United States
Department of
Agriculture

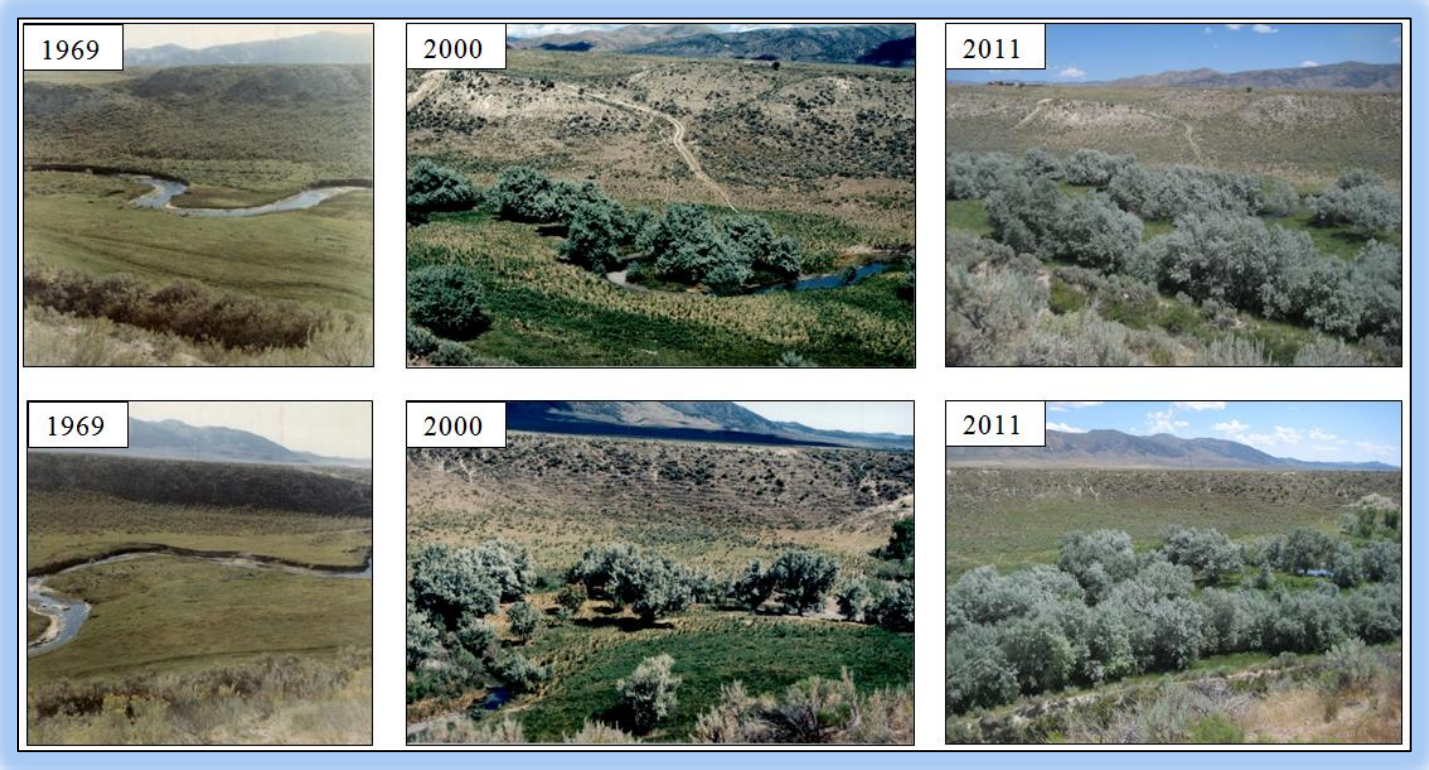
Forest
Service

July 2016

Environmental Assessment

Deep Creek Watershed Improvement Project

Westside Ranger District, Curlew National Grassland
Oneida County, Idaho



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SUMMARY

The Curlew National Grassland (NG), which is managed by the Caribou-Targhee National Forest, proposes to remove Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* sp.) trees and to stabilize several streambanks along Deep Creek. The project area is located approximately seven miles north of Stone, Idaho along Deep Creek upstream of Stone Reservoir (See Figure 1). The legal description is T15S; R32E; Sections 13, 23, 24, & 26 and is within the Westside Ranger District of the Curlew NG, Idaho. This action is needed to improve overall riparian vegetation and stream channel conditions along Deep Creek.

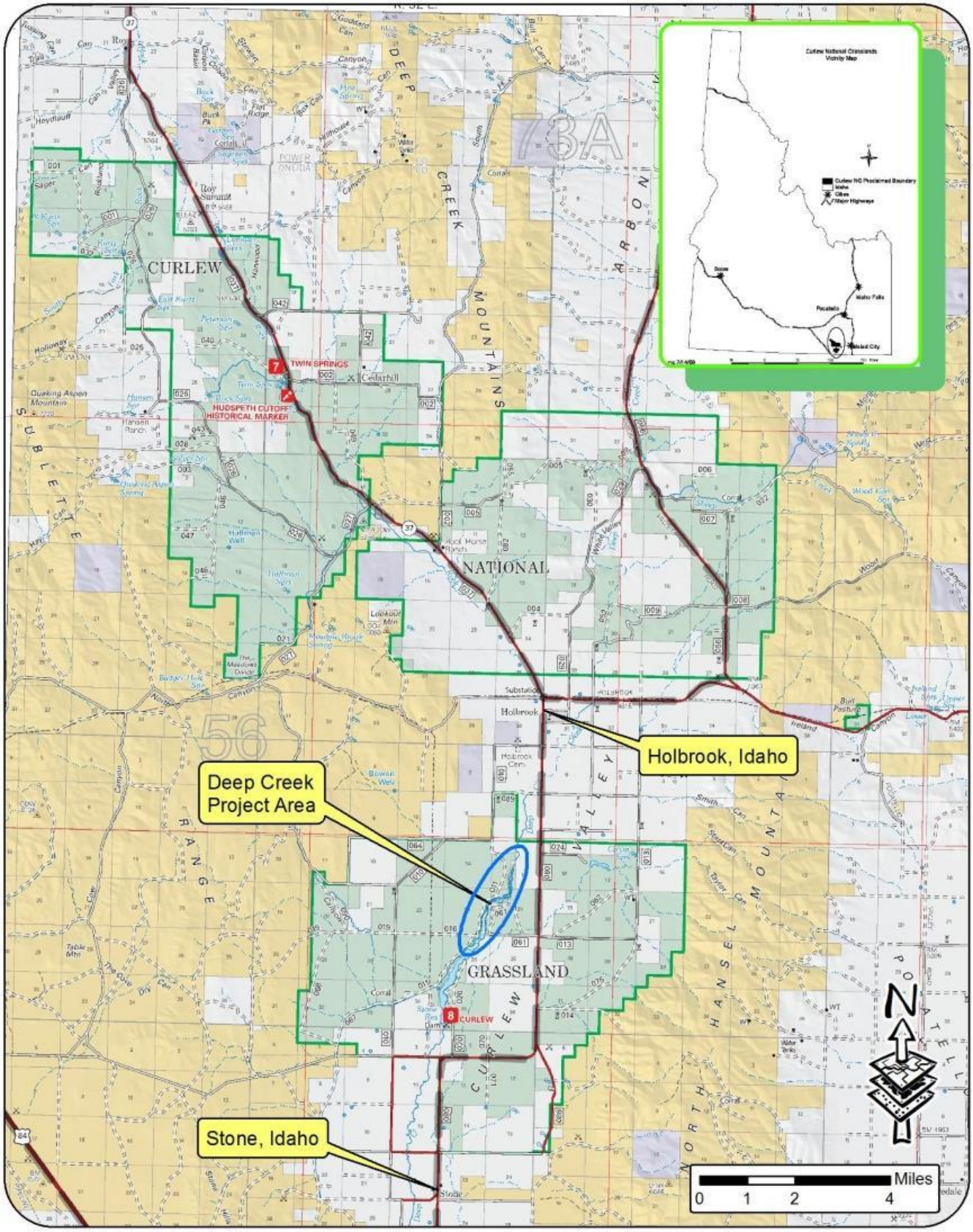
The proposed action would influence monarch butterfly habitat, sage-grouse habitat, and water quality along Deep Creek. There would likely be short-term impacts to monarch butterflies as the agency treats noxious weeds and before desirable species re-establish. In the long-term however, it is expected to benefit monarch butterflies by reducing Russian olive and improving the overall diversity. Removal of the Russian olive and saltcedar trees would directly benefit sage-grouse by opening up crucial riparian habitat that is not currently available to them. Long-term water quality would be improved by increasing streambank stability and reducing sediment delivery to Deep Creek.

In addition to the proposed action, the Forest Service also evaluated the “No Action” alternative where the streambank stabilization and large amounts of Russian olive removal would not occur. The agency considered other alternatives as well, but they were eliminated from detailed analysis. These alternatives are briefly discussed under the Alternatives section.

Based upon the effects of the alternatives, the responsible official will decide:

- Whether the proposed action will proceed as proposed, as modified, or not at all? If it proceeds:
    - What measures and monitoring requirements will the Forest Service apply?

Figure 1: Vicinity map of the Deep Creek Watershed Improvement Project Area.



INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and no action. The document is organized into four parts:

- *Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Comparison of Alternatives:* This section provides a more detailed description of the agency's proposed action and the no action alternative. Project design features were incorporated into the proposed action to address the issues. Finally, this section provides a summary table of the environmental consequences associated with the alternatives.
- The differences between the no action and the proposed action are measured through "indicators"; measureable or definable consequences of actions. Sage-grouse brood rearing habitat and monarch butterfly habitat are the two issues analyzed in depth.
- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and no-action alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and the effects of the Proposed Action.
- *Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Caribou-Targhee National Forest Headquarters Office in Idaho Falls, Idaho.

Background

Russian olive is a non-native species that was historically planted across the United States as a shelterbelt, windbreak, and ornamental tree. It is native to southern Europe and Asia. The Forest Service historically planted Russian olive as shelterbelts trees across the Grassland, but it has since expanded into other natural areas. Russian olive is especially problematic in riparian areas because it is very invasive and has the ability to displace native species (Stannard et al. 2002).

Large amounts of Russian olive and a few individual saltcedar trees have invaded the Deep Creek riparian area. Historic photographs show that the tree was not present along

the stream in 1969. Additional photos show that Russian olive had become well established by 2000. More recent photos demonstrate that its abundance continues to dramatically increase along Deep Creek. The cover page photographs and Figure 2 below demonstrate the Russian olive invasion along Deep Creek. Figure 3 shows the rapid increase in abundance in more recent years.

Figure 2: Photos showing Russian olive invasion (Mineau et al. 2012). Photo credits: 1970-G. Wayne Minshall; 2006-Colden Baxter.

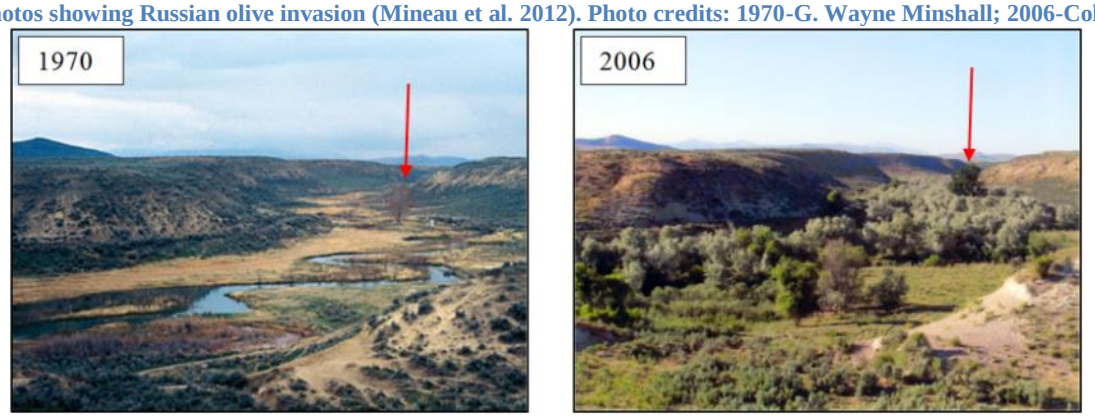
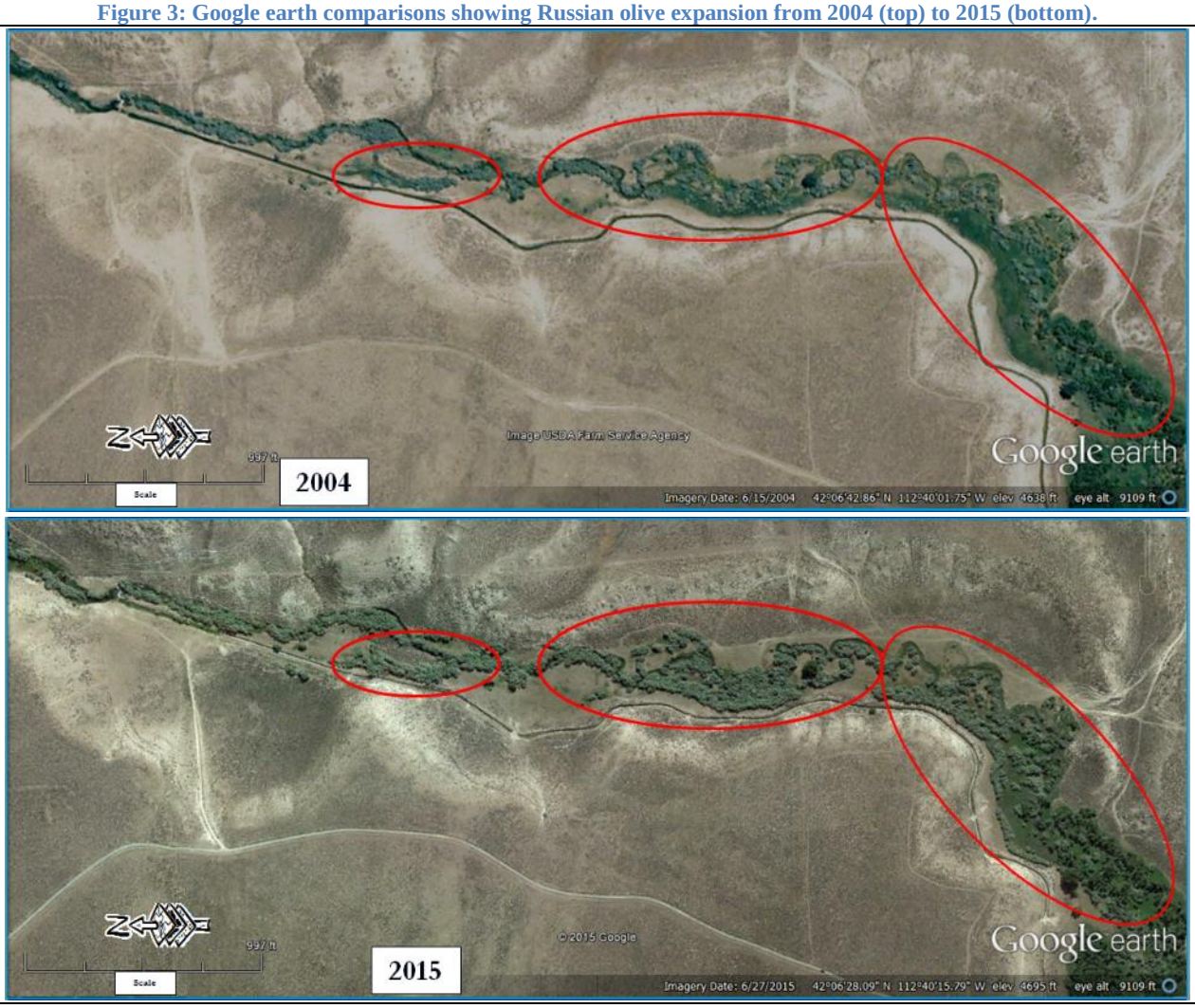


Figure 3: Google earth comparisons showing Russian olive expansion from 2004 (top) to 2015 (bottom).



Purpose and Need for Action

The purpose of this initiative is to improve overall riparian vegetation and stream channel conditions along Deep Creek. This action is needed to protect and restore the diversity and productivity of native and desirable riparian communities along Deep Creek. This action directly responds to the goals and objectives outlined in the Land and Resource Management Plan (LRMP) for the Curlew NG (USDA FS 2002). In particular, one goal for the Riparian/Wetland Area Prescription 2.8.8 is to:

- *Maintain or restore diversity and productivity of native and desired non-native deep-rooted plant communities that assist in regulating surface and bank erosion and support native and desired non-native populations that contribute to the viability of riparian dependent communities* (page 4-7).

The proposed action is designed to move the project area towards several desired future conditions described in the LRMP, as shown in Table 1 below.

Table 1: Comparison of desired future conditions and existing riparian conditions.

LRMP Desired Future Conditions	Existing Conditions
Soil hydrologic function and productivity in riparian areas is protected. Water quality buffering and regulation of nutrient cycling is maintained. (page 3-4)	Russian olive alters the natural flooding regime and reduces the availability of nutrients and moisture (USDA FS 2012). Mineau et al. (2012) found that Russian olive invasion along Deep Creek increased allochthonous litter nearly 25-fold; that the litter decayed more slowly than native willow; benthic organic matter storage increased fourfold; estimated stream ecosystem efficiency decreased 14%.
Water quality will be… improved or restored where quality does not meet Federal or State rules, regulations or policies. (page 3-5) Riparian vegetation structure and diversity are making substantial progress toward controlling erosion, stabilizing stream banks... (page 3-10)	The Idaho Department of Environmental Quality (DEQ) has identified the Deep Creek as impaired by sediment pollution (i.e. §303(d) listed). There are several tall, vertical, and unstable streambanks that lack riparian vegetation. These streambanks are actively eroding and contributing sediment to the stream that degrades aquatic habitat and water quality.
Management is proactive to avoid introduction or spread of exotic and noxious weeds. (page 3-8)	Saltcedar and Russian olive are weed species found throughout the project area. The rate of spread of Russian olive along the Deep Creek riparian area has greatly increased in recent years.
Riparian areas are dominated by deep-rooted vegetation that contain a mixture of age-classes, such as sedges and hydric grasses, willows, cottonwoods, and deciduous trees... (page 3-10)	Russian olive expansion is decreasing overall flora and fauna diversity. Cottonwoods, willows, and sedges are the desired riparian species and they are not abundant where Russian olive dominates.
Riparian & Aquatic habitats contain sufficient complexity, diversity, and productivity that they can support viable populations of native and desirable non-native species. (page 3-13)	The Russian olive stands have become very dense and now crowd out native and other desirable species, which has decreased in overall flora and fauna diversity.

