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Environmental Assessment

Turnpike Pit Medusahead Control

Paulina Ranger District, Ochoco National Forest
Grant County Oregon

Township 15 South, Range 26 East, Section 31, NE1/4, SE1/4

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Table of Contents

SUMMARY

The Ochoco National Forest proposes to control an infestation of medusahead rye, an Oregon State listed noxious weed, using herbicide. The project area is located at the Turnpike Pit Material Source within Grant County, on the Paulina Ranger District, Ochoco National Forest, and approximately 80 air miles east of Prineville, Oregon. The action is needed because Federal Agencies are required by law to treat noxious weed infestations, and authority to treat this infestation under the National Environmental Policy Act is not currently in place

The proposed action is expected to immediately reduce the potential for weed spread, currently three acres is size, and is expected to control the medusahead population within four years.

In addition to the proposed action, the Forest Service also evaluated the following alternatives:

- No Control
- Manual Control

Based upon the effects of the alternatives, the responsible official will decide whether or not to control the noxious weed infestation within the Turnpike Pit. If the decision is for control, then the responsible official will decide which method will be used.

CHAPTER ONE

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment (EA) discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into the following 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, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public, Forest Service personnel, and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by significant issues. 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 comparison of the other alternatives that follow.
- *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.

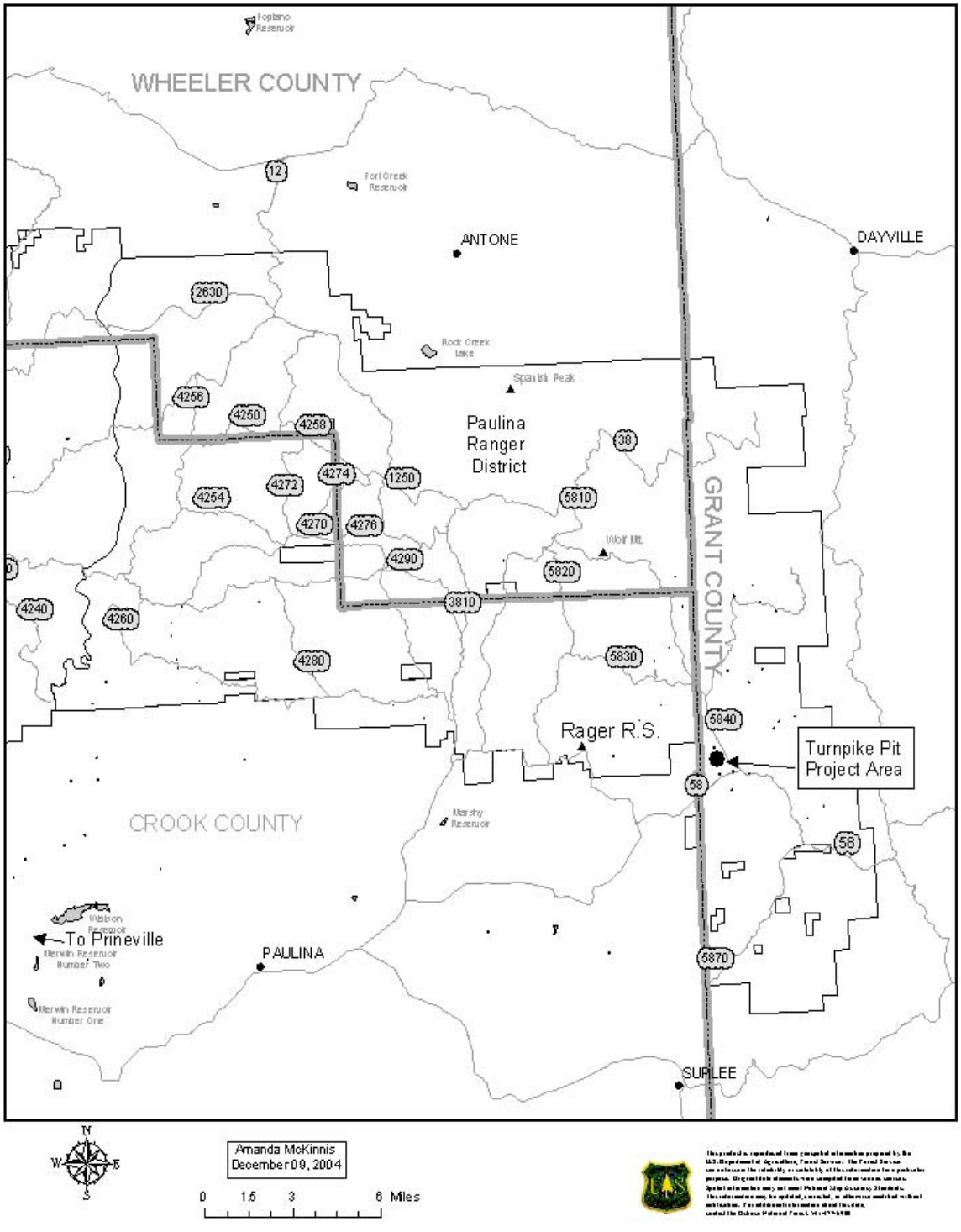
Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Paulina Ranger District Office in Paulina Oregon.

