fire assignment in the Elko District, all fire suppression equipment utilized to extract water from stream or spring sources (i.e. helicopter buckets, draft hoses and screens) will be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 100 feet of natural water sources (streams or springs).

9. Unless specifically identified as a restricted water source[4], dipping water from streams currently occupied by LCT (including beaver ponds) by helicopter bucket is allowed only during initial attack operations (the first 24 hours following the initiation of suppression actions). Beyond initial attack, additional water needed to control and/or contain the fire will be obtained by drafting into portable dipping tanks or drafting directly into the helicopter bucket in accordance with the above standard operating procedures. Water levels in the pond or pool will be monitored continuously. Water extraction will not exceed the ability of the stream inflow to maintain water levels that exist at the time initial attack efforts began. If the water level drops below this predetermined level, all water removal will cease immediately until water levels are recharged.

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4 The Humboldt Distinct Population Segment (DPS) Team will use the 1995 LCT Recovery Plan and the most recent data to develop a list and/or map which specifically identifies stream segments currently occupied by LCT where dipping water from streams (including beaver ponds) by helicopter is restricted due to specific meta-population concerns. This list and/or map will be reviewed annually and updated as necessary based on the most current species information.

10. For streams currently occupied by LCT, extraction of water from beaver ponds or pools will not be allowed if stream inflow is minimal (i.e. during drought situations) and extraction of water would lower the existing pond or pool level.

11. Fire control lines will not cross or terminate at the stream channel. Control lines will terminate at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.

12. Access roads and/or fords will not be constructed across the stream channel.

13. New roads or mechanical fire control lines will not be constructed and existing roads will not be improved within 300 feet of the stream channel unless authorized by the Field Manager or the designated Field Manager representative.

REHABILITATION MEASURES:

1. An assessment of the impacts of fire and fire suppression activities to LCT habitat will be completed by an interdisciplinary team of resource specialists, including the Elko Field Office Fisheries Biologist and Hydrologist, representatives from the U.S. Fish and Wildlife Service, and representatives from the Nevada Division of Wildlife. Based on this assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency Stabilization and Rehabilitation Handbook guidance, including but not limited to some or all of the following:

   a. Close the affected watershed and/or stream channel to livestock grazing for one or more years to allow for recovery of riparian vegetation. The appropriate length of time for closure to livestock grazing will be determined on a site specific basis based on resource data, scientific principles, and experience. Site specific monitoring will determine when resource objectives have been achieved on specific burned areas. Site specific vegetative recovery objectives will be identified by the interdisciplinary review team and included in the Notice of Closure to Livestock Grazing issued in accordance with 43 CFR 4110.3-3.

   b. Reconstruct damaged fences and/or construct new fences to ensure protection of the stream channel from grazing. In Wilderness Study Areas, fence construction and/or reconstruction will be in accordance with Interim Management Policy Guidelines.

   c. Monitor stream and riparian habitats to allow for comparison of post-fire impacts to existing baseline information.

   d. Where determined necessary by the interdisciplinary review team, install appropriate erosion control structures (i.e. erosion matting and/or straw bale structures, straw wattles, etc.) to mitigate overland flow effects to the stream channel.

   e. Where determined necessary by the interdisciplinary review team, reseed and/or replant riparian/wetland areas with native plant species to facilitate re-establishment of perennial vegetation, minimize potential channel erosion, and allow for recovery of riparian functionality.

f. Rehabilitate improved roads located within 300 feet of the stream channel as determined necessary to mitigate potential sedimentation into the stream channel.

g. Implement appropriate integrated noxious weed control measures where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

h. Where determined necessary by the interdisciplinary review team, initiate temporary road closures for at least one year to protect and stabilize burned areas and associated watersheds. An interdisciplinary assessment will be conducted after the first year to determine if road closures are still needed.

B. Unless a threat to human life exists, the following standard operating procedures for species protection will apply to riparian and/or wetland habitats currently occupied by Columbia spotted frog (Rana luteiventris):

<u>SUPPRESSION ACTIVITIES:</u>

1. Avoid the application of retardant or foam within 300 feet of the stream channel or waterway[1].

   <u>Exceptions</u>:

   - When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy air tanker).

   - Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.

   - When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines[2].

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1 Aerial application and use of retardants and foams will be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.