Proposed Action

The Forest Service proposes the following treatments:

1. **Russian olive removal**: Mechanically remove and treat approximately eleven acres of Russian olive and individual saltcedar plants. Biomass treatments of the woody material would include a combination of lop and scatter, pile burning, and chipping. Where necessary, heavy equipment would be used to transport the woody biomass to disposal areas for burning or other biomass treatments.
2. **Revegetation efforts**: A combination of passive and active revegetation methods would occur following Russian olive removal.
3. **Stream restoration and stabilization**: Mechanically stabilize several streambanks along Deep Creek. Heavy equipment would be used to reshape and stabilize the several steep eroding streambanks using bio-engineering and natural channel design techniques. Streamside revegetation and stabilization efforts would include whole willow transplants, sedge/sod-matt transplants, and willow & cottonwood staking.

Connected Action

As part of this proposed action, cut stumps would be treated with the herbicides listed in Appendix B to reduce the risk of regeneration. The agency has an approved Integrated Pest Management Strategy (IPMS) that includes a full range of integrated methods: preventative, manual, cultural, chemical, and biological (CNF 1996 & Caribou NF 2016). The herbicide treatment of noxious weeds was analyzed in these documents and will not be considered further in this analysis.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action and the no action alternative in order to make the following decisions:

- Whether the proposed action will proceed as proposed, as modified, or not at all? If it proceeds:
- What designs measures and monitoring requirements will the Forest Service apply?

Management Direction Relative to the Analysis Area

This analysis tiers to the 2002 Curlew National Grassland Final Environmental Impact Statement, Appendices, and Amendments. The 2002 Land and Resources Management Plan (LRMP) provides guidance and direction for grassland management decisions. The LRMP was derived from an interdisciplinary process with public and community involvement. The LRMP uses prescription areas to allocate uses and emphasize resource priorities. Specific Grassland-wide plan direction for resources and uses and management prescription area direction relative to the Proposed Action can be found in Appendix C of this document.

Public Involvement

The Deep Creek Watershed Improvement proposal was first listed in the Schedule of Proposed Actions (SOPA) in October 2013. The project was “cancelled” in October 2015

because it was incorporated into a larger proposal called the Curlew Invasive Plant Control Project (CIPCP). The Forest Service later determined that the Deep Creek proposal is a distinct project separate from other weed management strategies on the Grassland (see sidebar). Therefore, the Deep Creek proposal was again listed as "in progress" on January 1, 2016 SOPA.

The original proposal was provided to the public and other agencies for comment during scoping on February 18, 2014; the proposal was also scoped as part of the larger CIPCP on May 24, 2015. In addition, as part of the public involvement process, the agency published legal notices in the Idaho State Journal on February 23, 2014 and May 24, 2015 (CIPCP).

The agency presented the proposal to the US Fish & Wildlife Service at the 2013 and 2014 annual consultation meetings. The Forest Service also participated in Tribal Government Consultation with the Shoshone-Bannock Tribes in 2015 and again on April 15, 2016.

Curlew Invasive Plant Control Project (CIPCP): The Deep Creek Watershed Improvement Project was once incorporated into this larger proposal. A major component of the CIPCP proposal was to authorize the use of herbicide to control Russian olive, saltcedar, and common reed on the Curlew NG. The agency has already approved that activity however as part of the Integrated Pest Management Strategy (USDA FS 1996 & 2016). Treatments will move forward on other areas on the Grassland as following the strategy (e.g. Grandine, Sweeten Pond, and Rock Creek). The density of Russian olive is not as great at those locations, making biomass disposal and revegetation simpler.

Deep Creek Watershed Improvement Project: This Environmental Assessment is being prepared to integrate the streambank stabilization work, monarch butterfly habitat improvement work, revegetation efforts, and the biomass disposal treatments that are necessary for the treatment of Russian olive to occur along Deep Creek. These particular stands of Russian olive are some of the densest stands of invasive trees on the Grassland. In addition, monarch butterfly breeding sites are present in the project area.

Using the comments from the public, Forest Service personnel, other agencies, and the Shoshone-Bannock Tribes, the interdisciplinary team developed a list of issues to address.

Issues

Comments from public and internal scoping were considered to determine if there were any issues relevant to the decision. Potential issues were identified through public scoping and discussions with Forest Service specialists. The project comments are summarized in Appendix A: Response to Comments.

Project design features were incorporated into the proposed action to address the issues and resources. The proposed action is intended to move these resources towards the desired future conditions listed in the LRMP (Table 1). The differences between the no action and the proposed action are measured through "indicators"; measureable or definable consequences of actions.

Issues that were analyzed in depth were effects to monarch butterfly habitat, sage-grouse brood rearing habitat, and water quality.

Issue 1: Effects to Monarch Butterfly Habitat

Monarch butterfly breeding sites were identified along Deep Creek in 2015. Monarch butterfly populations are facing serious declines. The Forest Service has a national framework to guide actions for the conservation of the monarch butterfly (USDA FS 2015a). In the arid west, monarch butterflies rely on vertical structure provided by trees

and tall shrubs for shading and roost areas within riparian habitat as well as showy milkweed and nectar plants within primarily riparian habitat. Russian olive provides this shade and roosting areas, but also has expanded and shaded out the riparian meadows with showy milkweeds. Once Russian olive becomes dense, understory vegetation is essentially shaded-out. The indicator for this issue is:

- Suitable habitat available for monarch butterflies
  - Measure: Amount of open riparian meadows with showy milkweed and other nectar plants (moist soils without no trees) within a landscape mosaic pattern of trees and shrubs

Issue 2: Effects to Sage-Grouse Brood-Rearing Habitat
Based on photographs of Deep Creek in the late 1960's and 1970's, the area appeared to once provide riparian brood rearing habitat for sage-grouse. Currently, the Russian olive tree cover precludes use by sage-grouse. Recent surveys and regular field visits to Deep Creek have not produced sage-grouse observations. The indicator for this issue is:

- Brood rearing habitat available for sage-grouse
  - Measure: Acres of non-native trees removed

Issue 3: Effects to Water Quality: Ground disturbing activities, especially those located within the riparian/wetland area (RWA), have the potential to alter downstream water quality. Most pollutants (i.e. sediment & nutrients) delivered to streams comes from a source zone along streams whose width depends on topography, soils, and ground cover. Connected disturbed areas located near streams can deliver pollutants during runoff events. Such pollutants can harm water quality and aquatic organisms.

The proposed action could have minor short term impacts to water quality due to the mechanical streambank alterations proposed. However, long term water quality would be greatly improved due to increasing the streambank stability and removal of Russian olive, which can affect water chemistry. Riparian vegetation would be established to control erosion and stabilize stream banks. The indicator for this issue is:

- Streambank stability
  - Measure: Length of unstable streambank along Deep Creek

Other Relevant Resources: Public comment, tribal consultation, and agency direction require that other resource concerns also be considered and disclosed in the EA (e.g. soils, wildlife resources, rangeland resources, recreation, fuels management, fisheries, water uses by vegetation type, heritage resources, and invasive species plant management).

Concerns for threatened, endangered and sensitive plants, climate change, and air quality are not issues that were raised during scoping or which drove formulation of the proposed action. They will be briefly discussed in Chapter 3 under "Other Resources Considered," but will not be analyzed beyond that.

Concerns Outside the Scope of Analysis: Some of the comments received are outside the scope of this analysis. These include concerns that are already decided by law, regulation, the Grassland LRMP (USDA FS 2002), or other higher level decisions like

the Forest's IPMS (USDA FS 1996 & 2016) or Curlew and Buist Allotments, Allotment Management Plan Update EA (USDA FS 2004a & 2004b). Other items are now outside the scope of the analysis because the project area has been focused down from the Curlew Invasive Plant Control Project to just include the Deep Creek area.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes the alternatives considered for the Deep Creek Watershed Improvement project, including alternatives not taken through the full analysis. This chapter also contains the full description of the Proposed Action.

In response to public and internal comments, project-specific design measures were developed and incorporated into the proposed action in order to reduce potential impacts on sage-grouse brood rearing habitat and monarch butterfly habitat. Action alternatives were not developed and fully analyzed because the proposed action is specifically designed to minimize adverse impacts to the project issues while complying with the LRMP for the Grassland (USDA 2002), the Forest's Integrated Pest Management Strategy (USDA FS 1996 & 2016), the Strategic Framework for the Conservation and Management of Monarch Butterflies (USDA FS 2015a), the Greater Sage-grouse Record of Decision (USDA FS 2015b), and the applicable State and Federal laws and regulations.

Alternatives

Alternatives Considered But Eliminated from Detailed Analysis

Alternative Russian olive Treatments:

Other Russian olive treatments were considered, but have thus far been determined to be less desirable, effective, or practical. These include: girdling, flooding/ponding, burning in place, dozing, bio-control, chaining, and foliar herbicide. Many of these methods were eliminated because they could produce undesirable outcomes.

Total Removal of Russian olive:

Total removal of all of the Russian olive within the project area in one season was considered. This would include 100% removal in a very short time frame. This alternative was not examined in detail due to potential impacts to monarch butterflies, other wildlife species, and research desires from Idaho State University (ISU).

Alternative 1 – No Action

The No Action alternative is included in detailed analysis and serves as a baseline for comparison. Under the No Action alternative, current management plans would continue to guide management in the project area. Streambank stabilization would not occur along Deep Creek at the several eroding streambanks. Integrated Pest Management, including preventative, manual, cultural, chemical, and biological treatments, of Russian olive,

saltcedar, and other noxious weeds would likely continue as authorized by the Forest's IPMS (USDA FS 1996 & 2016) and an approved pesticide use proposal (PUP). However, large scale treatment and removal of Russian olive may not occur due to the large amount of biomass that would need to be disposed of.

Alternative 2 – Proposed Action

The proposed action description includes three main items: 1) Russian olive removal; 2) Revegetation Efforts; 3) Stream Restoration and Stabilization. In addition, all applicable direction and standards & guidelines from the Grassland LRMP (USDA FS 2002) would be applied. See Figure 4 for a map of Russian olive stands along Deep Creek and the stream work proposed.

Russian olive removal: The Forest Service would mechanically remove and treat approximately eleven acres of Russian olive. Any saltcedar encountered would also be mechanically removed and treated similar to Russian olive; minor amounts of a few individual salt cedar plants occur in the project area. Russian olive removal would be implemented in phases over multiple years to ensure proper revegetation. Phased removal treatments would be based on the revegetation and monarch butterfly habitat monitoring results described in next section (revegetation efforts).

Project specific actions will include mechanically cutting the tree with chainsaws or heavy machinery designed for tree removal (e.g. feller buncher). In areas that are densely infested or located along streambanks proposed for stabilization, heavy machinery, such as an excavator, would be used to remove trunks, stems, and roots. Where necessary, heavy equipment would transport the woody biomass to disposal areas for burning or other treatments.

Biomass treatments are necessary given the amount of material that would be generated. Russian olive can develop new roots from adventitious buds that come in contact with the soil so it is important to remove as much of the plant material as possible (USDA FS 2012). Root and stem remnants would be removed or piled and then destroyed by using fire, shredding, or mulching. Pulled material would be immediately destroyed by shredding, chipping, or masticating or else piled in designated locations for later burning or possible biomass disposal like bio-char.

Designated disposal areas for biomass treatments would be identified along Deep Creek by an interdisciplinary team as the project is phased in. Sensitive resource areas (e.g. heritage sites, riparian vegetation, & sensitive soils) would be avoided. Pile burning disposal areas would be limited to 0.25 acre; at large pile burn disposal sites, the top soil would first be removed and salvaged for replacement on the site after the pile is burnt. Disturbed disposal sites would be rehabilitated.

These removal and disposal methods proposed would require the use of multiple pieces of heavy machinery designed for cutting, masticating, clearing, mowing, transporting, and piling woody material.

Revegetation Efforts: Much of the information presented here on revegetation efforts is taken from Shafroth, et al. (2008) and Stannard, et al. (2002). Revegetation efforts will vary depending on the density of Russian olive within each treated area. Less dense areas

will not require much effort as the desirable surrounding vegetation will be available to colonize the site (i.e. passive restoration). Areas of dense Russian olive will require more monitoring, potential follow-up treatments, and revegetation/planting measures (i.e. active restoration). A combination of passive and active revegetation methods would be employed based upon a site-specific revegetation plan, which would consider the following:

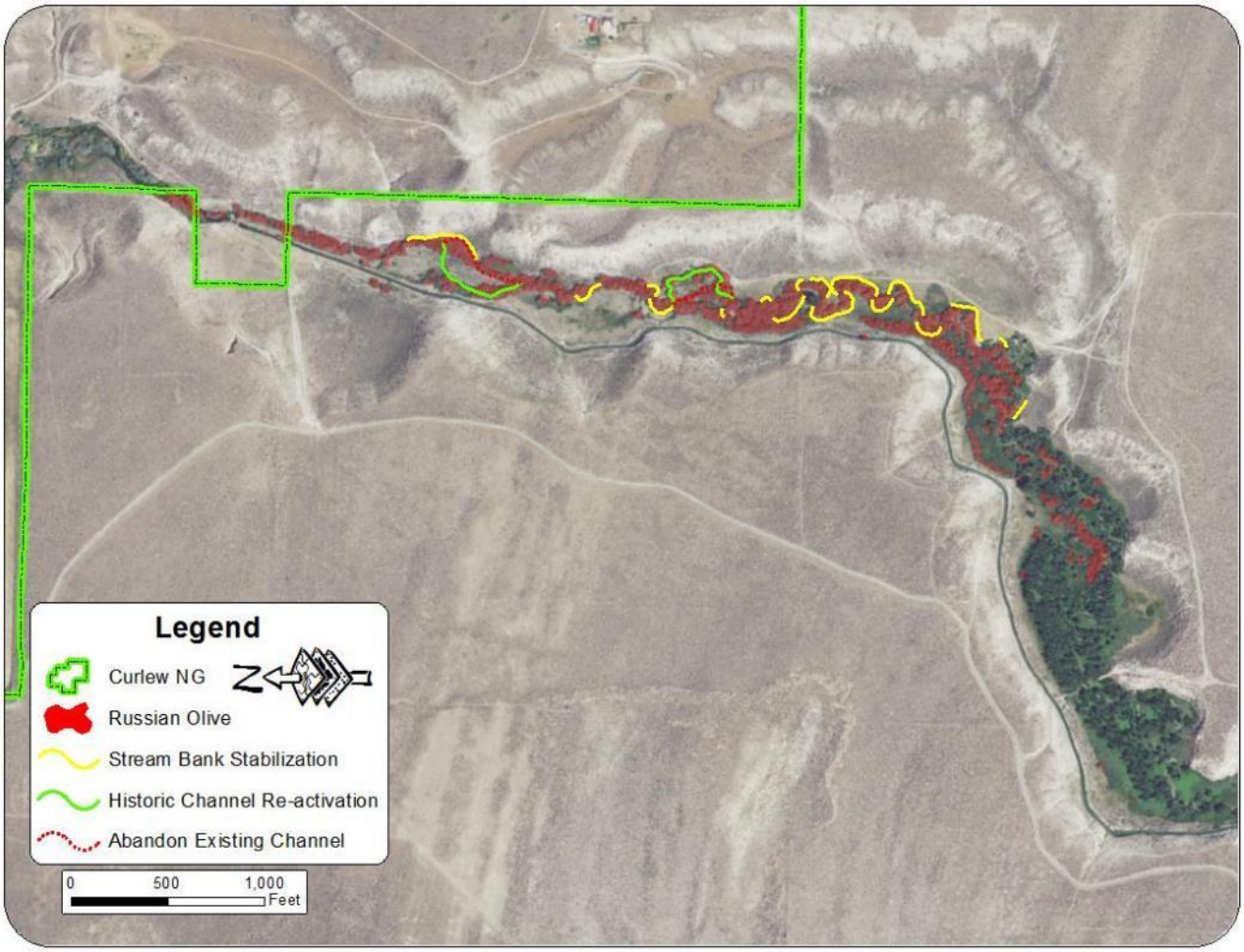
- Revegetation and monarch butterfly habitat monitoring results. Specifically, the agency will monitor the following items to ensure desired results are achieved: 1) the density of showy milkweed and other nectar plants; 2) the establishment of desirable woody plants (e.g. willows and cottonwoods); and 3) noxious weed response.
- Allow no livestock grazing before seed set of the second growing season after rangeland planting or seeding. If monitoring shows that this is not adequate to meet resource needs, defer livestock grazing as necessary. (LRMP Standard page 3-18). Temporarily electric fencing would be used to exclude livestock grazing in revegetated areas.
- Disturbed areas would be seeded to reduce weed invasion and soil erosion with a seed mix that contains species that are beneficial to sage-grouse and monarch butterflies and other pollinators.
- Follow-up treatments would follow the IPMS (USDA 1996 & 2016).
- Bare-root or containerized woody plants would be planted in key areas to meet habitat needs.