Background

Medusahead (*Taerniatherum caput-medusae* subsp. *asperum*) is an annual grass introduced from Europe or Asia into southwestern Oregon in the late 19th century. It is a highly successful invader of native plant communities, especially those occupying sites that have high clay content soils. It competes aggressively with other plants and is a low-value forage species for both livestock and wildlife. This weed is rated by the Oregon Department of Agriculture as a class B weed, which is a weed of economic importance which is regionally abundant, but may have limited distribution in some counties.

Medusahead is likely to have been introduced to the Turnpike Pit during the 747 Fire, see Figure 1 for the location of the pit. The 747 Fire camp was located at the pit where crews and heavy equipment were staged for the duration of the fire activity and rehabilitation efforts. The camp area was monitored for weed invasion as part of the Burned Area Emergency Rehabilitation effort starting in the fall of 2002. In the spring of 2003 a few plants were observed and manually removed, however the infestation quickly increased. Overall, there is very little medusahead on the Paulina Ranger District. This three-acre site at the Turnpike Pit is the largest concentration on the District.

Figure 1. General location of the Turnpike Pit Medusahead Control Project
Paulina Ranger District, Grant County, Oregon



Biology and Ecology of Medusahead

Medusahead germinates in fall, winter, or spring. Root growth occurs during the winter with a downward extension of roots up to 40 inches in good soil, thus having a competitive advantage over native plants when aboveground growth occurs in the spring. Medusahead exhibits prolific seed production. In uncrowded conditions the plant can produce six or more seedheads per plant, which contain more the 20 seeds per head. In an ideal situation medusahead can produce 4,000 to 10,000 seeds per square meter (Sheley 1999). The seed germinates quickly, within hours after moistening. Seed germination of viable three-year-old seed can be as much as 90%, however seed viability decreases annually. The seed has an awn with small barbs that attaches to animals, clothing and machinery. The seedheads are also readily dispersed by wind.

Medusahead litter is very slow to decompose due to high silica content, and often builds a litter layer up to 4 inches thick. This inhibits the growth of desirable native vegetation through shading and preventing seed from reaching the ground, however with its own survival strategy, medusahead seed can germinate within this litter layer.

Favorable environmental factors for medusahead growth include soils with high clay content, and water run-off from adjacent sites. Medusahead is likely to invade areas where native vegetation has been weakened by intense fires, mechanical disturbance or overgrazing. It is also capable of establishing itself in relatively undisturbed, diverse communities of native plants. Infestations primarily grow in sagebrush-grass communities with annual precipitation of 10 to 40 inches, where the moisture falls in the winter and spring. Because it grows in the winter and spring, a lack of summer moisture favors medusahead over longer growing perennial grasses.