2 This determination will be made on a case-by-case basis by the Field Manager or the designated Field Manager representative in consultation with the Fire Management Officer, Incident Commander, Resource Advisor, and Elko Field Office Fisheries Biologist through development of the Wildfire Situation Analysis.

If and when the Columbia spotted frog is listed as threatened or endangered, or proposed for listing, the following Emergency Consultation guidelines would apply:

Aerial application of retardant or foam outside 300 ft of a waterway is presumed to avoid adverse effects to aquatic species. If it is determined appropriate to apply retardant or surfactant foam within 300 feet of a waterway or stream channel based on one or more of the exceptions listed above, the unit administrator shall determine whether there have been any adverse effects to Columbia spotted frog.

If the action agency determines there were no adverse effects to Columbia spotted frog or their habitats, there is no additional requirement to consult with Fish and Wildlife Service (FWS).

If the action agency determines that there were adverse effects on Columbia spotted frog or their habitats then the action agency must consult with FWS, as required by 50 CFR 402.05 (Emergencies).

In the case of a long duration incident, emergency consultation should be initiated as soon as practical during the event. Otherwise, post-event consultation is appropriate. The initiation of the consultation is the responsibility of the unit administrator.

2. Do not draft fill engines that have surfactant foam mixes in tanks, directly from the stream channel or spring/pond.

3. A containment barrier will be constructed around all pumps and fuel containers utilized within 100 feet of the stream channel or spring/pond to prevent petroleum products from entering the stream. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.

4. Do not dump engines filled with surfactant foam mixes within 600 feet of the stream channel or spring/pond.

5. Do not conduct retardant mixing operations within 300 feet of the stream channel or spring/pond.

6. Fire control lines will not cross or terminate at the stream channel or spring/pond. Control lines will terminate at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.

7. Stream flow will not be impounded or diverted by mechanical or other means in order to facilitate extraction of water from the stream for fire suppression efforts.

8. Access roads and/or fords will not be constructed across the stream channel.

9. The intake end of the draft hose will be screened to prevent entry of spotted frog tadpoles. Screen opening size will be a maximum of 3/16 inch.

10. When drafting from beaver ponds or spring/ponds, drafting will occur only in open water areas free of dense aquatic vegetation where egg masses or spotted frog tad poles may concentrate.

11. Dipping water from beaver ponds or spring/ponds by helicopter bucket is allowed only during initial attack operations (the first 24 hours following the initiation of suppression actions). Beyond initial attack, additional water needed to control and/or contain the fire will be obtained by drafting into portable dipping tanks or drafting directly into the helicopter bucket in accordance with the above standard operating procedures. Water levels in the beaver pond or spring/pond will be monitored continuously. Water extraction will not exceed the ability of the stream or spring inflow to maintain water levels which exist at the time initial attack efforts began. If the water level drops below this predetermined level, all water removal will cease immediately until water levels are recharged.

12. Extraction of water from beaver ponds or spring/ponds will not be allowed if stream or spring inflow is minimal (i.e. during drought situations) and extraction of water would lower the existing pond level.

13. Before each fire assignment in the Elko District, all fire suppression equipment utilized to extract water from stream or spring sources (i.e. helicopter buckets, draft hoses and screens) will be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 100 feet of natural water sources (streams or springs).

REHABILITATION MEASURES:

1. An assessment of the impacts of fire and fire suppression activities to Columbia spotted frog habitat will be completed by an interdisciplinary team of resource specialists, including the Elko Field Office Fisheries Biologist and Hydrologist, representatives from the U.S. Fish and Wildlife Service, and representatives from the Nevada Division of Wildlife. Based on this assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency Stabilization and Rehabilitation Handbook guidance, including but not limited to some or all of the following:

    a. Close the affected habitat area to livestock grazing for one or more years to allow for recovery of riparian vegetation. The appropriate length of time for closure to livestock grazing will be determined on a site specific basis based on resource data, scientific principles, and experience. Site specific monitoring will determine when resource objectives have been achieved on specific burned areas. Site specific vegetative recovery objectives will be identified by the interdisciplinary review team and included in the Notice of Closure to Livestock Grazing issued in accordance with 43 CFR 4110.3-3.

    b. Reconstruct damaged fences and/or construct new fences to ensure protection of the habitat area from grazing. In Wilderness Study Areas, fence construction and/or reconstruction will be in accordance with Interim Management Policy Guidelines.

c. Monitor stream channel or spring/pond habitats to allow for comparison of post-fire impacts to existing baseline information.