Additional revegetation efforts will occur on the Deep Creek streambanks proposed for stabilization. This work is discussed below in the Stream Restoration and Stabilization description.

Stream Restoration and Stabilization: Heavy equipment would be used to reshape and stabilize several steep eroding streambanks along approximately two miles Deep Creek. Heavy equipment and bio-engineering techniques would be used to re-shape the stream banks to a more stable angle. The constructed streambanks would be armored with whole willow transplants, willow staking, and sedge mat transplants. Riparian re-vegetation efforts would include transplanting whole willow clumps and sedge-mats, willow staking, and seeding.

Streambank stabilization would result in excess material (soil) as the streambanks are “peeled back” to a stable angle. As with the disposal of the Russian olive biomass, designated disposal areas for excess streambank material would be identified by an interdisciplinary team. Sensitive resource areas (e.g. heritage sites, riparian vegetation, & in appropriate soils) would be avoided. Some of these disposal areas may coincide with biomass disposal areas. Others would be identified as well. Excess material would also be disposed of in the existing channel where it is abandoned in conjunction with the historic channel re-activation. All disturbed disposal sites would be seeded and rehabilitated.

Figure 4: Map of proposed stream work and Russian olive along Deep Creek.



Project Design Features Included in Proposed Action – Alternative 2

The proposed action would also include all of the project design features detailed in Appendix D: Project Design Features from Specialist Reports. These include measures for the protection of sage-grouse, monarch butterflies and other insect pollinator habitat, water quality, fisheries, heritage resources, and other resource concerns.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2: Comparison of alternatives by issues.

Resource Element	Alternative 1: No Action	Alternative 2: Proposed Action
Monarch butterfly habitat	Amount of open riparian meadows with showy milkweed & other nectar plants decreases as Russian olive expands from mosaic stands to dense stands.	Amount of open riparian meadows with showy milkweed & other nectar plants within a landscape mosaic pattern of trees and shrubs would increase.
Sage-grouse brood rearing habitat	Little to no Russian Olive removal occurs: May impact greater sage-grouse.	Up to 11 acres of Russian olive removal: Would benefit sage-grouse.
Water quality	Roughly 4,170 feet of unstable streambank identified in the project area would remain unstable.	Approximately 4,170 feet of streambank would be stabilized and thereby reduce sediment delivery directly to Deep Creek.

ENVIRONMENTAL CONSEQUENCES

This section summarizes the applicable environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

In accordance with 40 CFR 1502.21, this EA incorporates by reference the resource specialist reports in the project record (Colt 2016; Higginson 2016; Lehman 2016; Lyman 2016; Marr 2016; Plager 2016; Tiller 2016; Jorgensen 2016). The specialist reports contain the data, regulatory framework, assumptions, methodologies, maps, references and documentation that the interdisciplinary team relies upon to reach the conclusions of the analysis.

The most relevant scientific data that is available is considered and reviewed for this analysis. The information below and in the project record describes the conditions of resources and uses that are anticipated to occur under each alternative.

The effects analysis for each alternative consists of the direct and indirect effects of each alternative. Direct effects are impacts that occur at the same time and place as the initial action. Indirect effects are impacts that may (1) follow the initial action, (2) be of a different type or (3) be in a different place from direct impacts. The direct and indirect impacts of each alternative can only be completely evaluated within the context of past, present, and reasonably foreseeable future actions in the area, regardless of what agency or person undertakes such further action (40 CFR 1508.7) The effects of these other actions when combined with the effects of the project are referred to as "cumulative effects." Environmental issues carried forward for analysis in the EA have the potential for cumulative effects. NEPA implementation guidance requires that federal agencies identify the temporal and geographic framework used to evaluate potential cumulative effects of alternatives and the specific past, present and reasonably foreseeable projects that will be analyzed (40 CFR 1508.25). For purposes of the EA, the general temporal framework of reference will be current, reasonably foreseeable, and past activities within the last 20 years.

Monarch Butterfly Habitat

Affected Environment

Biology

Life Cycle: The monarch butterfly has four distinct life stages: egg, larva (caterpillar), pupa (chrysalis), and adult. The egg and caterpillar stages occur only on milkweed plants (*Asclepias* spp.), whereas adults survive by nectaring on a variety of flowering plants. Females only lay eggs on milkweed plants since monarch caterpillars only eat milkweed.

Reproduction Generations: During the spring and summer breeding season (approx. February/March – September), monarchs live from 2-5 weeks during which they mate and lay eggs. Potentially, three generations could occur at Deep Creek during the summer breeding season with their arrival around June 1st and departure sometime in September at the latest.

The Migrating Generation: The last generation of the year migrates to California or Mexico to overwinter. This generation can live as long as 9 months. They become reproductive in February or March as they move north. The western population in semi-arid regions have been found to primarily be associated with rivers and riparian areas.

Range-wide Threats (The Xerces Society 2016): The primary threats to the monarch butterfly include the loss of milkweed from agricultural and natural areas, degradation of overwintering sites, and climate change. The large-scale use of systemic insecticides may also pose a considerable threat. Natural enemies such as diseases, predators, and parasites likely also influence the monarch population.

Monarch Butterfly Habitat Summary

Local information about monarchs is only recently being analyzed by modeling, monitoring, and inventory. It is currently unknown how important the breeding sites on the Grassland are to the conservation of monarch butterflies. For the Curlew NG planning area though, the viability of the population at Deep Creek is clearly critical since it is the largest of only two on the Grassland (the other is at Grandine).

Figure 5: Monarch butterflies on showy milkweed at Deep Creek. As well as being the host plant for caterpillars, showy milkweed is also a great nectar

The number of monarchs that make it to Idaho and the rest of the western summer range is currently unknown. Currently there is no trend information for monarch butterflies at this site. Surveys in 2015 indicate that the population numbers during the height of the breeding season are well over 100+. Showy milkweed is the most common forb throughout the project area and an estimate of the milkweed population is at least a thousand+ stems. The project area is within the Deep Creek Monarch Breeding Site.

Showy milkweed is a sun-loving plant, but also needs a certain level of soil moisture that might be more available in partially shaded areas. Where Russian olive is dense however, little understory vegetation is

found, including showy milkweed. The best available information for similar sites in Utah documents the monarch's use of Russian olive for roosting and a preference for milkweed associated with the shade provided by the Russian olive. Russian olive is an invasive, non-native species, so it is appropriate to speculate that monarch butterflies do not require Russian olive; however it has been observed throughout the west that showy milkweed and monarch butterflies commonly utilize the edge between dense Russian olive stands and openings in riparian areas. Historically, trees and shrubs in breeding sites would likely be species such as cottonwood, tree-form and shrub-form willows, as well as other trees and shrubs typical of riparian areas in the Great Basin.

The shading provided from the trees and shrubs creates micro-site habitat for monarchs in the developing stages: egg, larva and pupa on milkweed plants. Vegetation structure is important to butterflies because it can affect their ability to thermoregulate and reproduce (Holl 1995 & 1996 as reference by Fleishman et al. 1999) for changing weather conditions throughout their breeding season. It is currently unknown what the optimum amount of structure/shade in association with open areas with milkweed is for a monarch breeding site in the arid west.

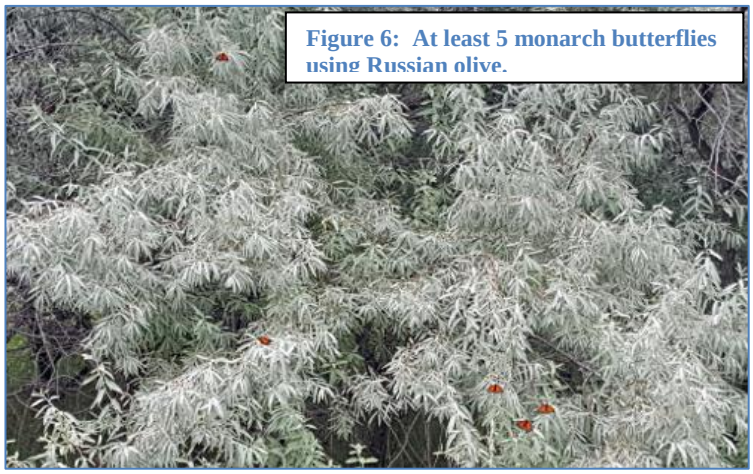


Figure 6: At least 5 monarch butterflies using Russian olive.

Information that is known about the requirements for monarch butterfly breeding sites relevant to understanding the effects of the alternatives is the amount and abundance of showy milkweed and other nectar plants, shade-availability appropriate for roosting sites by adults and for providing diversity of micro-sites for the egg, larva, pupa life-stages development throughout the breeding season.

Showy milkweed is the most common forb within the project area; however the expansion of Russian olive over the last 10 years has reduced the open riparian meadow areas where showy milkweed and other nectar plants occur. Cattle generally avoid eating milkweeds unless confined to restricted areas (Borders, 2012). Cattle grazing could at times consume or trample monarch butterfly larva (caterpillar) and pupa (chrysalis); however livestock grazing at Deep Creek – both past and present – likely has increased milkweed by grazing other species in the riparian meadows that compete with showy milkweed.

Unusual weather such as hot spells or freezing during the breeding season can also be a threat. This is one reason for needing shade-trees within monarch butterfly habitat.

Natural enemies – predators, parasitoids, and parasites that can harm monarch eggs, larvae, pupae, and adults are present in the project area, but to what extent is unknown.

At the project level, the potential threat of non-target species being sprayed by herbicides is reduced by following the Pesticide Use Proposal (PUP) in Appendix B and the IPMS.

Shade/Shelter for Roosting by adults & micro-site diversity for larval development

Monarch butterflies require milkweeds throughout their range, but information for where they are found in their arid west summer breeding range indicates a preference for having some level of trees and tall shrubs distinctly in riparian habitats that provide some beneficial edge effects for roosting and resource availability. Russian olive has been documented as a common species associated with milkweed, but there is no data currently available indicating that Russian olive specifically is important, only compelling observational information due to their co-occurrence. For example, in the shrub-steppe landscapes in Oregon and Washington, milkweed appears to be associated with Russian olive. Jepsen (2016) has often found milkweed at the edges of Russian olive groves.

The influence of temperature on larval development has been studied (University of Minnesota (U of M) 2016). Monarch larvae do not develop at temperatures below 10°C or above 34° C. They develop fastest at the highest temperatures within that range. Larva can survive very hot temperatures during the day (up to 40°C (104°F)), as long as the temperature cools down at night, but their development slows down at hot temperatures. Research indicates that survival rates and rate of development is fastest at higher temperatures, at least within the range of 15°C (59F) to 29°C (84F). (U of M 2016)

The Utah Lepidopterists' Society (2016) documents that monarchs are especially attracted to wet meadows in the Wasatch Valley and these preferred sites are recognized by an abundance of Russian olive trees as well as other plants such as milkweed, bull thistle, wild licorice, coyote (sandbar) willow. The Society notes the observation that the monarch adults especially prefer to roost in Russian olive trees to escape the heat of the day and that the female often lay their eggs on the milkweed adjacent to Russian olive.

Figure 7: Desirable condition of open meadows with milkweeds (foreground) and scattered shade trees and willows (background right).

The Southwest Monarch Study documents four basic needs for breeding habitat (waystations) as being: 1) Host Plants (milkweed species); 2) Nectar plants; 3) Shelter – Butterflies need trees or large shrubs for protection from the wind and heat of the day as well as a place to spend the night; and 4) Moisture – in dry conditions (low humidity and low rainfall), monarchs benefit from moisture (Southwest Monarch Study 2016).

Environmental Consequences

Alternative 1 – No Action

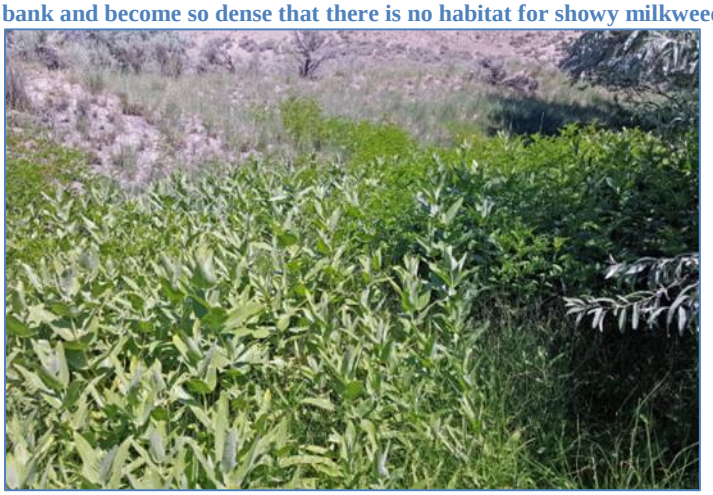
Based on observations made in 2015, the site currently has conditions favorable to monarch butterflies. There is abundant showy milkweed, abundant monarchs in all life stages, the presence of other nectar plants, trees for roosting, and a good variety of micro-

site conditions of various different levels of sunlight, moisture and temperature (edges between dense Russian olive stands and open meadows).

From comparing historical photos with recent ones, Russian olive has notably increased in cover throughout the project area, but so have other trees and shrubs. This increase is likely to continue under the no action alternative and as Russian olive becomes denser it will shade-out clumps of showy milkweed and other nectar source plants. The increase will likely also decrease the amount of edge habitat as the Russian olive stands merge together. To what degree this will continue to occur and to what level the increase of Russian olive will reduce the quality of monarch habitat is unknown. Some of the open meadows in the project area may have soil or moisture constraints that limit the establishment of Russian olive.

Observations indicate that the margins between the dry upland habitat and areas of Russian olive expansion are narrowing. These margins tend to be one of the areas where monarchs, milkweed, and other nectar plant occur.

Figure 8: Photo on the left shows a narrow patch of showy milkweed between a dense Russian olive grove and the ditch bank. Photo of right is a similar area, but the Russian olive grove has expanded all the way to ditch bank and become so dense that there is no habitat for showy milkweed.



Alternative 2 – Proposed Action

Direct and Indirect Effects: Removal of Russian olive would create open riparian meadow habitat allowing for the potential increase of both desirable and undesirable forbs and grasses. Revegetation efforts would include trees, shrubs, and forbs beneficial to monarch butterflies and other pollinator species. Revegetation would also include site preparation like treating noxious weeds using the Integrated Pest Management approach.

Impacts to monarch butterflies would be primarily minimized by restricting the activities to only occur outside the breeding season (no activity June 1st through September 30th).

Other effects are more specifically related to the changes in vegetation with project implementation. The proposed action would change the relative availability of plant species and other vegetation characteristics important to monarchs (e.g. milkweed, other nectar plants, and a micro-site diversity).

The proposed action includes design features that provides the ability to consider the unknowns about western monarch butterfly breeding sites. It is unknown how Russian

olive impacts the quality of monarch habitat in the project area. Another challenge is determining how much the weedy plants in the understory will increase with the removal of the dense Russian olive canopy. Some of these weedy plants, such as Canada thistle, are excellent nectar plants but also noxious weeds.

The action alternative would include an increased emphasize of IPM strategies to treat noxious weeds. Subsequent treatments of noxious weeds that are likely to increase after removal of the Russian olive and with the ground-disturbing activities associated with the streamside restoration work. The project includes design criteria to mitigate concerns of potential adverse impacts to monarch butterflies in the short-term but with expected long-term beneficial impacts to monarch butterflies and the overall quality of the riparian vegetation in the project area.

Cumulative Effects – Alternative 2

Within the Deep Creek project area the cattle grazing unit has a permitted number of 93 and is often grazed in the spring (April –June) due to early range readiness, vicinity to the campground, and the division fencing that extends into the water which may be exposed as the reservoir recedes.

Cattle grazing has likely increased the amount of showy milkweed overtime as well as other plants that increase with the presence of cattle grazing. Cattle grazing could consume or trample monarch butterfly larva (caterpillar) and pupa (chrysalis). However, cattle grazing can be compatible with monarch breeding site management with proper timing and considerations for maintaining milkweed and other nectar plants (Southwest Monarch Study 2016). Early spring, late fall, or winter grazing could maintain or increase showy milkweed by grazing the intermediate wheatgrass and reducing the chance of this aggressive grass from out-competing the milkweed.

Sage-Grouse Brood Rearing Habitat

Affected Environment

Greater sage-grouse are an Intermountain Region Sensitive species and a Curlew National Grassland Management Indicator Species (USDA FS 2002). The greater sage-grouse was recently a candidate for listing under the Endangered Species Act, however, the US Fish & Wildlife Service determined in 2015 that a listing was not warranted.

Greater sage-grouse is a common species observed on the Curlew NG. The entire Grassland is year-round sage-grouse habitat, with certain areas being utilized more heavily than others based on site specific habitat features, time of year, and grazing patterns.

Based on photographs of Deep Creek in the late 1960’s and 1970’s the area appeared to be excellent riparian brood rearing habitat. Currently, the Russian olive tree cover precludes use by sage-grouse. Agency personnel conducting surveys and regular field visits to Deep Creek from 2009 to the present (spring 2016) have not observed sage-grouse or sharp-tailed grouse using the drainage in the project area.

The closest active sage-grouse lek is 3.12 miles SSW of the Deep Creek project area. This lek has had very poor or no attendance since the Bowen and Stone 2 fires in 2006. The Huffman/Middlebrook lek complex, South Funk and North Hess-Haws leks have consistently had higher attendance and are 8.1 miles, 6.5 miles and 8.5 miles, respectively.

Environmental Consequences

Alternative 1 – No Action

The project area has seen a significant increase in Russian olive trees over the last 20-30 years, with a dramatic increase in cover over the last 10 years. With the no action alternative, Russian olive are expected to continue to increase in abundance and canopy cover.