Purpose and Need for Action

The purpose of the proposed action is to control the medusahead population within the Turnpike Pit before it spreads to adjacent grasslands. The need for the project being proposed stems from the following existing conditions:

- Monitoring of this infestation has shown it is currently spreading at a rapid rate.
- The area adjacent to the site is dominated by an open, dry, sagebrush-bunchgrass ecosystem with clay soils, which is particularly vulnerable to invasion by annual grasses such as medusahead. There is a possibility of rapid, exponential growth of the weed site.
- Noxious weeds, such as medusahead, are aggressive, non-native plants, and pose an increasing threat to native ecosystems throughout the United States.
- Noxious weeds can reduce the diversity and abundance of native vegetation and forage, impact the quality of wildlife habitat, increase erosion, and decrease water quality.
- Because these plants are not native, natural controls to limit their spread are rarely present.
- At this time the infestation is small, this improves control efficacy and cost effectiveness.

Proposed Action

The Paulina Ranger District is proposing to treat a medusahead population at the Turnpike Material Source, that:

- Was not effectively controlled with manual treatment in 2003.
- Has rapidly increased from just a few plants to 3 acres in size.
- Is currently confined within the Turnpike Pit.

The weeds are located on the southeast edge near the 5840-780 entrance road. The Region 6 approved herbicide glyphosate (Glypro) would be applied at a rate of one quart per acre, and would be applied twice per year, starting the first week in March 2005, and again the first week in June. Application would be done by the Crook County Weed Master, a licensed pesticide applicator, using an ATV-mounted sprayer and a backpack sprayer. Control of the infestation is estimated to occur within four years. A more detailed description of the proposed action is located in Chapter 2.

Management Direction

This document is tiered to the Final Environmental Impact Statement (FEIS) for the Ochoco National Forest Land and Resource Management Plan (Forest Plan). Lands within the project area fall within two management allocations (see Figure 2), including:

> MA-F20 Winter Range (Forest Plan p.4-82) – These areas are managed for big game winter range habitat. The desired condition is for big game use to be the primary activity from December 1 to May 1. Forest activities will maintain key forage and browse species for big game species.
>
> MA-F26 Visual Management Corridors (Forest Plan p.4-94) – These areas will maintain the natural appearing character of the Forest along major travel routes. The desired condition is for Forest visitors to encounter a landscape that is diverse and management activities are not visually evident to the casual observer.

In 1998 the Ochoco National Forest amended the Forest Plan by preparing an Environmental Assessment "Integrated Noxious Weed Management", to comply with Section 15, Management of Undesirable Plants on Federal Lands, of Public Law 93-629. This amendment directs the control of noxious weeds through various treatment methods, including herbicides when alternative treatment techniques are not effective or practical. This EA only covers treatment of weed infestations that were established prior to 1998, new weed species or new weed sites since that time need site specific environmental analysis. This document tiers to the Decision Notice and Finding of No Significant Impact of the 1998 Integrated Noxious Weed Management EA for all actions concerning treatment of noxious weeds.

The "Guide to Conducting Vegetation Management Projects in the Pacific Northwest Region" identifies five strategies for managing noxious weeds: 1) Prevention, 2) Early Treatment, 3) Correction, 4) Maintenance, and 5) No Action. Choosing a strategy is based on management objectives, an assessment of current vegetation communities, and an identification of a damage threshold that would initiate treatment. Prevention is the preferred strategy for managing noxious weeds (Forest Plan Amendment #18), which is not treatment, but ameliorates conditions the cause or favor the presence of noxious weeds.

> In the case of the medusahead infestation at Turnpike pit, the damage threshold has been exceeded (more than $1/10^{th}$ of an acre), therefore a correction strategy is necessary to bring the infestation below the damage threshold.
>
> Current prevention measures (administrative closure and public notification) would continue regardless of which alternative is chosen. These measures were put in place to reduce disturbance of the infestation and to minimize the potential for spread outside the project area. Although effective at reducing the spread of noxious weeds, prevention measures alone will not control the medusahead population.