d. Where determined necessary by the interdisciplinary review team, install appropriate erosion control structures (i.e. erosion matting and/or straw bale structures, straw wattles, etc.) to mitigate overland flow effects to the stream channel or spring/pond.

e. Where determined necessary by the interdisciplinary review team, reseed and/or replant riparian/wetland areas with native plant species to facilitate re-establishment of perennial vegetation, minimize potential channel erosion, and allow for recovery of riparian functionality.

f. Rehabilitate improved roads located within 300 feet of the habitat area as determined necessary to mitigate potential sedimentation.

g. Implement appropriate integrated noxious weed control measures where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

h. Where determined necessary by the interdisciplinary review team, initiate temporary road closures for at least one year to protect and stabilize burned areas and associated watersheds. An interdisciplinary assessment will be conducted after the first year to determine if road closures are still needed.

C. Unless a threat to human life or property exists, the following standard operating procedures for species protection will apply to the Independence Valley Warm Springs and ponds which supply water to outflow channels and marsh habitats occupied by the Independence Valley speckled dace (Rhinichthys osculus lethoporus):

The Independence Valley Warms Springs and wetlands habitat area is located entirely on private lands. The habitat area emerges from several seeps and springs along a 1-mile segment of the western edge of Independence Valley. The flows are impounded into two reservoirs. The upper, shallower reservoir overflows into the lower, deeper reservoir. The outflow from the lower reservoir flows through a channel before entering a marsh area. Several small shallow ponds exist in the marsh area. Spring heads exist both north and south of the impoundment reservoirs. Independence Valley speckled dace are not known to occur in the spring head areas or the two impoundment reservoirs. The dace are known to exist mostly in the marsh area and to a lesser extent in the outflow channel.

<u>SUPPRESSION ACTIVITIES:</u>

1. Avoid the application of retardant or foam within 300 feet of the stream channel or waterway[1].

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1 Aerial application and use of retardants and foams will be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.

Exceptions:

- When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy air tanker).

- Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.

- When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines[2].

Emergency Consultation:

Aerial application of retardant or foam outside 300 ft of a waterway is presumed to avoid adverse effects to aquatic species. If it is determined appropriate to apply retardant or surfactant foam within 300 feet of a waterway or stream channel based on one or more of the exceptions listed above, the unit administrator shall determine whether there have been any adverse effects to Independence Valley speckled dace.

If the action agency determines there were no adverse effects to Independence Valley speckled dace or their habitats, there is no additional requirement to consult with Fish and Wildlife Service (FWS).

If the action agency determines that there were adverse effects on Independence Valley speckled dace or their habitats then the action agency must consult with FWS, as required by 50 CFR 402.05 (Emergencies).

In the case of a long duration incident, emergency consultation should be initiated as soon as practical during the event. Otherwise, post-event consultation is appropriate. The initiation of the consultation is the responsibility of the unit administrator.

2. Water needed for suppression activities will be extracted from the two impoundment ponds only. Water may be extracted by helicopter bucket dipping or draft filling. Before water extraction begins, a marker (a stake with a painted line, etc.) will be placed in the outflow drainage area below the lower impoundment pond, indicating the level of water flowing from the pond. Water level in the outflow will be monitored continuously. If the water level in the outflow drops below the designated level, all water removal will cease immediately until water levels return to normal levels.

2 This determination will be made on a case-by-case basis by the Field Manager or the designated Field Manager representative in consultation with the Fire Management Officer, Incident Commander, Resource Advisor, and Elko Field Office Fisheries Biologist through development of the Wildfire Situation Analysis.

3. Surfactant foam or retardants will not be used within 300 feet of the spring sources, impoundment ponds, outflow channel, or marsh/wetland areas.

4. Do not draft fill engines that have surfactant foam mixes in tanks directly from the spring source, impoundment ponds, outflow channel, or marsh/wetland areas.

5. The intake end of the draft hose will be screened to prevent entry of fish species. Screen opening size will be a maximum of 3/16 inch.

6. A containment barrier will be constructed around all pumps and fuel containers utilized within 100 feet of the spring source, impoundment ponds, outflow channel, or marsh/wetland areas to prevent petroleum products from entering the stream. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.

7. Do not dump engines filled with surfactant foam mixes within 600 feet of the spring sources, impoundment ponds, outflow channel, or marsh/wetland areas.