Sage-grouse avoid trees and other tall structures that allow perching for avian predators. This includes the Russian olives and salt cedar along Deep Creek. Historical photographs from 1969 and 1970 show that Deep Creek was a riparian area devoid of trees and likely provided high quality brood rearing habitat for sage-grouse. Currently, sage-grouse avoid the area due to the tree cover. Under the no action alternative, the Russian olive woodland is expected to expand and widen over time and therefore sage-grouse habitat availability and quality in this area are expected to continue to decline. The continued increase in the invasive tree species will continue to exclude both sage-grouse and sharp-tailed grouse species. Therefore, the no action alternative "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species."

Alternative 2 – Proposed Action

Direct and Indirect Effects - Alternative 2

Removal of up to 11 acres of Russian olive and saltcedar trees would benefit sage-grouse by opening up crucial riparian habitat that is not currently available to them. This habitat is limited on the Grassland, especially during the brood rearing period. Similarly, streambank stabilization would increase the area of wetted edge along the creek, which dramatically increases insect and forb populations, which directly benefits grouse chicks. Forbs and especially insects are critical to developing grouse chicks for the first several months of life. Increases in these described habitat elements will directly benefit grouse species. This is particularly important for sage-grouse, as there is considerable concern for their populations both in southeastern Idaho and across their range. The short-term disturbance required to conduct the project is not expected to have any impacts to grouse as they currently do not use the area and because the project will be conducted in the fall or winter.

Cumulative Effects – Alternative 2

Based on the implementation of the recommended design criteria there are only beneficial effects to sage-grouse, therefore, this project would not add incrementally to cumulative impacts from past, present, and reasonably foreseeable projects to grouse.

Water Quality

Affected Environment

State Water Quality Standards and Best Management Practices (BMPs): The Idaho Department of Environmental Quality (IDEQ) has identified surface water use designations (beneficial uses) and water quality standards (IDEQ 2016). The beneficial uses of Deep Creek include cold-water aquatic life, primary contact recreation, domestic, agricultural, and industrial water supply, wildlife habitats, and aesthetics.

Through a Memorandum of Understanding (MOU) with the State of Idaho, the Forest Service is responsible for implementing nonpoint source pollution control measures during all management activities (USDA FS 2013a). The Idaho anti-degradation policy states that "the existing in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected" (IDEQ 2016). It is also Forest Service Policy to maintain or improve water quality (LRMP for the Curlew NG and FSM 2500[1] (2520.3)). The State recognizes BMPs as an effective process for protecting beneficial uses and ambient water quality.

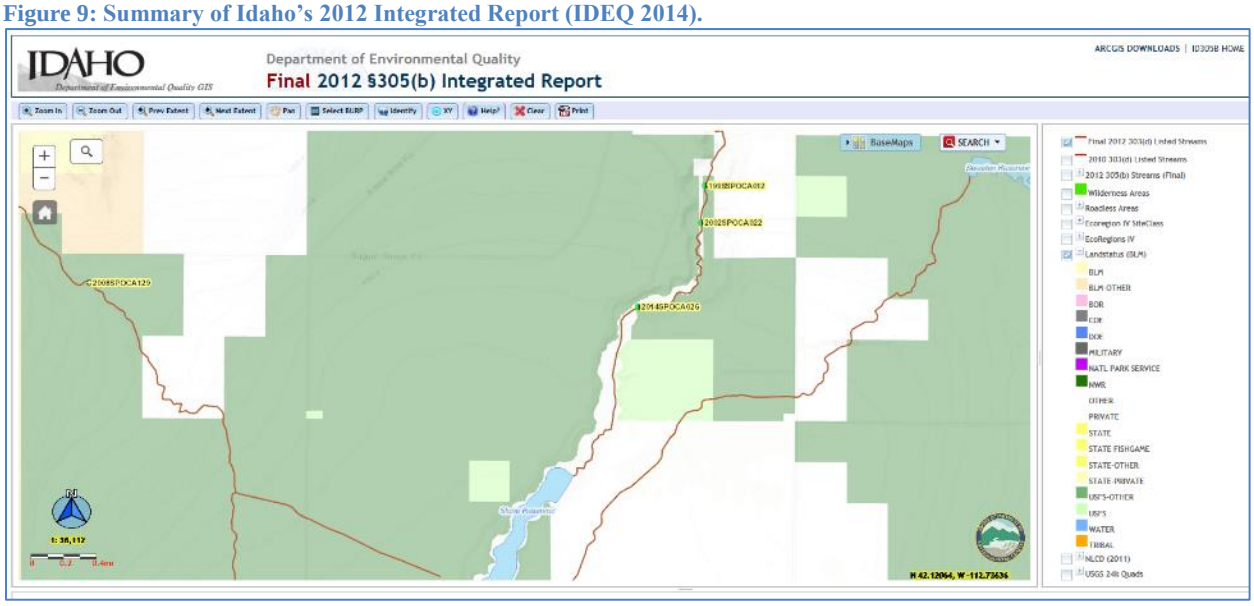
Impaired Waters (§303(d) Listed), Total Maximum Daily Loads (TMDLs), & BMPs: The IDEQ (2014) has identified the Deep Creek assessment unit (ID16020309BR001_03a) as not supporting the beneficial uses of cold water aquatic life due to sediment pollution; Deep Creek is §303(d) listed for sedimentation/siltation. A sediment TMDL has not yet been established, but the State has recognized the following relevant water quality standards for the applicable uses (IDEQ 2016):

- Cold Water Aquatic Life: Turbidity, below any applicable mixing zone set by the Department, shall not exceed background turbidity by more than fifty (50) NTU instantaneously or more than twenty-five (25) NTU for more than ten (10) consecutive days.

Through a MOU with the State of Idaho (USDA FS 2013b), the U.S. Forest Service is the designated agency for NFS Lands. The Forest must therefore ensure that BMPs are properly implemented to protect and improve water quality. Project BMPs designed to protect and improve water quality and watershed conditions are included in the project BMPs.

[1] Section 2520.3 of FSM 2500 states: "Apply management practices that meet requirements for protecting, maintaining, restoring, or improving watershed conditions."

Figure 9: Summary of Idaho's 2012 Integrated Report (IDEQ 2014).



Russian olive impacts: Mineau et al. (2012) found that the Russian olive has altered resource fluxes to Deep Creek with consequences for whole-ecosystem functions. Allochthonous litter increased nearly 25-fold and the litter decayed slower than native willow. Despite a mean 50% increase in canopy cover, there were no significant changes in gross primary production. Benthic organic matter storage increased four-fold, but there were no associated changes in stream ecosystem respiration or organic matter export. Thus, estimated stream ecosystem efficiency (ratio of ecosystem respiration to organic matter input) decreased 14%.

Environmental Consequences

The potential effects of the proposed action are mainly in regards to the streambank stabilization and fuels management aspects of the Russian olive removal. In regards to fuels management, the Forest Service scientific community has discussed the watershed effects of fuels management activities at great lengths (Elliot et al. 2010).

Russian olive may alter nutrient dynamics in soils and streams. Russian olive is a nitrogen-fixer that may increase the concentration and export of nitrate and dissolved organic nitrogen. It may increase soil inorganic nitrogen and soil water nitrate. Russian olive may also alter nitrogen availability and cycling in streams due to leaf litter inputs into the stream.

Direct and Indirect Effects

Alternative 1 (No Action) – This alternative would not result in any direct change to the existing watershed and stream channel conditions. No considerable changes are expected. The RWA and Deep Creek would remain at less than desirable conditions. With the exception of possible wildfire or future projects at some point, no considerable changes to watershed condition are expected.

Water Quality: Water quality in the area would continue to be impaired by sediment. There would be no acres treated within the RWA prescription and therefore for no potential effects on water quality.

In regards to sediment, the agency has identified this stream reach and the unstable streambanks to be impeding stream channel health and water quality. Sediment would continue to be delivered to the stream channel from the unstable streambanks during flood events. Approximately 4,170 feet of unstable streambank has been identified in the project area. These streambanks would remain unstable.

Figure 10: Photos of unstable streambanks along Deep Creek.

Alternative 2 (Proposed Action) – This alternative best addresses the issues identified by Deep Creek water quality impairment. The RWA attributes along Deep Creek would move toward functioning at desirable levels.

The proposed action could have minor short term impacts to water quality due to the mechanical streambank alterations proposed. However, long term water quality would be greatly improved due to increasing the streambank stability and removal of Russian olive, which can affect water chemistry. Riparian vegetation would be established to control erosion and stabilize stream banks.

The greatest potential impact to water quality comes from the streambank treatments and Russian olive removal. Site-specific BMPs have been developed for this project to improve long-term water quality. Overall watershed function is expected to improve with proper implementation of the BMPs.

Water Quality: Water quality in the area would move towards meeting state water quality standards as sediment loads would be reduced. Approximately 4,170 feet of streambank would be stabilized and thereby reduce sediment delivery directly to Deep Creek. This alternative would improve long-term water quality as sediment delivery to the stream channel from vertical unstable streambanks would decrease.

Cumulative Effects

Alternative 1 (No Action): Long-term watershed conditions may slightly improve.

Water Quality: Water quality in the area would continue to be impaired by sediment. It may slightly improve as past land management disturbances continue to recover, as well as through ongoing livestock management improvements.

Alternative 2 (Proposed Action): Implementation of the BMPs is expected to improve the long-term watershed conditions and water quality.

Water Quality: Overtime, bank stabilization would decrease sediment delivery direct to Deep Creek. Water quality in the area would move towards meeting state water quality standards as sediment loads would be reduced. In addition, continued recovery of past disturbances and improved livestock management techniques would decrease sediment loads.

Overall, long-term water quality would expected to be improved. The greatest risk to water quality in terms of sediment production and delivery to stream channels, comes from short term impacts associated with the streambank stabilization and fuels treatments. The risk can be minimized through proper implementation of the project BMPs.

Other Resources Evaluated

This section provides a summary of several other resource concerns that are considered and further evaluated in the specialist reports contained in the project record.

Other Wildlife Resources

Biological Evaluation

The species or species groups listed in Table 3 were reviewed in a Biological Evaluation (Colt 2016). Many were dismissed from further analysis because they either do not have habitat in the area, their distribution does not overlap the project area or they have been surveyed for and are not known to occur within or near the project area. The four species/groups considered for additional analysis include, greater sage-grouse (R4 sensitive and CNG MIS), Columbian sharp-tailed grouse (R4 sensitive), and riparian bird species richness (CNG MIS).

Table 3: ESA listed species, R4 Sensitive species, CNG Management Indicator Species and other species of interest.

Species / Issues Considered	Habitat[2]	Presence[3]	Effects[4]
Threatened, Endangered, Proposed, and Candidate Species[5]			
Canada lynx (Lynx canadensis) Threatened	No	No	NE
Ute ladies' tresses orchid (Spiranthes diluvialis) (threatened)	No	No	NE
Sensitive Species[6]			
Gray wolf *(Canis lupus)*	No	No	NI
Pygmy rabbit (*Brachylagus idahoensis)*	Yes	No	NI
Spotted Bat *Euderma maculatum*	No	No	NI
Townsend's (Western) Big-eared Bat *Corynorhinus townsendii pallescens*	No	No	NI
North American wolverine (*Gulo gulo luscus)*	No	No	NI
Bald eagle (*Haliaeetus leucocephalus)*	No	No	NI
Boreal Owl *(Aegolius funereus)*	No	No	NI
Greater sage-grouse (*Centrocercus urophasianus)*	Yes	Yes	See Analysis
Trumpeter Swan *(Cygnus buccinator)*	No	No	NI
Peregrine falcon (*Falco peregrinus anatum)*	No	No	NI
Harlequin Duck *(Histrionicus histrionicus)*	No	No	NI
Flammulated Owl *(Otus flammeolus)*	No	No	NI
Three-toed Woodpecker *(Picoides tridactylus)*	No	No	NI
Great Gray Owl *(Strix nebulosa)*	No	No	NI
Columbian Sharp-tailed Grouse *(Tympanuchus phasianellus columbianus)*	Yes	Yes	See Analysis
Northern Goshawk *(Accipiter gentillis)*	No	No	NI
Columbia spotted frog (*Rana luteiventris*)	Yes	No	NI
Boreal toad (*Bufo boreas*)	Yes	No	NI
Starveling Milkvetch *(Astragalus jejunus var. jejunus)*	No	No	NI
Payson' Bladderpod *(Lesquerella paysonii)*	No	No	NI
Cache Beardtongue *(Penstemon compactus)*	No	No	NI
Management Indicator Species[7]			
Greater sage-grouse (*Centrocercus urophasianus)*	Yes	Yes	See Analysis
Riparian Bird Species Richness (passerines/ migratory birds)	Yes	Yes	See Analysis

[2] Suitable habitat for species or prey occurs in the project or analysis area.

[3] Occurrence is known, expected, probable, or possible in the project or analysis area determined by the amount, distribution, and quality of suitable habitat in and around the project area; reviewing file information of suitable habitat, sightings; survey data; site visits; and/or personal knowledge of species and habitat.

[4] Effects to species from any of the proposed action alternatives: **NE** – No effect. **NLJCE** – Not likely to jeopardize the continued existence of the proposed species or, experimental, nonessential population. **MA-NLAA** - May affect - Not Likely to Adversely Affect. **NI** – "No Impact" No direct, indirect, or cumulative effects would occur because there is no suitable habitat in the project area, the project area is outside the range of the species, or the species is not expected to be affect by the proposed action. **MIIH** – "May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species" due to direct effects to species or indirect effects to habitat important to their prey. **BI** – "Beneficial impact" due to expected improvement in habitat quality.

[5] Threatened, Endangered, Proposed, and Candidate species identified by U.S. Fish and Wildlife Services IPaC and on the 180-Day Species List Number (or update) and date of transmittal letter: **Intermountain Region R4 TES species List 2015**

[6] Sensitive species identified by the Regional Forester are known or suspected to occur on the CNG (USDA Jan. 2015).

[7] Management Indicator Species – CNG FEIS (USDA 2002a) and LRMP (USDA 2002b)

Columbian sharp-tailed grouse

Affected Environment: Columbian sharp-tailed grouse are a common species within the Grassland. Sharp-tailed grouse use grassland and mountain brush habitats with relatively dense herbaceous and shrub cover. The Grassland is important Columbian sharp-tailed grouse habitat from a range-wide perspective. With respect to the Deep Creek project site, there are several leks that surround the project area, including leks 1.25 miles to the NW, 2.6 miles to the W and 1.75 miles to the SE.

In the winter, sharp-tailed grouse will use trees, including Russian olives, for roosting, however, they are not dependent on these species during the winter and have not been seen roosting in the Russian olive woodland along Deep Creek. In the nesting and brood rearing period, however, sharp-tailed grouse do avoid trees and woodland areas.

Environmental Consequences

Alternative 1 - No Action: If the invasive woodland along Deep Creek continues to expand, sharp-tailed grouse habitat quality and availability would decrease. The continued increase in the invasive tree species would continue to exclude sharp-tailed grouse species. Therefore, selection of the no action alternative "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species."

Alternative 2 - Proposed Action: Removal of the Russian olive and saltcedar trees would benefit sharp-tailed grouse by opening up crucial riparian habitat that is not currently available to them. This habitat is limited on the Grassland, especially during the brood rearing period. Similarly, streambank stabilization would increase the area of wetted edge along the creek, which dramatically increases insect and forb populations, which directly benefits grouse chicks. Forbs and especially insects are critical to developing grouse chicks for the first several months of life. Increases in these described habitat elements will directly benefit grouse species. The short-term disturbance required to conduct the project is not expected to have any impacts to grouse as they currently do not use the area and because the project will be conducted in the fall or winter.

Cumulative Effects: Based on implementation of the recommended design criteria there are only beneficial effects to sharp-tailed grouse, therefore, this project would not add incrementally to cumulative impacts from past, present, and reasonably foreseeable projects to grouse.

Riparian Bird Species Richness

Affected Environment: Riparian Bird Species Richness is a measure of avian diversity within riparian areas: Breeding Bird Complex or Riparian Bird Species Richness. Point count surveys during the breeding/nesting season have recorded 24 species of birds in the Deep Creek area (Table 4).

Of these 24 species, the following 15 species were likely using the area primarily because of the Russian olive tree cover for nesting: American robin, barn swallow, American goldfinch, common raven, western kingbird, ash-throated flycatcher, yellow warbler, Bullock's oriole, house wren, European starling, Eurasian collared dove, western wood-pewee, downy woodpecker, tree swallow, and great-horned owl. The other nine species, including red-winged blackbird, Brewer's blackbird, western meadowlark, mourning

dove, lark sparrow, sage thrasher, killdeer, song sparrow, and mallard are more likely drawn to the sagebrush, cottonwood, willow or water habitat elements.

Table 4: Twenty-four Passerine species recorded in Deep Creek avian point counts.

American Robin	Common Raven	House Wren
Red-winged Blackbird	Sage Thrasher	European Starling
Brewer's Blackbird	Western Kingbird	Eurasian Collared Dove
Song Sparrow	Ash-throated Flycatcher	Mallard
Barn Swallow	Yellow Warbler	Western Wood-pewee
Mourning Dove	Bullock's Oriole	Downy Woodpecker
Lark Sparrow	Killdeer	Tree Swallow
American Goldfinch	Western Meadowlark	Great-horned Owl

Environmental Consequences

Alternative 1 - No Action: Selection of the no action alternative would have **no effect** on riparian bird species richness in Deep Creek as the existing habitat will not be impacted. Over time, as Russian olive cover and density continues to increase in the drainage, there may be some additional species drawn to the available woody habitat. These species would most likely be fairly common species in southeast Idaho or those not typically nesting in the sagebrush steppe ecosystem on the Grassland. Such species may include the ring-necked pheasant or magpie.