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Decision Framework

The Responsible Official for this proposal is the Paulina District Ranger. Several decisions will be made from this environmental assessment. The District Ranger will decide whether or not to control the medusahead infestation within the Turnpike Pit. If the Ranger decides to control the infestation, the decision will include determining what method best meets the goals of the Forest Plan and respond to the purpose and need for the project. The decision will address whether or not to implement the project as proposed, modify the project, or not to implement the project at all. The District Ranger will decide if implementation of the proposed action or alternatives would cause significant effects requiring analysis in an environmental impact statement. That determination will be based on context and intensity, weighing the significance of the actions (40 CFR 1508.27).

Public Involvement

The proposal was listed in the Deschutes and Ochoco National Forests Winter 2004 Schedule of Projects. In October of 2004 a scoping letter was mailed to 55 members of the public, tribes, and agencies for comment. During this period the public and other agencies were provided with the details of the project proposal. Five responses were received and are filed in the project record at the district office. Four of the comment letters were in support of immediate treatment of the medusahead population with herbicides. One letter expressed concerns over soil contamination, the possible health effects glyphosate would have on the applicator, and its toxicity to fish and wildlife. In addition the letter asked about response of medusahead to control measures other than herbicide. These responses helped identify issues associated with the project.

Issues

This section identifies the issues associated with implementing the proposed action. The Forest Service interdisciplinary team identified preliminary issues prior to requesting input from the public. Significant and non-significant issues were identified from the issues identified by the Forest Service and responses received from the public. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant are included in the analysis file.

The public's response to the proposed action reflected and reinforced issues identified by the Forest Service. These issues were grouped into similar themes for a total of four significant issues. These issues include:

Issue # 1: Effects to Native Vegetation

Spraying the herbicide glyphosate to control medusahead may affect native vegetation adjacent to the pit, such as sagebrush, bunchgrasses and perennial forbs.

Measure: Acres of native vegetation potentially affected by direct application and drift potential.

Issue # 2: Human Health Risk

The health and safety of forest workers and the public may be at risk from exposure to glyphosate through direct skin contact and/or inhalation.

Measures: Number of worker days exposed to treatment hazards.

Area of potential exposure to the public from treatment (acres).

Issue # 3: Cost of Treatment

The treatment of medusahead at Turnpike Pit may be costly and fiscal resources are limited, resulting in opportunity cost trade-offs.

Measures: Cost per acre by treatment type.
Cost to Government incurred from having to use alternative material sources.

Issue # 4: Treatment Effectiveness

Treatment alternatives vary in their effectiveness to prevent or reduce the spread of medusahead from the Turnpike Pit.

Measure: Plant density reduction and potential for spread.

Other Concerns Identified by the Public and Interdisciplinary Team (IDT)

The IDT and individuals responding in the scoping process raised several concerns. While the significant issues were used to develop alternatives, these concerns/issues were identified as important to the analysis of the proposal. They are used to analyze effects of the alternatives and to develop necessary mitigation measures. Some of the concerns are required to be analyzed by laws and management direction such as the Clean Water Act and evaluating effects to Threatened, Endangered and Sensitive Species. These issues are listed below and are discussed in further detail in Chapter 3, Environmental Consequences.

- Water Quality
- Proposed, Endangered, Threatened, Sensitive Plant, Animal and Fish Species
- Heritage Resources
- Management Indicator Species
- Land Birds, including Migratory Species
- Soil Productivity

CHAPTER TWO

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Turnpike Pit project. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the physical, biological, social and economic effects of implementing each alternative.

Alternatives Considered in Detail

Alternative 1: No Action

In the No Action alternative, neither herbicide use nor hand digging on medusahead would occur. The prevention measures already established for this particular noxious weed infestation would continue. Measures to help prevent spread of medusahead include administrative closure of the pit (no rock material is being removed from the pit), and signing to alert the public of the weed infestation. In addition, applicable prevention measures from the Ochoco Forest Plan Amendment #18 Noxious Weeds would be followed. The No Action alternative provides a baseline to document the effects of the other action alternatives.