8. Do not conduct retardant mixing operations within 300 feet of the spring source, impoundment ponds, outflow channel, or marsh/wetland areas.

9. Fire control lines will not cross or terminate at the spring source, impoundment ponds, outflow channel, or marsh/wetland areas. Control lines will terminate at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.

10. Before each fire assignment in the Elko District, all fire suppression equipment utilized to extract water from stream or spring sources (i.e. helicopter buckets, draft hoses and screens) will be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 100 feet of natural water sources (streams or springs).

REHABILITATION MEASURES:

The Independence Valley Warm Springs habitat area is located on private lands. A land exchange has been proposed that, if approved, would change ownership of these lands from private to public. Until ownership changes, rehabilitation measures on private lands are restricted to addressing damages due to fire suppression activities. Therefore, the following rehabilitation measures would apply, assuming private ownership of the Independence Valley Warm Springs habitat area.

1. An assessment of the impacts of fire suppression activities to Independence Valley speckled dace habitat (the Independence Valley Warm Springs wetlands is located on private lands) will be completed by an interdisciplinary team of resource specialists, including the Elko Field Office Fisheries Biologist and Hydrologist, representatives from the U.S. Fish and Wildlife Service, and representatives from the Nevada Division of Wildlife. Based on this assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency

Stabilization and Rehabilitation Handbook guidance, including but not limited to some or all of the following:

a. Reconstruct fences or other structures damaged by suppression activities.

b. Rehabilitate roads improved or created by suppression activities located within 300 feet of the habitat area as determined necessary to mitigate potential sedimentation into the habitat area.

c. Implement appropriate integrated noxious weed control measures in those areas damaged during fire suppression activities where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

d. Re-seed or replant riparian or wetland areas damaged by suppression activities with native species as determined necessary by the interdisciplinary review team to facilitate re-establishment of perennial vegetation.

2. In addition to the above, the following rehabilitation measures would also be considered by the interdisciplinary review team charged with assessing the impacts of fire and fire suppression activities, should ownership of the Independence Valley Warm Springs habitat area change from private to public ownership:

a. Close the affected habitat area to livestock grazing for one or more years to allow for recovery of riparian/wetland vegetation. The appropriate length of time for closure to livestock grazing will be determined on a site specific basis based on resource data, scientific principles, and experience. Site specific monitoring will determine when resource objectives have been achieved on specific burned areas. Site specific vegetative recovery objectives will be identified by the interdisciplinary review team and included in the Notice of Closure to Livestock Grazing issued in accordance with 43 CFR 4110.3-3.

b. Reconstruct damaged fences and/or construct new fences to ensure protection of the habitat area from grazing.

c. Monitor riparian/wetland habitats to allow for comparison of post-fire impacts to existing baseline information.

d. Where determined necessary by the interdisciplinary review team, install appropriate erosion control structures (i.e. erosion matting and/or straw bale structures, straw wattles, etc.) to mitigate overland flow effects.

e. Where determined necessary by the interdisciplinary review team, reseed and/or replant riparian/wetland areas with native plant species to facilitate re-establishment of perennial vegetation, minimize potential effects of erosion, and allow for recovery of riparian/wetland functionality.

f. Implement appropriate integrated noxious weed control measures where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

D. Unless a threat to human life exists, the following standard operating procedures for species protection will apply to spring/pond areas occupied by Clover Valley speckled dace (Rhinichthys osculus oligoporus):

Clover Valley speckled dace are known to exist in three separate spring/pond habitats all located on private lands in Clover Valley. All three habitat areas are comprised of a riparian/wetland complex consisting of a spring source, one or more impoundment ponds, and one or more outflow channels. Dace are known to inhabit the spring source areas, impoundment pond(s) and/or outflow channels.

SUPPRESSION ACTIVITIES:

1. Avoid the application of retardant or foam within 300 feet of the stream channel or waterway[1].

Exceptions:

- When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy air tanker).

- Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.

- When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines[2].

Emergency Consultation:

Aerial application of retardant or foam outside 300 ft of a waterway is presumed to avoid adverse effects to aquatic species. If it is determined appropriate to apply retardant or surfactant foam within 300 feet of a waterway or stream channel based on one or more of the exceptions listed above, the unit administrator shall determine whether there have been any adverse effects to Clover Valley speckled dace.

If the action agency determines there were no adverse effects to Clover Valley speckled dace or their habitats, there is no additional requirement to consult with Fish and Wildlife Service (FWS).