Alternative 2 - Proposed Action: The proposed action alternative would have a mixed effect on riparian bird species richness. Since the project would be conducted in the fall or winter after the nesting and brood rearing period, there would not be any direct losses of individuals, specifically active nests or chicks. There would be an adverse effect to the 15 species drawn to the Russian olive cover due to the fact that this potential nesting habitat will be removed and no longer available. In addition to these species, black-capped chickadee and dark-eyed junco, two common winter birds may use the area for cover and may be impacted from the lost habitat. For the other nine species described above no effects are anticipated, as they will likely continue to use the area without the Russian olive cover.

Riparian bird species richness in Deep Creek is expected to decrease as a result of the implementation of the proposed action. However, it is important to realize that the majority of the species using the area now are capitalizing on the non-native woody tree cover. All of these species are very common species to southeast Idaho. Therefore, the simple number of species counted in Deep Creek will likely decrease with the implementation of the project, but the species native to sagebrush-steppe riparian systems will likely increase. Therefore, the intent of riparian habitat management on the Grassland and the use of riparian bird species richness in the land use plan would be met by implementation of the proposed action.

Cumulative Effects: Implementation of the proposed action would change the habitat available and thereby change the passerine species using the Deep Creek riparian area. However, the species which will be adversely impacted are common species in southeast Idaho and this project in accumulation with past, present and reasonably foreseeable project will not push these species toward an Endangered Species Act (ESA) listing.

Fuels & Fire Management

Affected Environment

Fuels: The majority of Russian olive is mature. Tree densities vary, but are generally very thick with limited understory fuels except for grass and leaf litter. Limited brush species occur under the thick Russian olive understory except for regenerating Russian olive. Thick canopy and abundant ladder fuel can predispose stands to crown fire under critical fire weather conditions or when the environment and fuel conditions will allow for such conditions to exist (BLM 2008).

Fire: Large fire size has been witnessed on the Grassland in the recent decade which has effected much of the sagebrush ecosystem. The effect these fires have had on Russian olive is generally minimal under normal burning conditions. Literature suggests that disturbance by fires could help propagate Russian olive as it is top killed and responds by sprouting following the burn (Caplan 2005). This has not yet been observed on the Grassland as Russian olive is mainly confined to established tree rows and near riparian vegetation where wildfire impacts are generally limited.

Environmental Consequences

Fuels: Analysis of the proposed treatment was conducted to understand the effects of the resulting biomass created by the proposed treatment on the project area. Under the proposed action alternative, Russian olive would be removed creating activity fuel to be addressed and mitigated. Fuels will remain relatively un-changed from a wildfire management stand point over the long term of the project. There will be a short term impact as vegetation is removed and carry forward until it is re-established. Canopy fuels would be reduced over the long run with associated lack of crown fire with that reduction. Once the Russian olive material is removed from the streambank, this will create a high load of activity fuel that will need to be addressed through pile burning or other means of disposal.

Management of Russian olive with prescribed burning could help maintain desirable future levels of vegetation understanding that any top kill will trigger a plant response to re-sprout. Prescribed burning would need to have rehabilitation occur to ensure success and compliance with standards and guides found in the recent 2015 sage grouse conservation amendment. Project design features for fuels management are included in Appendix D: Project Design Features from Specialist Reports.

Fire: The proposed action and no action will be very similar in regards to fire. Both actions will suppress all wildfires according to CMP guidance. However, with less Russian olive present on the landscape, there is less of a chance that sprouting would occur and further propagating Russian olive. As this has been identified as an invasive species it is desirable to limit spread and propagation outside of tree rows. Fire behavior would likely be the same with or without Russian olive present in the Deep Creek Drainage. With more native vegetation, a more natural fire regime would exist and concerns of high intensity fire would be minimized.

Cumulative Effects: Past cultivation and fires have had the most widespread effects on vegetation on the Grassland. Wildfire is primarily the largest and most frequent

disturbance. No cumulative effects from fuels or fire management is expected to occur with the implementation of this project.

Fisheries

The proposed action "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species." Short term impacts associated with project actions including nonnative tree removal, streambank stabilization, and ground disturbance in the aquatic buffer of Deep Creek are expected. However these actions are likely to provide long-term benefits to BCT historic habitat within the Middle Deep Creek watershed, by restoring streambank stability, native vegetation diversity, and floodplain function.

BCT do not occupy historical habitat within the project area. In 2001, the Forest Fish Distribution crew sampled Deep Creek and found mostly warm-water nonnative fish including carp, largemouth bass, and yellow perch. Rainbow trout were also present and are stocked by Idaho Department of Fish and Game (IDFG) annually in Stone Reservoir (IDFG On-line Stocking Records). The only native fish encountered were speckled dace. To date, no rare or sensitive fish species have ever been documented on the Curlew National Grassland.

The arid lowland systems of the Grassland, including Deep Creek, have the potential to provide a unique ecological niche for BCT within their historical range. However, suitable habitat would likely be scale limited and may only support isolated populations. Currently there is no momentum to establish a BCT population in Stone Reservoir or Deep Creek. This project will help move the Riparian/Wetland Area in the project area towards the desired future condition by restoring native aquatic vegetation diversity and improving instream aquatic habitat complexity and productivity.

Recreation and Scenery

Affected Environment

Background: The impoundment that formed Stone Reservoir was first installed in 1916, and was heightened on more than one occasion to enlarge water storage capacity. The reservoir not only provides water storage for irrigation, but also provides for fishing, waterfowl hunting, water play, and recreation. The reservoir is privately owned and the Forest Service manages land above the high water mark. The Curlew Campground and the adjacent boat ramp parking area were built in the 1960s. The campground serves much like a community park for valley residents and is one of the few waterbodies with fishing and boating opportunities in this dry valley.

Recreation Setting and Scenery: Visual quality objectives (VQOs) for the project area include Partial Retention. This VQO allows some visual changes to the foreground and middle-ground, but any changes must remain visually subordinate to surrounding landscapes. Unseen areas, or areas seen as background from most viewing points, are managed as "Modification", this VQO allows more apparent change from the natural appearing landscape.

While locals and visitors have become accustomed to the predominately Russian Olive vegetation stands, it does not represent a natural setting. Shade is dense and in some places, access to the water's edge or through the stream is impeded by these invasive species. Visual quality is adversely impacted by the severe cut-banks along the backwaters and the stream channel. The eroded banks of Deep Creek and the backwater of the Stone, especially at lower water levels in late summer, do not meet the VQO of Partial Retention when viewed as middle-ground or foreground.

Environmental Consequences

Alternative One – Not Action: The invasive vegetation component of Russian olive and Salt Cedar would remain and continue to propagate. The Russian olive thickets make recreational access to Deep Creek/Stone Reservoir water body problematic. This alternative does not meet the recreation setting of Roaded Natural nor the VQO of Partial Retention (USDA 2002) due to the eroded banks of Deep Creek and the Russian olive thickets that have invaded natural riparian species.

Alternative Two – Proposed Action: Under this alternative invasive vegetative cover of Russian Olive and Salt Cedar would be removed in stages over time and existing steep bank erosion would be stabilized with native vegetation. A *slow* transition from the existing recreation setting and landscape character would help recreationists and visitors adjust to the desired condition of native species cover to include cottonwoods and other native tree species. Bank stabilization efforts would greatly improve scenic integrity of the western banks of the backwater zone of the reservoir. Improvements in setting and visual quality would occur in the short-term with streambank stabilization. Vegetation "conversion" done in increments, would improve overall scenic integrity of the riparian zones associated with Deep Creek.

Soil Resources

Affected Environment

Soils in the area consist of materials derived from alluvium/lacustrine deposits, with silt loam to fine sandy loam surface textures and are slightly to moderately influenced by calcium carbonate (15 - 35%) with infrequent saline influences.

Environmental Consequences

Alternative 1 – No Action: Russian olive is rapidly becoming the dominant woody species in the project area trending towards becoming a monotypic stand. Research conducted along Deep Creek by Mineau et al. (2012) found that Russian olive invasion alters the processing and storage of organic matter with consequences for net ecosystem efficiency resulting from the Russian olive litter and extensive shading.

The adverse effects to soil function from a decrease in vegetative diversity are well documented, specifically when site conversions are from a grass/shrub dominated community to a larger woody monoculture. A loss of vegetative diversity typically results in negative effects to the soil's ability to cycle nutrients, retain soil organic carbon, maintain soil moisture and resist erosion. A loss of these soil services would negatively impact the areas ability to provide grazing forage and wildlife favorable plant species.

The current condition likely does not meet the desired future conditions for maintaining soil hydrologic function and productivity in riparian areas (USDA FS 2002).

Alternative 2 – Proposed Action: While disturbance associated with the stream work will result in negative short term impacts, the work will benefit the soil resource in the long term as a result of setting the area on a recovery trend versus the continued degradation of site productivity that currently exists. Several areas proposed for treatment are currently eroding, so stabilizing those locations will be an improvement over current conditions. BMPs would minimize adverse effects from the proposed action.

Compaction and rutting from motorized traffic shuttling materials is unlikely since the soils in the area tend to have a sandy loam surface texture as long as they are not wet during activities and landings are located on flat surfaces.

Pile burning will impact a small aerial extent of the activity area dependent upon the density of the piles constructed, but will not exceed 0.25 acres for any one activity area. Most commonly pile burning results in high consumption of organic matter, altered physical characteristics, a reduction in soil microbial and mycorrhizal populations and diversity. To address this effect, top soil will be salvaged in areas identified for large areas of slash piling to be saved for reclamation of burned sites. Pile burning conducted under correct conditions will reduce the fire hazard, make planting easier, and should retain the lower duff material to protect the mineral soil and conserve nutrients to sustain forest productivity (Elliot et al. 1996). Specifically, Frandsen and Ryan, 1985 found that by conducting pile burn operations when the soils are wet (snow or rain), lethal soil heating was reduced by 20% and resulted in substantially decreased loss of soil organics and in some cases left surface organic material on site.

Cumulative Effects: The cumulative effects resulting from the mechanized removal of invasive material, heavy equipment, top soil salvaging and pile burning are expected to be within acceptable levels of impact to provide for long term soil productivity and function. Overall, the project is anticipated to redirect the current condition towards a recovery trend more aligned with Desired Future Conditions.

Water Use by Vegetation Type

In general, very little information is available concerning water use by Russian olive (Nagler et al. 2010). No detectable changes in the water balance (i.e. streamflow changes within Deep Creek) are expected as a result of this project due to the limit amount of vegetation affected (up to 11 acres of Russian olive) within the large watershed.

Evapotranspiration estimates were derived for cottonwoods and willows (Source: University of Idaho Research and Extension Center http://data.kimberly.uidaho.edu/ETIdaho/). Estimates for Russian olive are not available.

Table 5: Actual evapotranspiration estimates (http://data.kimberly.uidaho.edu/ETIdaho/).

Plants	Growing Season (mm)	Non-Growing Season (mm)	Annual (mm)
Cottonwoods	720	126	849
Willows	753	96	850

Shafroth et al. (2010) summarized the “water savings” potential of removing Russian olive as follows:

> "Projects that remove saltcedar and Russian olive with the intention of making more water available for beneficial use by reducing evapotranspiration and increasing flow in streams have produced mixed results. It remains to be demonstrated that any groundwater conserved results in increased surface flows or enhanced groundwater availability to water users. In a few cases, clearing saltcedar has resulted in temporary, measurable increases in streamflow. Most studies, however, have found that although evapotranspiration may be decreased by large-scale removal of saltcedar, no significant long-term changes in streamflow are detected as a result of vegetation removal. No detection of the expected water savings in streams could be due to the limits in the precision of streamflow measurement or the fact that water savings occur as a change in groundwater and soil storage rather than an increase in streamflow. Water savings expectations largely have been viewed as a function of reducing the evapotranspiration loss without sufficient attention to the overall water budget (which would also include storage in groundwater or soil water) and the ultimate transmission of any gains (savings) to streamflow."
>
> "Generating water savings through vegetation removal depends on long-term replacement of saltcedar and Russian olive with plant communities that transpire less water than saltcedar or Russian olive. Furthermore, changes in transpiration must be substantial enough to affect more than just soil-water storage in order to translate into extractable groundwater or streamflow. Thus, it is important to distinguish between expected water savings (based on evapotranspiration comparisons) and actual water savings (corroborated by increased streamflow or groundwater levels)."

Invasive Species Plant Management

Noxious weed species can cause serious modifications to landscapes by decreasing species biodiversity, competing with native species, contributing to erosion, increased sediment loading in streams, and many other factors. The Russian olive and salt cedar removal along Deep Creek would cause disturbed open sites that would be susceptible to a wide range of invasive species, including Canada Thistle, Musk thistle, Teasle, Bull Thistle, and Black Henbane. To address this issue, an inventory of the invasive species will be taken after the Russian olive and salt cedar have been removed. The sites will then be elevated to a high treatment priority for three years after the completion of the project. At the end of the three year elevated priority period, the sites will be re-evaluated and placed into the regular treatment schedule if appropriate. Any treatments would follow the project design features for this project.

Heritage Resources

A cultural resource survey was conducted within the project's Area of Potential Effect. Four cultural properties were identified, three of which are recommended as eligible for listing on the National Register of Historic Places. Two of these historic properties are intersected by existing roads that will be used as access routes for project equipment and vehicles. No parking will be allowed off established roads within the sites' boundaries. Due to its current use, the third historic property will also be avoided by all project activities. The Forest Archaeologist will be consulted prior to designating biomass treatment areas. Following these protective measures, the Forest Service has determined that the project will have no adverse effect on historic properties. The Idaho State Historic Preservation Office concurred with this determination on July 13, 2016.

Rangeland Resources

This project does not have any potential to increase livestock grazing capacity following treatment. No increase in permitted livestock use would occur.

CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

ID TEAM MEMBERS:

Role	Core Team Members
ID Team Leader & Hydrology	Brad Higginson, Hydrologist
Wildlife	Chris Colt, Wildlife Biologist
Botany	Rose Lehman, Forest Botanist
Fisheries and Aquatic Resources	Corey Lyman, Fisheries Biologist
Rangeland Resources and Noxious & Invasive Plants	Hans Bastian & Clayton Collins, Rangeland Specialist
Soils	David Marr, Soil Scientist
Heritage Resources	Ali Abusaidi & Sharon Plager, Archeologist
Fuels	Arik Jorgensen, Fuels Specialist
Rangeland Resources and Noxious & Invasive Plants	Heidi Heyrend, Forest Rangeland Specialist
Recreation	Deb Tiller, Recreation Specialist
NEPA Support	Jessica Taylor, NEPA Coordinator

FEDERAL, STATE, AND LOCAL AGENCIES:

The agency presented the proposal to the US Fish & Wildlife Service at the 2013 and 2014 annual consultation meetings.

Several members of the team toured the area with Dean Rose and Martha Wackenhut from the Idaho Fish & Game to get their input on November 24, 2015

TRIBES:

The Forest Service also participated in Tribal Government Consultation with the Shoshone-Bannock Tribes. The Forest Service also participated in Tribal Government Consultation with the Shoshone-Bannock Tribes in 2015 and again on April 15, 2016

OTHERS:

Brad Higginson and Lori Bell presented the project to several members of the Delmore Canal Company Board on February 17, 2016 at the Stone School in Stone, Idaho.

REFERENCES

Borders, B. E. 2012. *Great Basin Pollinator Plants: Native Milkweeds (Asclepias spp.).* The Xerces Society for Invertebrate Conservation in collaboration with USDA-NRCS Great Basin PMC. http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/nvpmctn11525.pdf

Bureau of Land Management (BLM). 2008. The Colorado River Corridor, A decade of fuels treatments. U.S. Department of Interior, Bureau of Land Management, Moab Fire District. Moab, UT.

Caldwell W. and K. Oberhauser. 2016. Monarch Breeding Habitat Assessment Tool Developed by the University of Minnesota Monarch Lab in partnership with the Monarch Joint Venture. http://monarchjointventure.org/images/uploads/documents/Habitat_Assessment_Tool_Final.pdf

Caplan, Todd. 2005. [Personal communication by C.A. Jorgensen]. May 3. Albuquerque, NM: Parametrix Inc. On file with: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula, MT; RWU 4403 files.

Colt, C.J. 2016. Biological evaluation & wildlife and rare plant specialist report, Deep Creek Watershed Improvement Project Curlew National Grassland. Dated: March 25, 2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\18BABE_Wildlife

Elliot, W.J., I.S. Miller, & L. Audin, Eds. 2010. Cumulative watershed effects of fuel management in the western United States. Gen. Tech. Rep. RMRS-GTR-231. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 299 p. http://www.fs.fed.us/rm/pubs/rmrs_gtr231.html

Elliot, W.J.; Page-Dumroese, D.; Robichaud, P.R. 1999. The effects of forest management on erosion and soil productivity. Proceedings of the Symposium on Soil Quality and Erosion Interaction, Keystone, CO, July 7, 1996. Ankeney, IA: Soil and Water Conservation Society. 16 p. http://forest.moscowfsl.wsu.edu/cgi-bin/engr/library/searchpub.pl?pub=1999c

Frandsen, William H., Ryan, Kevin C. 1985. Soil moisture reduces belowground heat flux and soil temperatures under a burning fuel pile. Intermountain Forest and Range Experiment Station. USDA Forest Service, Missoula, MT.

Fleishman, E., G.T. Austin, P.F. Brussard, D.D. Murphy. 1999. A comparison of butterfly communities in native and agricultural riparian habitats in the Great Basin. USA Biological Conservation 89 (1999) 209-218.

Higginson, B. 2016. Hydrology Specialist Report, Deep Creek Watershed Improvement Project. Curlew National Grassland, Westside Ranger District. Dated 6/14/2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\09Hydrology

Holl, K.D., 1995. Nectar resources and their influence on butterfly communities on reclaimed coal surface mines. Restoration Ecology 3, 76-85.

Holl, K.D., 1996. The effect of coal surface mine reclamation on diurnal lepidopteran conservation. Journal of Applied Ecology 33, 225-236.