Alternative 2: The Proposed Action

This alternative proposes to treat a medusahead population that is currently three acres in size. At the present time, this population is completely within a gravel pit area, called Turnpike Pit, which is used by the Forest Service primarily as a source for rock and gravel. The area surrounding the pit is also used by the public as a camping and parking area. The weeds are located on the southeast edge near the 5840-780 entrance road; see Figure 2 for the infestation location. The Region 6 approved herbicide glyphosate (Glypro) would be applied at a rate of one quart per acre, twice per year, the first treatment would occur in early spring, followed by another application one month later. The purpose of the second application is to kill any previously missed plants and newly emerged seedlings. The Crook County Weed Master, a licensed pesticide applicator, using an ATV-mounted boom sprayer, and a backpack sprayer, would do the herbicide application. Herbicide application would be done annually, with control of the infestation estimated to occur within four years.

Glyphosate would be directly applied to the foliage of medusahead. It is absorbed by leaves and rapidly moves through the plant. A surfactant, Phase, would be added to the herbicide to increase the effectiveness of penetration into the leaf surface. Phase would be added at a rate of 8 ounces per 25 gallons of mix. Phase is a non-ionic organosilicone/methylated soybean oil blend, basically crop oil with a 1-2% wax emulsifier. To alleviate unnecessary mortality of native plant species by using a boom sprayer, the edges of the infestation where medusahead transitions against native vegetation would be sprayed using a backpack type sprayer. The wand attachment of a backpack sprayer allows application to specific plants.

State of Oregon herbicide application rules would be followed regarding application, storage, transportation, and worker safety. Herbicide label requirements and material safety data sheets for Glypro would also be followed (on file in the project record).

Mitigation Specific to Alternative 2

The following mitigation measures have been incorporated directly into the design of the proposed action:

- The Turnpike Pit would remain closed to administrative use until the infestation is controlled. Administrative use includes (but not limited to) removing rock or gravel, or using the area as a fire camp or staging area.
- The Forest Service would designate the area to be treated; this would include delineating areas for using a backpack sprayer.
- Herbicides would be applied according to the manufacturer's label, as designated by the Environmental Protection Agency.
- Herbicide applicators would follow all safety guidelines in the Oregon Department of Agriculture statutes, including the transportation of herbicides.
- Herbicide would not be applied during periods of excessive soil moisture, active precipitation events, or when heavy (>2") of precipitation is forecasted within the next week.
- To minimize drift potential herbicide would not be applied when there is a temperature inversion, or when wind speeds exceed 5 mph. Spray nozzles on equipment would be chosen to produce the largest droplet size possible.
- To minimize drift potential to waterbodies and sensitive plant habitat, herbicide would not be applied when the wind is coming from the east. The nearest stream channel and sensitive plant location are ¼ and ¾ miles, respectively, to the west.
- Herbicide applications operations would be completed before July 15th, the date livestock enter the South Pasture of the Wind Creek Allotment
- Vehicles, including ATV's, would either not enter the project area, or would be cleaned of weed material before leaving the project area.
- Vehicles (ATVs, Trucks) would be excluded from scab areas due to the sensitive nature of these soils. Existing roads may be used.
- One week prior to the application of the herbicide, signs would be posted on entryways into surrounding rock flats notifying the public of the potential for risk of handling and consuming vegetation that has been sprayed. On the day of herbicide application, that date would be written on the signs, notifying the public.
- The District Ranger would notify the Tribes by telephone prior to herbicide application, notifying them of the date of treatment.

Monitoring Specific to Alternative 2

Monitoring of implementation and treatment effectiveness would take place several times during the year. Implementation monitoring would occur for each herbicide treatment to ensure all safety requirements and mitigation measures are being followed, and that application is consistent with the herbicide label. Daily application logs would be kept according to the Ochoco NF Integrated Noxious Weed EA protocol. Forest

Service personnel would conduct implementation monitoring. Treatment effectiveness monitoring would be done annually to ensure treatments are achieving the desired result, namely that medusahead reduction is occurring in both area and plant density, and that effects to non-target species is minimal. Treatment effectiveness would by jointly monitored by the Forest Service and Crook County Weed Control.