1 Aerial application and use of retardants and foams will be consistent with national policy guidelines established by the National Office of Fire and Aviation, as amended.

2 This determination will be made on a case-by-case basis by the Field Manager or the designated Field Manager representative in consultation with the Fire Management Officer, Incident Commander, Resource Advisor, and Elko Field Office Fisheries Biologist through development of the Wildfire Situation Analysis.

If the action agency determines that there were adverse effects on Clover Valley speckled dace or their habitats then the action agency must consult with FWS, as required by 50 CFR 402.05 (Emergencies).

In the case of a long duration incident, emergency consultation should be initiated as soon as practical during the event. Otherwise, post-event consultation is appropriate. The initiation of the consultation is the responsibility of the unit administrator.

2. Dipping water from the impoundment ponds by helicopter bucket is allowed only during initial attack operations (the first 24 hours following the initiation of suppression actions). Beyond initial attack, additional water needed to control and contain the fire will be obtained by drafting from the pond into a portable dipping tank or drafting from the pond directly into the helicopter bucket.

3. Before drafting begins, a marker (a stake with a painted line, etc.) will be placed in the outflow drainage area indicating the level of water flowing from the pond. Water level in the outflow will be monitored continuously. If the water level in the outflow drops below the designated level, all water removal will cease immediately until water levels return to normal levels.

4. The intake end of the draft hose will be screened to prevent entry of fish species. Screen opening size will be a maximum of 3/16 inch.

5. A containment barrier will be constructed around all pumps and fuel containers utilized within 100 feet of the spring source, impoundment ponds, or outflow channel to prevent petroleum products from entering the water. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.

6. Do not draft fill engines that have surfactant foam mixes in tanks directly from the spring source, impoundment ponds or outflow channel.

7. Do not dump engines filled with foam or surfactant mixes within 600 feet of the spring source, impoundment ponds, or outflow channel.

8. Do not conduct retardant mixing operations within 300 feet of the spring source, impoundment ponds, or outflow channel.

9. Fire control lines will not cross or terminate at the spring source, impoundment ponds, or outflow channel. Control lines will terminate at the edge of the riparian zone at a location determined appropriate to meet fire suppression objectives based on fire behavior, vegetation/fuel types, and fire fighter safety.

10. Before each fire assignment in the Elko District, all fire suppression equipment utilized to extract water from stream or spring sources (i.e. helicopter buckets, draft hoses and screens) will be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 100 feet of natural water sources (streams or springs).

REHABILITATION MEASURES:

All known spring/pond areas providing habitat for Clover Valley speckled dace are located on private lands. Therefore, rehabilitation measures would be limited to addressing those impacts directly related to fire suppression activities.

1. An assessment of the impacts of fire suppression activities to Clover Valley speckled dace habitat will be completed by an interdisciplinary team of resource specialists, including the Elko Field Office Fisheries Biologist and Hydrologist, representatives from the U.S. Fish and Wildlife Service, and representatives from the Nevada Division of Wildlife. Based on this assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency Stabilization and Rehabilitation Handbook guidance, including but not limited to some or all of the following:

    a. Reconstruct fences or other structures damaged by suppression activities.

    b. Rehabilitate roads improved or created by suppression activities located within 300 feet of the habitat area as determined necessary to mitigate potential sedimentation into the habitat area.

    c. Implement appropriate integrated noxious weed control measures in those areas damaged during fire suppression activities where determined necessary by the interdisciplinary review team and/or where determined appropriate through post-fire monitoring.

    d. Re-seed or replant riparian or wetland areas damaged by suppression activities with native plant species as determined necessary by the interdisciplinary review team to facilitate re-establishment of perennial vegetation, minimize potential effects of erosion, and allow for recovery of riparian/wetland functionality.

7.0 CONCLUSION AND EFFECT DETERMINATION

A. Threatened and Endangered – Finding Possibilities

This BA concludes that the Proposed Action may affect the continued existence of the threatened Lahontan cutthroat trout (LCT), but is not likely to adversely affect this species or its habitat. The SOPs for species protection described in Section 6 are consistent with national Guidelines for Aerial Application of Retardants and Foams in Aquatic Environments. These national guidelines were developed by the Fish and Wildlife Service and Federal wildland firefighting agencies as part of emergency consultation procedures described at 50 CFR 402.05. The use and implementation of these SOPs for species protection will have positive affects to LCT because it will contribute to minimizing the application of retardant in ways that could have adverse effects to aquatic species. In addition, implementation of the proposed action, including the use of the SOPs for species protection, will minimize the adverse effects of wildfires on aquatic species and habitats by reducing wildland fire sizes and intensities.