Idaho Department of Environmental Quality (IDEQ). 2016. Rules of the Department of Environmental Quality, IDAPA 58.01.02, Water Quality Standards and Wastewater Treatment Requirements. http://adminrules.idaho.gov/rules/current/58/0102.pdf

IDEQ. 2014. Idaho's 2012 Integrated Report Final. January 2014. State of Idaho, Department of Environmental Quality. Boise, Idaho. http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report.aspx

Jepsen S. 2016. Personal communication with Rose Lehman (Forest Botanist) on 23 Feb. 2016.

Jorgensen, C.A. 2016. Fuels Specialist Report for Deep Creek Watershed Improvement Project. Date 3/15/2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\07FireFuels

Lehman, R. 2016. Deep Creek Watershed Improvement Project, Vegetation and Monarch Butterfly Habitat. Dated May 15, 2016. Located in Project record. File at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\02Botany

Lyman, C. 2016. Bonneville Cutthroat Trout Biological Evaluation for the preferred alternative of the Deep Creek Watershed Improvement Project. Located in Project record. File at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\08Fisheries

Marr. D. Deep Creek Watershed Improvement Project, Soil Resource Report. Dated March 3, 2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\14Soils

Mineau M.M., C.V. Baxter, A.M. Marcarelli & G.W. Minshall. 2012. An invasive riparian tree reduces stream ecosystem efficiency via a recalcitrant organic matter subsidy Ecology, 93(7), 2012, pp. 1501–1508, 2012 by the Ecological Society of America. http://www.esajournals.org/doi/abs/10.1890/11-1700.1

Nagler, P.L., P.B. Shafroth, J.W. LaBaugh, K.A. Snyder, R.L. Scott, D.M. Merritt, and J. Osterberg. 2010. Chapter 3 - The Potential for Water Savings Through the Control of Saltcedar and Russian Olive. In: Shafroth, P.B., Brown, C.A., and Merritt, D.M., eds., 2010, Saltcedar and Russian olive control demonstration act science assessment: U.S. Geological Survey Scientific Investigations Report 2009–5247. http://pubs.usgs.gov/sir/2009/5247/

Pick, T.L. 2013. Long-term strategy for Russian olive and saltcedar management. Yellowstone River Conservation District Council. Bozeman, Montana. http://yellowstonerivercouncil.org/news/wordpress-content/uploads/2014/01/Long-Term-Strategy-for-Russian-Olive-Saltcedar-Mgmt.pdf

Plager. S. 2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\04CulturalResources

Stannard, M., D. Ogle, L. Holzworth, J. Scianna, & E. Sunleaf. 2002. History, biology, ecology, suppression and revegetation of Russian-olive sites (Elaeagnus angustifolia L.). Technical Notes, USDA Natural Resources Conservation Service. Boise, Idaho; Bozeman, Montana; and Spokane, Washington. Plant Materials No. 47 March 2002. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiF2bW1-ODKAhVK52MKHSR8CRQQFggcMAA&url=http%3A%2F%2Fwww.nrcs.usda.gov%2Fwps%2FPA_NRCSConsumption%2Fdownload%3Fcid%3Dnrcseprd403431%26ext%3Dpdf&usg=AFQjCNE2o8LMp9gg4IpLCoQWrF9jcJqxTQ

Shafroth, P.B., Brown, C.A., and Merritt, D.M., eds., 2010, Saltcedar and Russian olive control demonstration act science assessment: U.S. Geological Survey Scientific Investigations Report 2009–5247. http://pubs.usgs.gov/sir/2009/5247/

O'Meara, S., D. Larsen, & C. Owens. 2010. Chapter 5. Methods to Control Saltcedar and Russian Olive. http://pubs.usgs.gov/sir/2009/5247/

Shafroth, P.B., D.M. Merritt, V.B. Beauchamp, & K. Lair. 2010. Chapter 7. Restoration and Revegetation Associated with Control of Saltcedar and Russian Olive. http://pubs.usgs.gov/sir/2009/5247/

Shafroth,P.B., V.B. Beauchamp, M.K. Briggs, K. Lair, M.L. Scott, & A.A. Sher. 2008. Planning Riparian Restoration in the Context of Tamarix Control in Western North America. March 2008, Restoration Ecology, Vol. 16, No. 1, pp. 97–112. https://www.fort.usgs.gov/sites/default/files/products/publications/21869/21869.pdf

Southwest Monarch Study. 2016. Retrieved from http://www.swmonarchs.org/

The Xerces Society. 2016. The Xerces Society - Monarch Butterflies. Retrieved from website: http://www.xerces.org/monarchs/

Tiller. D. 2016. Deep Creek Vegetation Management Plan. Dated 3/25/2016. Filed at: O:\NFS\CaribouTarghee\Project\WESTD\2520DeepCrRussianOlive\05Resources\12Recreation

USDA FS. 2016. Supplement Information Report to the Caribou National Forest noxious weed and poisonous plant control program EA DN and FONSI. Caribou-Targhee National Forest, Idaho Falls, Idaho. Posted at: O:\NFS\CaribouTarghee\Project\SO\2080NoxiousWeeds\noxious_weeds

United State Department of Agriculture Forest Sevice (USDA FS). 2015a. Conservation and Management of Monarch Butterflies: A Strategic Framework. FS-1044. March 2015. http://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/ConservationManagementMonarchButterflies.pdf

USDA FS. 2015b. Greater Sage-grouse Record of Decision for Idaho and Southwest Montana, Nevada and Utah. Sept. 2015. Intermountain & Northern Regions. http://www.fs.usda.gov/detail/r4/home/?cid=stelprd3843381

USDA Forest Service. 2013a. Memorandum of Understanding between the Idaho Department of Water Resources and the USDA, Forest Service Intermountain and Northern Regions. FS#: 13-MU-11046000-014.

USDA Forest Service. 2013b. Memorandum of Understanding between the Idaho Department of Environmental Quality, Idaho Department of Lands, US Department of Interior, Bureau of Land Management and the USDA Forest Service Northern and Intermountain Regions. FS#: 13-MU-11046000-023.

USDA FS. 2012. Field guide for managing Russian olive in the southwest. TP-R3-16-24. USDA FS, Southwestern Region. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410126.pdf

USDA Forest Service. 2012b. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a. April 2012. http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf

USDA FS. 2004a. Environmental Assessment, Curlew National Grassland Allotment Management Plans Update. June 2004. USDA FS, Intermountain Region. Caribou-Targhee National Forest.

USDA FS. 2004b. Decision notice and finding of no significant impact for the Curlew and Buist Allotment Management Plan Update. Signed: Dec. 3, 2004. USDA FS, Intermountain Region. Curlew National Grassland, Westside Ranger District.

USDA FS. 2002. Final Land and Resource Management Plan for the Curlew National Grassland. USDA FS, Intermountain Region. http://www.fs.usda.gov/detail/ctnf/landmanagement/planning/?cid=stelprdb5238009.

USDA FS. 1996. Noxious weed and poisonous plant control program, Caribou National Forest. EA, DN,/FONSI. Signed 9/30/1996. Posted at: O:\NFS\CaribouTarghee\Project\SO\2080NoxiousWeeds\noxious_weeds\Caribou

University of Minnesota . (2016). The University of Minnesota Monarch Lab . Retrieved from http://monarchlab.org/

Utah Lepidopterists' Society. 2016. Website: Utah Lepidopterists' Society 2016

The Xerces Society. 2016. *The Xerces Society - Monarch Butterflies* . Retrieved from http://www.xerces.org/monarchs/. Website accessed on 3/27/2016.

APPENDIX A: RESPONSE TO COMMENTS

Response to Comments – Deep Creek Watershed Improvement Project
Curlew National Grassland – February 2016

Comments were categorized as 1) Issues; 2) Other Relevant Resources; or 3) Concerns Outside the Scope of Analysis.

Issues: Project design features were incorporated into the proposed action to address the issues: 1) Monarch Butterfly Habitat, 2) Sage-grouse brood rearing habitat, and 3) water quality. The issues drove project design features associated with the proposed action.

Other Relevant Resource (ORR): Other resource concerns that were analyzed and disclosed in the EA

1. Soils
2. Wildlife
3. Rangeland Resources
4. Recreation
5. Fuels Management
6. Fisheries
7. Invasive Species Plant Management (ISPM)

Concerns Outside the Scope of Analysis: These comments are outside the scope of the analysis.

1. Outside the scope of the proposed action
2. Already decided by law, regulation, Grassland Plan, or other higher level decision
3. Irrelevant to the decision to be made
4. Conjectural and not supported by scientific or factual evidence
5. A general statement

2014 Deep Creek Watershed Improvement Project Scoping Responses

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
1	Pg. 1; ¶2	New Russian olive (RO) will appear requiring several repeated treatments	Charles H. Trost, Ph.D.	Invasive Species Plant Management (ISPM)	Other relevant resource-ISPM: The proposed action and the Pesticide Use Proposal in Appendix B contain measures to address this concern.
1	Pg. 1; ¶3	RO are a major winter food source for many native birds & mammals.		Wildlife	Other relevant resource-Wildlife Resource: Effects to wildlife resources are analyzed & disclosed in the EA.
1	Pg. 1; ¶3	RO provide many benefits to native wildlife.			
1	Pg. 1; ¶3	RO serve as a wind break, which is why they were planted in the first place.	Charles H. Trost, Ph.D.	Wildlife	Outside Scope of Analysis: The LRMP (USDA FS 2002) provides direction for managing tree rows/wind breaks under Management Prescription (Rx) 3.4.1-Special Wildlife Areas. The project area does not include designated tree rows or areas of Rx 3.4.1. The Forest's IPMS (USDA FS 1996 & 2016) provides direction for managing weeds. The proposal is to control RO where it is expanding outside of tree rows into riparian areas.
1	Pg. 1; ¶1 & 4	General agreement with project, but concerned about removing all RO, especially those not near water. Do not remove ROs away from the creek to allow enhanced food source for wildlife during energetically demanding times.		Wildlife	Other relevant resource-Wildlife Resource: Effects to wildlife resources are analyzed & disclosed in the EA. The removal of RO removal will be phased in as described in the proposed action to allow wildlife to adjust to habitat changes.
2	Pg. 1; ¶2	General support for project	Idaho Conservation League(ICL)	N/A	N/A: General Statement.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
2	Pg. 1; ¶	Include a robust planting effort of native vegetation, including willows and cottonwoods as appropriate.	ICL	Botany & Hydrology	Monarch butterfly habitat: The proposed action includes willow and cottonwood planting along Deep Creek. A revegetation will include measures maintain or improve monarch habitat.
2	Pg. 1; ¶2	Consider staging so that some minimal amount of cover is always present to provide habitat cover for yellow-billed cuckoos.		Wildlife	Other relevant resource-Wildlife Resource: Effects to wildlife resources are analyzed & disclosed in the EA. The project will be phased in as described in the project design features to allow wildlife to adjust to habitat changes. There is a robust cottonwood forest immediately downstream of the project area.
3	Pg. 1; ¶1	Consider cottonwood trees or other native fast growing trees at the Curlew Campground if Russian olive is removed.	Idaho Department of Parks & Recreation	Recreation	Outside Scope of Analysis: The Campground is no longer in the project area. RO at the campground will be managed as per direction in the LRMP & IPMS. Maintaining and improving shade trees is important at the campground.
4	Pg. 1; ¶1	Restoring Deep Creek is a good idea, but cattle grazing is likely responsible for the degradation. Deep Creek should be off limits to grazing.	Yellowstone to Uintas Connection (YUC)	Range	Other relevant resource-Rangeland and several other resources are analyzed & disclosed in the EA. Riparian grazing criteria were decided by the Curlew National Grassland Allotment Management Plan Update Environmental Assessment completed in 2004. These criteria were design to improve overall conditions.
4	Pg. 1; ¶1	Suggest a meeting of interested parties to achieve full protection of Deep Creek to protect habitat and investment.	YUC	N/A	General Statement. The agency conducted public scoping and published legal notices in February 2014 & May 2015. The agency accepts public comments throughout the process and will consider those throughout project implementation.
5	Pg. 1; ¶1	Interested in Project	Dick Artley	N/A	N/A: General Statement.
6	Pg. 1; ¶1	Interested in Project	Idaho DEQ	N/A	N/A: General Statement.

2015 Curlew Invasive Plant Control Project Scoping Responses

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
7	Pg. 1; ¶1	Deep Creek is a long term study site for researchers at ISU. The project provides an opportunity to continue research. ISU would like to continue working with the USFS on this research.	Colden Baxter, Ph.D.	Hydrology	Other relevant resource – ISPM & Water : The Forest Service is cooperating with ISU on research opportunities with this project.
8	Pg. 1; ¶2	Support restoring riparian area & invasive species control.	Idaho Conservation League (ICL)	N/A	N/A: General Statement.
8	Pg. 1; ¶2	Ensure that the risk of introduction of herbicides and other chemicals into water bodies is minimized.		ISPM	Other relevant resource-ISPM: The pesticide use proposal (PUP) in Appendix B includes measures to minimize this risk.
8	Pg. 1; ¶3	Amend standard scoping notice to include Adobe (.pdf) files as an acceptable format. The email address was omitted from the project website.		NEPA	Outside Scope of Analysis: Although it may not be specifically stated, the Forest Service does accept comments in Adobe (.pdf) format. The agency received comments from ICL.
8	Pg. 3; ¶1	Prioritize efforts to prevent the initial weed introduction, soil disturbance, and vectors for weed spread into the area per the LRMP.		ISPM	Other relevant resource - ISPM: Measures are included the agency's IPMS. Project specific criteria as listed in the PUP (Appendix B) and the project design features (Appendix D) to reduce weed introductions, soil disturbance, and vectors.
8	Pg. 3; ¶1	Do more to address major causes of noxious weeds spread such as high road densities, overgrazing, uncontrolled OHV use, & soil disturbance from vegetation management.	ICL	ISPM	Outside Scope of Analysis: The Forest's IPMS includes a full range of integrated methods, including preventative, manual, cultural, chemical, and biological (USDA FS 1996 & 2016). Ongoing efforts across the Grassland are being made in regards to these suggestions, many of which are documented in recent Grassland Monitoring Reports. Report for 2002-2009: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5301219.pdf

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
8	Pg. 3; ¶2	Demonstrate, via analyses of the characteristics of specific herbicides as well as site conditions and weather patterns, that proposed herbicide application treatments will not adversely impact non-target species or overall ecosystem integrity.		ISPM	Other relevant resource- ISPM: The agency prepared a pesticide use proposal (PUP) for this specific project. All herbicides will be applied as per label directions and the agency's IPMS in order to not adversely impact non-target species or overall ecosystem integrity.
8	Pg. 3; ¶2	Non-herbicide treatments and prevention techniques should be utilized in situations where herbicide application may result in unintended harm.		ISPM	Other relevant resource- ISPM: The Forest's IPMS includes a full range of integrated methods, including preventative, manual, cultural, chemical, and biological (USDA FS 1996 & 2016).
8	Pg. 3; ¶3	Provide a Pesticide Use Proposal alongside the EA.		ISPM	Other relevant resource- ISPM: A pesticide use proposal (PUP) for this project is included in an Appendix B.
8	Pg. 3; ¶3	The proposal does not indicate what herbicides are being considered, the rate at which they will be applied, and for how long herbicide application will occur within these sensitive riparian areas. Depending on the herbicide(s) chosen, consider the time of year that herbicide is applied in order to reduce the impact to the surrounding environment, and to increase the effectiveness of application to infested spots.	ICL	ISPM	Other relevant resource- ISPM: The agency prepared a pesticide use proposal (PUP) with site- specific project, which is provided in an Appendix B. All herbicides will be applied as per label directions.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
8	Pg. 3; ¶3	Even with a limitation to ground-based spraying, it is critical to monitor drift in adjacent areas and to establish thresholds when monitoring indicates that drift exceeds established levels. Spraying should be limited to when wind speeds are below 5 mph, or when conditions may warrant additional limitations. These measures and sideboards should be clearly displayed in the EA.		ISPM	Other relevant resource- ISPM: A pesticide use proposal (PUP) that is site-specific for this project is included in an Appendix B of the EA. Drift is addressed in PUP. To reduce drift, stumps will be treated with a roller brush rather than spraying.
8	Pg. 3; ¶4	A common contributor to the introduction, and flourishing, of aquatic invasive species is excessive nutrients and sediment. There are numerous ways to counteract these issues including installing sediment capture ponds upstream, vegetative buffers, and reducing livestock use around riparian areas.	ICL	ISPM, Rangeland Resources, Botany, & Hydrology	Other relevant resource - ISPM & Water Quality: Bank stabilization is proposed to reduce sediment loading to Deep Creek. Livestock grazing is presently light along Deep Creek and it will be controlled following treatments in order to allow for revegetation of disturbed areas.
8	Pg. 4; ¶1	Specify streambank Stabilization methods and what measures to reduce erosion resulting from treatments.		Hydrology	Water Quality: Specific measures are listed in the proposed action.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
8	Pg. 4; ¶1	Deep Creek is a 303(d) listed stream so reduce the total impacted area and mitigate activities that may exacerbate the stream's condition. Examples: use either downsized front-end loaders or walking excavators, only utilizing heavy machinery when the ground is dry, and using hand tools when applicable. Consider seeding grasses and/or planting shrubs/trees.		Hydrology	Water Quality: Best management practices (BMPs) are included in the project design features to protect and improve long term water quality. All work would be done according to applicable permits to protect water quality.
8	Pg. 4; ¶3	Consider the cumulative effects on the watershed, on wildlife habitat, and on recreational opportunities		Hydrology, Wildlife, & Recreation	Other relevant resources: Cumulative effects to these resources are analyzed in the EA.
8	Pg. 4; ¶4	If treatment occurs within active Greater Sage-Grouse habitat, activity should not occur from July-September as sage-grouse tend to move to areas with more moisture and forage.	ICL	Wildlife	Sage-grouse habitat: Timing constraints to protect sage-grouse habitat are listed in the project design features.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
8	Pg. 4; ¶4	Account for the impacts to aquatic ecosystems. Even sub-lethal amounts of herbicide in water systems can have significant impacts on fish, including "changes in behavior, weight loss, impaired reproduction, inability to avoid predators, and lowered tolerance to extreme temperatures." The use of herbicide on aquatic plant species may also dramatically alter existing fish habitat by reducing available oxygen and food sources.		ISPM & Fisheries	Other relevant resources- ISPM & fisheries: The PUP in Appendix B applies to this specific project. No herbicide use would occur in live water. Treating aquatic plants is not a project action. We would not apply herbicide to waterways.
8	Pg. 4; ¶4	The area is a popular recreational area for bird watching and fishing, which should also be considered in the cumulative effects.		Recreation, Fisheries, & Wildlife	Other relevant resources: Cumulative effects to these resources are analyzed in the EA and resource specialist reports. The nonnative fish are desired and trout are stocked in Stone Reservoir. Access to Deep Creek may be limited during project implementation therefore contributing to minor short term impact to anglers.
8	Pg. 4; ¶6	The proposal fails to accurately portray the temporal and spatial scope of the project. Establish a specific timeline for applicability of herbicide and/or invasive species treatments, not a permanent authorization.	ICL	ISPM	Other relevant resource- ISPM: The proposed action no longer includes all components of the Curlew Invasive Plant Control Project (CIPCP). As authorized by the Forest's IPMS (USDA FS 1996 & 2016), the agency prepared site-specific PUP for this specific project