Alternative 3

This alternative includes hand pulling or grubbing of medusahead individuals before the plant drops seed. Herbicides would not be used. The alternative was developed to respond to two issues brought forward by the public and the interdisciplinary team. These issues include possible effects to native vegetation from herbicide application, and possible effects to human health from contact with herbicide.

Hand pulling entails the removal of individual grass shoots and its roots; this can generally be done without the use of hand tools, depending on soil moisture levels. A fair amount of physical effort is involved. Medusahead would be the target species; no native vegetation would be removed or harmed by this treatment method. A minimum of two hand pulling treatments would be required during the growing season (March – November), because plants germinate at various times and it is imperative to ensure that seeds are not produced and dispersed. Hand pulling of medusahead would continue in this manner until there is no evidence of plant germination. Control is expected to take over 10 years.

Mitigation Specific to Alternative 3

The following mitigation measures have been incorporated directly into the design of Alternative 3:

- The Turnpike Pit would remain closed to administrative use until the infestation is controlled. Administrative use includes (but not limited to) removing rock or gravel, or using the area as a fire camp or staging area.
- Treatment would occur using a containment strategy, working the sparse outer perimeter first, and working inward to the densest part of the population.
- Seed heads, in any stage of maturity, would be double bagged and disposed of according to the Paulina District Ranger's instructions.
- Vehicles would either not enter the project area, or would be cleaned of weed material before leaving the project area.
- Equipment and clothing would be checked for seed heads and other material and disposed of before leaving the area.
- Machinery (ATVs, Trucks) would be excluded from scabland areas due to the sensitive nature of these soils. Existing roads may be used.

Monitoring Specific to Alternative 3

Monitoring of implementation and treatment effectiveness would take place several times during the year. Implementation monitoring would occur periodically throughout the year to assess when control efforts are needed, based on seed head development. Treatment effectiveness monitoring would occur annually to determine if desired results are being achieved, that medusahead reduction is occurring, including both area and plant density. Forest Service personnel would conduct the implementation and effectiveness monitoring.

Alternatives Considered But Eliminated From Detailed Analysis

Seeding for competition/cattle grazing:
Seeding, usually in combination with other control measures, has proven to be somewhat effective in the treatment of medusahead. Recent newspaper articles cited OSU research showing that use of "seed islands" and livestock grazing are effective for large infestations (Sheley 2004). However, the soil is not productive at this site, it is a rock pit that has had the topsoil bladed off, and the surface is crushed rock with soil mixed in. This lies on top of bedrock. Seeding, especially with native plants would not be successful and the site will be constantly disturbed, as it will be maintained as a material source in the future. To effectively get livestock to consume medusahead at this site, they would need to be fenced in and forced to eat it, which alone may not be effective. There are also concerns of cattle then transporting seed off-site.

Burning:
Burning is sometimes used to reduce the viability of the seed and destroy the mat of seed heads that medusahead produces. This infestation currently does not have a mat of seed heads and the site has little other fuel to carry a fire. Waiting for the mat to build up would allow the infestation to spread considerably. The site would also have to be extremely dry to be effective which increases the risk of unintentional fire in the adjacent scabland, which could also lead to ground conditions conducive to the spread of medusahead. Literature shows that sufficient numbers of seed remain uninjured and reduction in density is usually temporary (Young et al 1972).

Tilling/plowing:
Since the site is already disturbed, the possibility of mechanical control through soil disturbance to keep the grass from flowering was explored. This alternative was dismissed due to the fact that the area of infestation is already down to bedrock, with only a thin layer of soil. This method may actually spread the infestation through additional disturbance.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on items where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives and how they respond to the Purpose and Need, and issues identified in Chapter 1.