This BA concludes that the Proposed Action may affect the continued existence of the endangered Independence Valley speckled dace, but is not likely to adversely affect this species or its habitat. The SOPs for species protection described in Section 6 are consistent with national Guidelines for Aerial Application of Retardants and Foams in Aquatic Environments. These national guidelines were developed by the Fish and Wildlife Service and Federal wildland firefighting agencies as part of emergency consultation procedures described at 50 CFR 402.05. The use and implementation of the SOPs for species protection will have positive affects to Independence Valley speckled dace because it will contribute to minimizing the application of retardant in ways that could have adverse effects to aquatic species. In addition, implementation of the proposed action, including the use of the SOPs for species protection, will minimize the adverse effects of wildfires on aquatic species and habitats by reducing wildland fire sizes and intensities. This determination of effects was found due to the limiting range of this species and the potential that a fire retardant drop could affect a large proportion of the population. However, it is unlikely that such a drop would occur directly in the marsh areas and outflow channels where the species occurs. It is more likely that fire management activities could protect the limited occupied habitat of this species.

This BA concludes that the Proposed Action may affect the continued existence of the endangered Clover Valley speckled dace, but is not likely to adversely affect this species or its habitat. The SOPs for species protection described in Section 6 are consistent with national Guidelines for Aerial Application of Retardants and Foams in Aquatic Environments. These national guidelines were developed by the Fish and Wildlife Service and Federal wildland firefighting agencies as part of emergency consultation procedures described at 50 CFR 402.05. The use and implementation of the SOPs for species protection will have positive affects to Clover Valley speckled dace because it will contribute to minimizing the application of retardant in ways that could have adverse effects to aquatic species. In addition, implementation of the proposed action, including the use of the SOPs for species protection, will minimize the adverse effects of wildfires on aquatic species and habitats by reducing wildland fire sizes and intensities. This determination of effects was found due to the limiting range of this species and the potential that a fire retardant drop in the impoundment ponds or outflow channels where this species occurs could affect a large proportion of the population. However, it is unlikely that such a drop would occur directly in these areas. It is more likely that fire management activities could protect the limited occupied habitat of this species.

B. Candidate Species – Finding Possibilities

This BA concludes that the Proposed Action may affect the continued existence of the Columbia spotted frog (CFS), but is not likely to adversely affect this candidate species or its habitat. The SOPs for species protection described in Section 6 are consistent with national Guidelines for Aerial Application of Retardants and Foams in Aquatic Environments. These national guidelines were developed by the Fish and Wildlife Service and Federal wildland firefighting agencies as part of emergency consultation procedures described at 50 CFR 402.05. The use and implementation of the SOPs for species protection will have positive affects to CFS because it will contribute to minimizing the application of retardant in ways that could have adverse effects to aquatic species. In addition, implementation of the proposed action, including the use of the SOPs for species protection, will minimize the adverse effects of wildfires on aquatic species and habitats by reducing wildland fire sizes and intensities. Limited literature was found that discusses the effects of fire fighting chemicals or other fire management activities on amphibians. Amphibian juveniles and eggs seem to be more affected by chemical suppressants than adults. Dewatering activities may result in loss of CFS. Sedimentation resulting from large-scale fires allowed to burn through riparian areas may impact juveniles and egg masses. CFS habitat is known to occur in fire management polygons A1, B4, B8, B9 and C3. Fire management activities within these polygons require protection of watersheds and streams where CSF may occur through implementation of the SOPs for species protection.

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10.0. APPENDICES

APPENDIX 1
BLM Letter of Request for Sensitive Species List
FSW Species List for the Elko District

APPENDIX 2
Action Agencies' Request and Guidelines

APPENDIX 3
FWS Concurrence Letter

APPENDIX 4
Agency Instruction Memorandum No. OF + A 2000-011

APPENDIX 5
Action Agencies' Request and BA

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FWS Concurrence Letter

APPENDIX 7
BLM and FWS Consultation Agreement

APPENDIX 8
Biological Assessment/Evaluation of Aerially Delivered Fire Retardant Guidelines