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
8	Pg. 4; ¶6	Will mechanical removal of invasive trees and shrubs be included, or will the authorization for invasive species control only apply to herbicide use?		ISPM	Other relevant resource- ISPM: Mechanical removal and biomass treatments are included in the proposed action. The Forest's IPMS includes a full range of integrated methods, including preventative, manual, cultural, chemical, and biological (USDA FS 1996 & 2016). Specific measures are specified in the project design features and PUP for the project.
8	Pg. 4; ¶7	Identify the specific measures that will be used to control invasive species and what tools and methods will be applied.			
8	Pg. 4; ¶7 & Pg. 5; ¶1	Specific sideboards applied to the Deep Creek, Sweeten Pond, and Grandine area may not be applicable across the Grassland.		N/A	Outside Scope of Analysis: The proposed action no longer includes all components of the Curlew Invasive Plant Control Project (CIPCP).
8	Pg. 5; ¶2	Detail what sideboards will be applied for future projects, and what measures will be taken to ensure public notice and involvement as future projects are considered.		ISPM	Outside Scope of Analysis: The proposed action no longer includes all components of the CIPCP. Any future treatments would occur under the Forest's IPMS (USDA FS 1996 & 2016), a PUP, and/or a separate NEPA document, if appropriate.
8	Pg. 5; ¶4	Qualitative monitoring of bioengineering treatments should be conducted early on after completing treatments. This will ensure that issues, such as a flooding event or depredation of plants, can be remediated as soon as possible. Long-term monitoring should also be conducted to determine the effectiveness of treatments and whether any maintenance is necessary.	ICL	Hydrology	Water Quality: Monitoring of streambank stabilization work could occur under the BMP evaluation protocol.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
9	Pg. 1; ¶1	General support for project	Yellowstone to Uintas Connection (YUC)	N/A	N/A – General statement.
9	Pg. 1; ¶2	Deep Creek: The incised stream conditions and high sediment levels are impairing stream function.		Hydrology	Water Quality: Measures are proposed to improve stream functioning.
9	Pg. 1; ¶1	Cheat grass should be included in your analysis and infestations addressed.		ISPM	Outside scope of analysis: Cheat grass control presently occurs under the Forest's IPMS and PUP(s).
9	Pg. 1; ¶3	It is essential that the riparian zone be free of livestock following stream restoration work.		Hydrology, Fisheries, & Rangeland Resources	Other relevant resource- Rangeland Resources: Measures are included to limit livestock grazing in order to ensure revegetation of disturbed areas following Russian olive and bank stabilization treatments. Temporary fencing will be used to exclude livestock grazing in re-seeded areas.
9	Pg. 1; ¶3	Please include fencing livestock out of Deep Creek in perpetuity to allow the stream and cutthroat trout populations to be restored and maintained.	YUC	Rangeland Resources & Fisheries, & Range	Outside scope of analysis: Livestock grazing in the area is authorized as per the recent AMP revision. The fishery consists of non-native carp, small mouth bass, and rainbow trout. There are no Bonneville cutthroat trout present on the Grassland. Native fish restoration is not a project action. Also native fish restoration would be a state action, not a USFS action.
9	Pg. 1; ¶1	Livestock grazing is a soil disturbance that accelerates invasive establishment and increase. It should also be addressed.		ISPM & Rangeland Resources	Other relevant resource- Rangeland Resources: A standard in the LRMP is to allow no livestock grazing before seed set of the second growing season after… rangeland planting or seeding. If monitoring shows that this is not adequate to meet resource needs, defer livestock grazing as necessary (LRMP Standard; page 3-18). Temporarily fencing would be used to exclude livestock grazing in re-seeded areas.
9	Pg. 1; ¶1	Our experience is that treatment with herbicides continues to be necessary long after livestock are removed.		ISPM	Other relevant resource- ISPM: General statement. The PUP in Appendix B addresses herbicide treatments.

Letter #	Page & Paragraph	Comment	Commenter	Resource Area	Notes on how/where comment is addressed
9	Pg. 1; ¶1	We have not yet seen an effective grazing strategy that allows native perennial grasses, willows, riparian areas to be restored while attempting to graze invasives such as cheatgrass, Canada thistle and others. Typically these are not preferred forage, so extremely heavy utilization levels are required to achieve grazing of the invasives. This results in the native vegetation being grazed to levels that will reduce the natives and eventually eliminate them.	YUC	ISPM & Rangeland Resources	Outside scope of analysis: The agency is not proposing to use livestock as a treatment method. Temporarily fencing would be used to exclude livestock grazing in re-seeded areas. The PUP in Appendix B addresses herbicide treatments.

Comments from US Forest Meeting with Delmore Canal Company Board
Attendees: Vard Neal, Carl Hill, Lyle Steel, & Lee Ford (Delmore Canal Company). Brad Higginson and Lori Bell (USFS)
Date: February 17, 2016 Location: Stone School in Stone, Idaho.

Comment	Resource(s)	Notes on how/where comment is addressed
Russian olive on the Grassland is contributing to the expansion of Russian olive down the whole valley into Utah	ISPM	General statement: The proposed action is intended to address this comment.
The Forest Service stopped us from aerial spraying of Russian olive and now they're out of control.	ISPM	General Statement: Aerial spraying is not a viable option available to the agency in riparian areas.
How much water is used by Russian olive verse willows?	Water Quality	See the "Water Use by Vegetation Type" section in the environmental consequences section
Need to revegetate areas when removing Russian olive or they'll come back thicker than ever.	ISPM	A detailed revegetation plan will be developed prior to project implementation.
Flush cut stumps and treat immediately.	ISPM	This treatment method will be used. See Appendix B: Pesticide Use Proposal (PUP).
Beware of spreading seed when piling.	ISPM	Effort are included in the proposed action to minimize seed dispersal.
Russian Olive won't burn.	ISPM	General statement.
There are certain times of the year when the water in the canal is very low- those would be good times to work, but we're okay with you doing it any time.	ISPM	General statement. The Forest Service appreciates Delmore Canal Company's cooperation with this project, especially as they are an adjacent landowner.
We're afraid you're going to run out of money to implement.	ISPM	General statement.
Keep realignment of stream away from the canal, otherwise it'll undercut it.	Water Quality	This has been considered in project design.
Can you use cottonwood pieces to stabilize streambanks instead of planting willows? Discussed sedge-mats to stabilize instead. Have concern with what material or planting would be used to stabilize the banks.	Water, Monarch, & ISPM	The revegetation plan will utilize several techniques. Willow, cottonwood, and sedge/sod matts would be transplanted along streambanks.

Comment	Resource(s)	Notes on how/where comment is addressed
How much money do you have to do this project	Water & ISPM	As of now, project implementation has been funded through a Joint Chief's (USDA NRCS & FS) proposal in the amount of approximately $56,000. Future funding sources may also be pursued.
The canal company board supports removal of Russian olive, but wants it done in a way that doesn't spread the seed.	ISPM	General statement. The Forest Service appreciates Delmore Canal Company's cooperation with this project, especially as they are an adjacent landowner.
Streambank stabilization and Russian olive removal along their private land boundary, reserved row, and easement, are okay with them, including sloping the steep streambanks.		

APPENDIX B: PESTICIDE USE PROPOSAL (PUP)

USDA Forest Service

FS-2100-2 (v12-2015)
OMB 0596-0241 Exp. 12/2018

PESTICIDE-USE PROPOSAL (Reference FSM 2150)

To complete this form, see **Instructions for Form FS-2100-2, Pesticide-Use Proposal**

AGENCY/ COOPERATOR	CONTACT NAME, PHONE NUMBER, and E-MAIL	REGION	FOREST/ DISTRICT	DATE SUBMITTED
Forest Service	Clayton Collins, 208-236-7504, cjcollins@fs.fed.us	04	15/57	

How would you like to be informed of the decision on your proposal?	Please choose one: ___ Telephone ___ Email _X_ Both
1) OBJECTIVE a) Project name and/or identifier b) Specific target pest(s) c) Purpose	a) Deep Creek Russian Olive Removal b) Russian Olive and Salt Cedar c) Monarch Butterfly habitat improvement and riparian restoration
2) PESTICIDE PRODUCT(S) a) Trade name b) Formulation as purchased c) Restricted-use pesticide (yes/no) d) EPA registration number e) Common name of chemical(s) f) AI, AE, IU, or PIB expressed as % or concentration	a) Rodeo and PathfinderII b) Liquid concentrate c) NO d) 62719-324 and 62719-176 e) Glyphosate and Triclopyr f) 53.8% AI, 13.6% AI
3) TYPE OF APPLICATION a) Method b) Equipment	a) Cut Stump Treatment b) Hand sprayer with cone nozzle and spray shield or roller.
4) FIELD APPLICATION INFORMATION a) Formulation of material to be applied b) Planned application rate c) Dilution rate d) Diluent e) Pounds of AI or AE per acre (or other applicable rate) f) Other pesticides being applied to proposed treatment site(s)	a) Mixture b) In accordance with the label recommended rate for cut stump treatment. c) In accordance with the label recommended rate for cut stump treatment. d) Water. e) In accordance with the label recommended rate for cut stump treatment. f) None
5) TREATMENT AREA DESCRIPTION a) Targeted treatment area b) State and county c) Site description d) Estimate of acres (or other unit) to be treated e) Number of applications f) Month(s) and year(s) of application	a)T.15 S – R.32 E, Sec. 23,24 of the Boise Meridian b) Idaho, Oneida c) Riparian zone of Deep Creek above Stone Reservoir d) 25 acres e) 2-4 as Needed f) Treatment window will be 9/15 -12/31 for 3-5 years starting in 2016 to accommodate the Monarch Butterfly
6) SENSITIVE AREAS a) Special designated area (if applicable) b) Areas to be avoided c) Areas to be treated with caution	a) N/A b) None c) Waters edge (only to be treated with Rodeo)
7) PROJECT IMPLEMENTATION a) Trained/certified personnel to be used b) Personal safety c) State and local coordination d) Best management practices e) Monitoring f) Additional project information	a) Forest Service personal with a valid applicators license will conduct/oversee treatment of this project. b) All label required PPE will be wore during herbicide mixing and application. c) Treatment will be conducted by only Forest Service employees. d) Treat cut stumps with roller applicators or wands with spray shields to eliminate drift and potential off target herbicide contact e) Effectiveness Monitoring will be conducted for three years following project completion.

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	f) Reentry intervals For cattle grazing will be in accordance with recommended label timeframes. Additional exclusion of cattle from the project area may occur during the planed re-vegetation of the project area. The project area will be elevated to a high priority treatment area for three years after the project is completed.
For Official Use Only	
8) REVIEWER(S) SIGNATURE(S) a) Pesticide use coordinator	Date:
b) Other reviewer(s) (as necessary)	Date:
9) APPROVAL (signature of approving official)	Date:

Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0241. The time required to complete this information collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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APPENDIX C: APPLICABLE DIRECTION FROM THE LRMP FOR THE CURLEW NG

This environmental analysis tiers to the 2003 Revised Caribou Forest Plan Final Environmental Impact Statement, Appendices and Amendments. The 2003 Revised Forest Plan (RFP) provides guidance and direction for forest management decisions and allocates uses across forest landscapes. The RFP was derived from an interdisciplinary process with public and community involvement. The RFP uses prescription areas to allocate uses and emphasize resource priorities. Forest-wide plan direction for resources and uses is discussed first, followed by prescription area direction. All applicable Standards & Guidelines from the LRMP (USDA FS 2002) will be applied.

From Hydrology Report (Higginson 2016):

Water Quality 3-6

Standard	Notes on compliance
1. Within legal authorities, ensure that new or proposed management activities within watersheds containing §303(d) listed water bodies maintain or improve overall progress toward beneficial use attainment for pollutants which led to listing, and do not allow additions of these pollutants in quantities that result in unacceptable adverse effects.	See hydrology report. Relevant sections include: Impaired Waters (§303(d) Listed), Total Maximum Daily Loads (TMDLs), & BMPs, and LRMP Consistency & Compliance
Guideline	
1. Work with the State of Idaho's 2-year cycle to determine if the 303(d) waterbodies are correctly listed or have been restored adequately to provide designated beneficial uses.	See hydrology report. Relevant sections include: State Water Quality Standards and Best Management Practices (BMPs) and Impaired Waters (§303(d) Listed), Total Maximum Daily Loads (TMDLs), & BMPs.
2. New projects within watersheds containing 303(d) listed waterbodies should be supported by the appropriate scale of analysis and collaboration with appropriate Federal, State, Tribal, and local Agencies, organizations and individuals.	See hydrology report for analysis.
3. New project proposals analyzed under the National Environmental Policy Act (NEPA) should consider the 11 questions outlined in the Idaho Nonpoint Source Management Plan to achieve Federal consistency with the Idaho Nonpoint source Management Plan and the Clean Water Act as implemented by the State of Idaho.	See hydrology report. Relevant sections include: State Water Quality Standards and Best Management Practices (BMPs). The Idaho Nonpoint Source Management Plan was updated in 2015 from the 1999 plan, which contained the 11 questions. The new plan now references the MOU between the Idaho DEQ and USFS.

Fisheries, Water; and Riparian Resources 3-10

Standard	
1. To protect other resource values, minimum in stream flows will be required by the Forest Service in the event of a new application to develop a small hydropower project.	N/A to proposed action.
2. Streams identified as being in riparian Properly Functioning Condition (PFC) will be maintained in that condition.	Deep Creek is Functioning at Risk. This project is intended to move Deep Creek towards PFC.
Guideline	

1. Limit roads in riparian areas to those needed for major public transportation where they do not cause damage or where no practical alternatives exist.	N/A to proposed action.
2. When applying herbicides aerially, maintain a 100-foot buffer on all streams.	N/A to proposed Action. Herbicide treatments will be ground based according to the project specific pesticide use proposal (PUP).

FOREST USE AND OCCUPATION

Access 4-8

Standard	
1. Existing and new culverts and stream crossings will be designed or improved to accommodate at least a 100- year flood event, including associated bedload and debris.	N/A to proposed Action.

BIOLOGICAL ELEMENTS

Fish/Water/Riparian 4-15

Guideline	
1. Prioritize streams that are "at risk" and that have the potential for restoration.	Deep Creek is functioning at risk. The project is intended to move the stream towards PFC.

Standards and Guidelines: Greater Sage-grouse Idaho and Southwest Montana Plan Amendment

Recreation (86)

Standard	
2. Streams identified as being in riparian Properly Functioning Condition will be maintained in that condition.	Deep Creek is Functioning at Risk. The project is intended to move Deep Creek towards PFC.

Roads/Transportation (86)

Standard	
GRSG-RT-GL-071-Guideline – In priority and important habitat management areas and sagebrush focal areas, road construction within riparian areas and mesic meadows should be restricted. If not possible to restrict construction within riparian areas and mesic meadows, roads should be designed and constructed at right angles to ephemeral drainages and stream crossings, unless topography prevents doing so.	N/A to proposed Action.

From Fisheries Report (Lyman 2016):

Standard and Guidelines	Meet	Violate
Riparian/Wetland Areas (RWA): Fire/Fuels Prescribe fire or vegetation treatment of lands adjacent to RWA's must be compatible with management prescription goals. (S)	X	
Avoid locating base camps, staging areas, hazardous material storage facilities, or other centers for incident management activities within this area. (G)	X	
Riparian/Wetland Areas (RWA): Wildlife Habitat Manage RWA to accommodate or promote adequate habitat requirements for fish, amphibians, birds and mammals. (G)	X	

From Wildlife Report (Colt 2016)

Terrestrial Ecosystems – Wildlife Habitat 3-12

General Wildlife Habitat

Standard	Comments
1. The habitat requirements of management indicator species (MIS) will be considered in all resource development projects. The MIS for sagebrush habitat is sage grouse and for riparian/wetland areas is a breeding bird complex.	Impacts to greater sage-grouse and riparian bird species richness are analyzed in the project Biological Evaluation.
Guideline	
1. Desired non-native wildlife species should be retained in the Grassland where not in conflict with other resource objectives.	No extirpation of desirable non-native species on the CNG is expected from the project.