Table 1. Issues and Consequences by Alternative

Issue	Alternative 1 No Action	Alternative 2 Herbicide Control	Alternative 3 Manual Control
Effects to non-target vegetation from herbicide	No direct effect from herbicide. Highest potential for native plant reduction over time due to weed competition and spread.	Potential adverse effects to native plant species, estimated at a maximum of two acres.	No direct effects to native vegetation from herbicide. Potential for native plant reduction due to weed competition and spread.
Human health risk	No Effect	Minimal risk when safety regulations and mitigation measures are followed. Work days of potential exposure = 0.5/year	Moderate risk of ergonomic injury. Work days of potential exposure = 68/year

Issue	Alternative 1 No Action	Alternative 2 Herbicide Control	Alternative 3 Manual Control
Cost effectiveness	Cost to control weed population = $ 0 Cost of alternate material source = $24,300	Cost to control weed population = $5,462 Cost of alternate material source = $6,480	Cost to control weed population = $67,416 Cost of alternate material source = $16,200
Water quality	Potential to affect aquatic habitats by preventing the establishment of riparian vegetation, increase in streambank instability, and sedimentation	Control is most likely, minimizing the risk to riparian habitats and water quality. Herbicide will not reach stream channels	Intermediate risk to riparian habitats and water quality due to the higher potential for weed spread and affects to native vegetation.
Proposed, Threatened, Endangered, Sensitive species (PETS)	Greatest potential to affect greater sage grouse and Henderson's ricegrass through loss of habitat. No effect to other PETS species	Least potential to reduce greater sage grouse habitat. The potential impact from consumption of herbicide by sage grouse is negligible. No effect to other PETS species.	Loss of native vegetation may affect Henderson's ricegrass and greater sage grouse. No effect to other PETS species.
Heritage resources	No effect	No effect	No effect
Management Indicator Species	Noxious weed spread would affect forage for a variety of species and reduce winter range habitat for big game.	Negligible and immeasurable effects on animals from herbicide. Improvement in forage quality. Risk to other habitats is the least.	Rate of improvement of habitats is less than Alternative 2. Risk exists of spread to native habitats. Habitat degradation is less than Alternative 1.
Migratory birds/Land birds	Greatest modification to habitats used by bird species dependent on sagebrush habitats.	Least risk of habitat modification. The concentrations of herbicide proposed have a negligible potential to affect small birds.	Has an elevated risk of habitat modification as compared to Alternative 2.
Soil productivity	Loss of native vegetation results in risks to sensitive scabland soil types from erosion and reduced productivity.	Herbicide has the potential to affect native vegetation, however, mitigations are incorporated to minimize the effects. Glyphosate is readily degraded by soil microbes and persists in soils for 1-3 weeks.	Longer term risk of loss of native vegetation affecting soil quality and productivity as a result of reduced effectiveness of treatment than Alternative 2.

CHAPTER THREE

ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic 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 bases for comparison of alternatives presented in the chart above.

Issue 1: Effects to Native Vegetation

Measure #1 Acres of native vegetation potentially affected by herbicide application and spray drift.

Existing Condition

The Turnpike Pit medusahead site is located on the east side of the Paulina Ranger District approximately seven miles from the Rager Ranger Station in an area that is characterized by a broad expanse of gentle, undulating hills dominated by bunchgrasses, western juniper, and ponderosa pine. The elevation of the area ranges from 4160' to 4520' above sea level. The area in the immediate vicinity of the medusahead site is dominated by scablands. Scablands are defined as areas of shallow, rocky, residual soil (clay) and sparse vegetation. These soils are subject to severe water saturation and frost heaving during winter, making revegetation virtually impossible (LRMP 1989). The Interior Columbia Basin Ecosystem Management Project considers this vegetation type as a cool shrub zone (Hann et al 1997). Available plant moisture is limiting due to shallow soils and low precipitation, 17 inches per year. As a result of low moisture the vegetation is dominated by stiff and low sagebrush, and bunchgrasses, including, Sandberg's bluegrass, Idaho fescue bluebunch wheatgrass and squirreltail. The desired future condition for sensitive scabland soils is to maintain and ensure the native plant species persist at a natural level in order to afford effective ground cover thereby contributing to soil stability and reduced rates of erosion.