Sagebrush Habitats

Guideline	Comments
1. Identify and maintain those habitats that have sagebrush with native understory vegetation.	Project will maintain and enhance sagebrush and native understory vegetation.
2. Manage for a mosaic of age and structural sagebrush communities across the Grassland in patches of at least 320 acres.	Project will not modify nor reduce sagebrush and will not decrease sagebrush patch size.

Sage Grouse and Columbian Sharp-tailed Grouse

Guideline	Comments
1. Management activities will consider proximity to active lek locations during site-specific project planning.	The closest sage-grouse lek is 3.12 miles from the project area. The next closest lek sites are 6.5, 8.1 and 8.5 miles from the project area. The closest sharp-tailed grouse leks are 1.25, 1.75 and 2.6 miles from the project area. This information the potential effects are disclosed in the Biological Evaluation/Wildlife Report, pages 8 and 12.
2. If management actions would impact courtship, limit physical, mechanical and audible disturbances within the breeding complex during the breeding season (March - May) within three hours of sunrise or sunset.	Project activity will not occur during breeding and nesting and will not impact grouse. See the effects analysis section in the attached wildlife report.
3. Where management actions may disturb nesting grouse, avoid manipulation or alteration of vegetation during the nesting period (May-June).	No effect; see above.

Riparian Habitats

Guideline	Comments
1. Surveys for the presence of amphibians should be completed prior to development of springs, riparian areas and wetland complexes. Developments should maintain suitability for use by amphibians.	Project will improve riparian habitat conditions for native amphibian species.

Subsection and Prescription Areas, Prescription Area 2.8.8 -Riparian/Wetland Areas (RWA)

ECOLOGICAL PROCESS AND PATTERNS - BIOLOGICAL ELEMENTS

Wildlife Habitat 4-8

Guideline	Comments
1. Manage RWA to accommodate or promote adequate habitat requirements for fish, amphibians, birds and mammals.	Riparian/Wetland Area (RWA) habitats for native fish, amphibians, birds and mammals will be improved. Effects to riparian habitat is addressed in the associated wildlife report.

Prescription Area 3.4.1 -Special Wildlife Areas - BIOLOGICAL ELEMENTS

Vegetation 4-11

Standard	Completed Date (initials)
1. Native and non-native grass, forb, and shrub species will be used in the composition of re-vegetation after disturbance and reflect those species preferred by native grouse for pre-nesting, nesting and brood rearing.	The proposed project action will remove undesirable non-native Russian olive and saltcedar plants and replace them with native grass and forb species desirable for grouse. Topic covered in associated report.
2. Vegetation treatments are allowed when they meet wildlife resource goals of this prescription.	See above

Wildlife 4-11

Standard	Comments
1. Treatments and developments will emphasize maintenance and improvement of wildlife habitat.	Proposed treatments directly improve wildlife habitat for species of concern. Topic addressed in associated wildlife report.

Vegetation 4-15

Guideline	Comments
1. Bulbous bluegrass dominated sites and sagebrush stands with > 25% canopy cover will be priorities for treatment.	Not applicable for this project
2. Consider maintaining dense (>15%) sagebrush cover adjacent to private land that has less sagebrush than is desirable for quality sage grouse habitat.	Not applicable for this project

Wildlife 4-16

Standard	Comments
1. Do not treat sagebrush within 0.25 miles of an active sage grouse lek.	Standard superseded by GRSG LUP amendment (2015). New standards are addressed in associated wildlife report. Sage-grouse breeding (leks) and nesting habitat are not expected to be adversely impacted by implementation of the project.
Guideline	
1. Time treatment practices to provide the least impact to wildlife with emphasis on upland game birds.	Project is timed (fall/winter) to minimize adverse impacts to all bird species, including upland game birds.
2. Current guidelines for sage and sharp-tailed grouse management will be used as a basis to develop site-specific recommendations for proposed sagebrush treatments. Lek buffers as described in the most current guidelines do not apply to the Grassland, because of the highly fragmented nature of the area	Current guidelines for sage-grouse and sharp-tailed grouse including the 2015 GRSG LUP amendment are met. Project is expected to benefit grouse species; discussed in associated wildlife report.

and the distance that hens are known to move to nest (Biologist Meeting *10/24/01)* Rationale for deviation from the other guidelines will be identified in the site-specific project analysis.	
3. Areas of vegetation treatment will consider sagebrush canopy cover; understory diversity and proximity to known active lek sites. Higher priority will be given to treatments of sagebrush in the greater than 25% canopy cover class and areas with limited understory diversity.	Not directly applicable; not treating sagebrush, rather removing non-native invasive Russian olive and saltcedar.
4. When implementing vegetation seeding treatments, provide for a seed mix with species that are preferred by native upland birds during the pre-nesting, nesting and brood-rearing periods, where possible.	Seeding will consider native upland birds.

Standards and Guidelines - Greater Sage-grouse -Idaho and Southwest Montana Plan Amendment

General Greater Sage-grouse (77)

Standard	Comments
GRSG-GEN-ST-004-Standard – In priority habitat management areas and sagebrush focal areas, …	Not applicable – Area not priority habitat or sagebrush focal area. See GRSG FEIS 2015
GRSG-GEN-ST-005-Standard – In priority, general, and important management areas and sagebrush focal areas, only allow new authorized land uses if, after avoiding and minimizing impacts, any remaining residual impacts to the greater sage-grouse or its habitat are fully offset by compensatory mitigation projects that provide a net conservation gain to the species, subject to valid existing rights by applying beneficial mitigation actions. Any compensatory mitigation will be durable, timely, and in addition to what would have resulted without the compensatory mitigation as addressed in the Mitigation Framework (Appendix B).	Not applicable – project does not change land use/no new land uses; additionally, project is beneficial to sage-grouse.
GRSG-GEN-ST-006-Standard – Do not authorize new surface disturbing and disruptive activities that create noise at 10dB above ambient measured at the perimeter of an occupied lek during lekking (from March 1 to April 30) from 6 p.m. to 9 a.m. Do not include noise resulting from human activities that have been authorized and initiated within the past 10 years in the ambient baseline measurement.	Project implementation will not occur between March 1 and April 30, does not authorize activities that will create noise during the closed period and is not expected to impact grouse breeding or nesting activity.
Guideline	
GRSG-GEN-GL-007-Guideline – During breeding and nesting (from March 1 to June 15), surface disturbing and disruptive activities to nesting birds should be avoided.	Project will not occur during breeding and nesting period.
GRSG-GEN-GL-008-Guideline – When breeding and nesting habitat overlaps with other seasonal habitat, habitat should be managed for breeding/nesting desired conditions in table 1.	Not directly applicable, project does not change grouse habitat conditions (grass and brush cover). However, the project will indirectly improve grouse brood rearing habitat.
GRSG-GEN-GL-009-Guideline – Development of tall structures within 2 miles from the perimeter of occupied leks, as determined by local conditions (e.g., vegetation or topography), with the potential to disrupt	Not applicable. Is not within 2 miles of lek and does not authorize tall structures.

breeding or nesting by creating new perching/nesting opportunities for avian predators or by decreasing the use of an area, should be restricted within nesting habitat.	

Adaptive Management (78)

Standard	Comments
GRSG-AM-ST-010-Standard – If a hard trigger is identified, management direction applying to priority habitat management areas will be applied to important habitat management areas within the Conservation Area in Idaho, and the Sage-Grouse Implementation Task Force will evaluate available and pertinent data and recommend additional potential implementation level activities to the appropriate Forest Service line officer in both Idaho and Southwest Montana (Appendix C).	Not applicable – not within priority management area/does not apply to triggers changing habitat designations.
GRSG-AM-ST-011-Standard – If a soft trigger is identified, the Forest Service will review available and pertinent data in coordination with the Sage-grouse Implementation Task Force, which may recommend potential implementation level activities to the appropriate agency line officer (Appendix C).	Not applicable – not within priority management area/does not apply to triggers changing habitat designations.

Roads/Transportation (86)

Guideline	Comments
GRSG-RT-GL-070-Guideline – In priority and important habitat management areas and sagebrush focal areas, new roads and road realignments should be designed and administered to reduce collisions with the greater sage-grouse.	Not applicable – does not authorize new roads

APPENDIX D: PROJECT DESIGN FEATURES FROM SPECIALIST REPORTS

Monarch Butterfly & Other Insect Pollinators (Lehman 2016):

- To the extent possible retain showy milkweed rhizomes in areas where existing milkweed has been disturbed and use for revegetation.
    - Showy milkweed can be propagated from rhizome cuttings (Landis & Dumroese 2015). The rhizomes possible can be directly placed during active riparian restoration implementation or will need to be propagated in plots for future planting. This will likely be experimental in practice.
- Active project activities shall not occur during the monarch butterfly breeding season, generally between June 1st and September 30th.
- Disturbed areas would be seeded to reduce weed invasion and soil erosion with a seed mix that contains species that are beneficial to sage-grouse and monarch butterflies and other pollinators (Already included in proposed Action)
    - The revegetation plan will include species adapted to the site conditions. To the extent possible, locally collected native plants will have preference.
- Retain where possible, nectar plants that currently exist in the area and are not noxious weeds.
    - Nectar plants currently documented to occur in the project area that should not be herbicide sprayed include, but are not limited to: showy milkweed, Aster spp., skunkbush sumac, shinning willow, coyote willow, bull thistle, Rocky Mountain beeplant, curlycup gumweed, alfalfa, sunflower, catnip, salt spring checkerbloom, common dandelion and yellow salsify.
    - Follow IPMS principles for weed treatments. This includes that the tactic chosen will be the most effective, economical with the least impact on non-target species and environment.
- Retain existing cottonwoods and shrubs in the project area and include trees and shrubs in the revegetation plan. This may require leaving some patches of Russian olive until desirable species establish and provide shaded micro-sites. Bare-root or containerized woody plants would be planted in key areas to meet habitat needs is already included in the proposed action.
    - Monarch butterflies use Russian olive to roost as a way to escape the heat of the day and will often lay their eggs on the milkweeds adjacent to Russian olive trees. This has been observed in Utah, on site, and elsewhere in the West. Because of these observations provide the best available information, it will be critical to follow the phase removal approach and project monitoring for the initial treatments that has been incorporated into the proposed project.

- If not Russian olive, it will likely be critical that retention and establishment of cottonwoods, tree-form willows and other riparian trees/shrubs in patches (key areas) are included in the revegetation plan for maintaining structural diversity and niche habitat for monarch adults (butterfly stage) and the egg, larva, pupa life stages. During hot spells during the summer, shade and partial shade provided from existing trees and tall shrubs optimize conditions for a diversity of site conditions to help ensure the survival of monarch larva.

- Share information gained from this project to help support Best Management Practices (BMP) development for monarch butterflies. These BMPs are currently being developed by the Xerces Society this year (Jepsen, 2016). As soon as available, these BMPs should be considered in the phased removal of Russian olive.

- Implement the best available methods for habitat improvement of other pollinators (especially bees) and beneficial insects (e.g. lady bugs and xx wasps) as information becomes available.

Required Monitoring

Monarch butterfly habitat needs will be incorporated into the revegetation plan, especially in establishing the management goals and objectives, monitoring the effectiveness of management actions, and evaluating actual outcomes.

Hydrology (Higginson 2016):

It is important to recognize that the proposed action is in fact a BMP targeted towards improving overall watershed health. Compliance with the Clean Water Act is achieved through the proper site-specific design, implementation, and monitoring of BMPs[8]. The Agency's BMPs include:

- Grassland Plan (LRMP) direction (USDA FS 2002)
- National BMPs for Water Quality Management on NFS Lands (USDA FS 2012b)
- Forest Service Handbook 2509.22-Soil & Water Conservation Practices (USDA FS 1988)

In addition to the project design features and BMPs suggested by the other Forest Service Specialists in their specialist reports and the Pesticide Use Proposal (Marr, Lehman, Jorgensen, & Plager), the following BMPs should be incorporated into the proposed action.

BMP#1 – Disposal of Slash within the Riparian /Wetland Area (RWA)

The RWA along Deep Creek is 150 feet on either side the stream channel (Prescription 2.8.8-RWAs; pg 4-6 to 4-9). Within the valley bottom along Deep Creek, the following measures would be applied:

- Minimize the mechanized treatment of wood residue in RWA to what is needed in order to avoid creating excessive fuel loads.
- Do not dispose of or burn material within the bankfull channel or irrigation ditch.
- Do not remove existing dead & down material from the RWA for burning or mastication.

[8] 40CFR130.2(m): Methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include, but are not limited to, structural & nonstructural controls & operation & maintenance procedures. BMPs can be applied before, during, & after activities to reduce or eliminate the introduction of pollutants into receiving waters

- When felling trees, lop and/or scatter as much material as practical. That is, do not remove material for burning or mastication unless excessive material is present. If excessive material is present move material as far from stream channels as practical given the local terrain.
- Fell trees in a way that protects residual vegetation from damage. Minimize ground-disturbing activities to the extent practicable.
- *Avoid locating… staging areas… and other centers for incident activities within* RWA unless approved by hydrologist or soil scientist (LRMP pg 4-8). If necessary, burn pile locations will be identified by an interdisciplinary team consisting of a fuels specialist, soil scientist, botanist, hydrologist, and archeologist.
- Minimize new soil/vegetation disturbances by using existing disturbances as much as practicable.

BMP#2 – Other Soil and Water Protection Measures

- Little to no rutting in in heavy equipment or masticator tracks should occur. If rutting begins to occur, and especially if it exceeds 4 inches, operations will cease until conditions improve or operations can be modified to avoid such rutting. No equipment operation should take place when ground conditions are wet enough that there is a risk of rutting. Avoid operations if soil is saturated.
- When lopping and scattering, attempt to arrange fuels into less dense areas to avoid the need for mastication or burning.
- If burning is necessary, it should occur when soils are wet from snow or rain to limit impacts on soil organic matter, physical properties and soil organisms.
- After jackpot or pile burning is complete, rake the burned area to disrupt any hydrophobic layer, incorporate the ash to reduce erosion, mix in charcoal to benefit soil and chemical properties and incorporate any adjacent duff/litter over the burned site.
- If feasible, drag slash from other lopping & scattering efforts to cover the burn soils in an attempt to avoid erosion, provide woody material for site rehabilitation and increase soil moisture from shading.

BMP#3 – Stream Channel Restoration Work

- Instream work will be conducted during low flow periods and in accordance with the necessary permits (e.g. stream channel alteration and §404 permits). Instream work will be conducted in accordance with MOU with the Idaho Department of Water Resources (USDA FS 2013a).
- A Forest Service hydrologist will be on site during all in stream construction activities.
- Schedule operations during periods when the probabilities for rain and runoff are low.
- Place Woodstraw or organic debris on disturbed areas during rehabilitation efforts in order to provide immediate ground cover and accelerate recovery.
- Obliterate, re-contour, seed, and replant disturbed areas.

BMP#3 – Watershed Improvement Needs Inventory

The project is identified on the Forest's watershed improvement needs inventory because of degrade watershed conditions. The action alternative accounts for approximately 17 acres of watershed improvement (up to 11 acres for Russian olive removal and approximately 6 acres for stream channel improvement work).

Fuels & Fire Management (Jorgensen 2016):

1. Use appropriate seed when rehabilitating the pile burn sites to limit cheat grass and other invasive plants that could increase fuel loading on the burn scars.
2. When utilizing broadcast burning to dispose of biomass, make sure to limit fire effects to desirable vegetation by burning under desirable conditions. Understand that use of herbicide will still be needed to eliminate Russian olive sprouts.
3. If material is left to protect rehabilitated sites, make sure that fuel bed is not continuous and will not act as a wick facilitating wildfire spread in the riparian zone.

Fisheries (Lyman 2016):

- Application of herbicides will follow label directions and comply with the Forest's IPMS (USDA FS 1996 & 2016).
- Designated disposal areas for biomass treatments should be identified along Deep Creek by an interdisciplinary team. Sensitive resource areas (e.g. heritage sites, riparian vegetation, & in appropriate soils) would be avoided. Pile burning disposal areas would be limited to 0.25 acre; at large pile burn disposal sites, the top soil would first be removed and salvaged for replacement on the site after the pile is burnt. Disturbed disposal sites would be rehabilitated.
- Implement phased treatments of dense Russian olive stands located on the Deep Creek channel, when possible, to maintain stream cover and shading. This would apply to reaches where RO is the only woody vegetation providing a riparian canopy.
- Incorporate bio-engineering and natural channel design techniques when developing and implementing streambank stabilization.
- Allow no livestock grazing before seed set of the second growing season after rangeland planting or seeding. If monitoring shows that this is not adequate to meet resource needs, defer livestock grazing as necessary. (LRMP Standard page 3-18).

Wildlife Resources (Colt 2016):

- For the protection of breeding, nesting and brood passerine bird species, it is critical that the project not occur from March 15th until the end of September.

Soil Resource (Marr 2016):

- Phase in/stagger removal and revegetation efforts to allow for evaluation of success before complete removal of stabilizing vegetation and to reduce likelihood for spread of undesirable species. A phased/staggered implementation would also allow for the naturally occurring plant species to spread moving towards a diversified plant community.
- Conduct mechanical operations when soils are dry to prevent detrimental rutting/displacement
- Coordinate operations with Soil Science personnel to identify any areas of avoidance with mechanical equipment that may be highly susceptible to erosion
- Coordinate with Soil Science personnel to identify suitable locations for piling of slash and to determine suitable top soil salvage depths.

- Attempt to utilize other means of slash disposal before burning piles (i.e. lop & scatter, chipping, biochar, etc.)
- Locate piles on flat areas to decrease erosion potential
- Plan to provide for stabilization of top soil stock piles to prevent erosional loss.
- Plan to identify arterial routes of use within the riparian areas and to access pile locations
- Plan for burning of piles to occur when soils are wet from snow or rain to limit impacts on soil organic matter, physical properties and soil organisms.
- Ensure all equipment is washed prior to entering the activity area to limit introduction of invasive species