The medusahead infestation, 3 acres, is currently located at a rock pit used by the Forest Service for extracting rock and crushing rock into gravel. The area consists of a central pit surrounded by a number of roads. There is a small spring fed pond located within the pit itself. The weeds are located on a level area on the road and east rim of the pit, where the soil has been modified extensively through compaction caused by heavy equipment, gravel deposition, and soil removal through blading, leaving just a few inches of soil over bedrock. Vegetation here is very sparse and limited to weedy annuals such as cheatgrass and common dandelion. As of the fall of 2004, medusahead had not yet moved into the surrounding native vegetation where disturbance has been less, but is currently directly adjacent. There is also a small population of medusahead that was established in the early summer of 2004, at the junction of the 5840 road and the road leading to the pit.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – This alternative calls for no action, which means no control of medusahead would occur, including no spraying of herbicides. Therefore acreage of native vegetation would not be directly or indirectly affected from herbicide application, or from spray drift. Other effects to native vegetation would occur under this alternative. The medusahead would spread into vulnerable native plant communities, such as stiff and low sagebrush communities on clay soil, where it aggressively out-competes perennial grasses. Where it gains a foothold, it tends to form exclusive stands which are worthless for livestock forage, show increases in soil erosion, increase fire return intervals and are not used by wildlife species (Sheley 1999).

Cumulative Effects – Past activities in the project area include road construction, construction of the rock pit and use by the public. All of which have had a detrimental effect on native vegetation. Topsoil and vegetation have been permanently removed. The species composition in the surrounding area has changed through time. This is likely to have been the result of impacts associated with public uses such as camping, riding ATV's, target shooting, and other recreational pursuits. Weedy species, both native and non-native, occur in higher percentages than in a less disturbed area, making the site more vulnerable to noxious weed infestation.

The Turnpike Pit was used as the primary camp and staging area for suppression activities during the 747 Fire during July and August of 2002. There was further soil disturbance to the pit area and surrounding scablands. The medusahead infestation may have been introduced from equipment brought in to fight the fire.

To reduce the risk of spread of medusahead to other areas, the pit is currently closed to administrative use and no rock is being removed. An informational sign was also placed in the pit area asking public users to limit traffic and disturbance in the weed site. The pit is located in a grazing allotment where livestock use occurs annually. Cattle use in the pit area is low because there is little forage on the scablands, especially in mid-summer. However, cattle do use the pond as a watering source. This increases the potential for spread as seedheads can get caught in the hair or hooves and transported elsewhere. The medusahead was hand-pulled in 2003, and was ineffective at controlling spread. The small population at the road junction was hand-pulled in the summer of 2004.

Future activities planned in the area that might influence the potential spread of the medusahead infestation include the Hardcorner Fuels project, which includes precommercial thinning and prescribed burning. Several burn units are within ¼ mile of the medusahead site. Burning can often create a seedbed for noxious weed introduction. These units are in the direction of the prevailing winds, and along the 5840 road, a major travel route on the District. The burning may result in a higher risk of weed spread due to exposed soil where wind, cattle, wildlife or public travel could deposit medusahead seed.

Alternative 2 – The Proposed Action

Direct and Indirect Effects - Native vegetation has the potential to be directly affected by the proposed action of spraying herbicide to control medusahead. This effect would be limited by a combination of mitigations and the fact that natural vegetation in the area is sparse. The current infestation considered for spraying has sparse cover (less than 10%) of weedy native and non-native plants that would be killed by glyphosate application. The infestation is large enough where the most efficient method of spraying is an ATV-mounted boom sprayer; where herbicide is applied at a constant, even rate. The edges of the infestation that are adjacent to scabland vegetation would be sprayed using a backpack style sprayer, which gives more control where herbicide is applied, for instance, under a sagebrush plant rather than over the top of the plant. Nevertheless some native plants may be killed or weakened by herbicide application.

It is estimated that spraying herbicide would result in a maximum amount of one half acre of native vegetation being killed or weakened. This is based on total mortality within a 25-foot wide perimeter of the infestation where it butts up against scattered native plants. The actual amount of vegetation harmed would be likely much less since a backpack sprayer would be used in application, which can be directed at specific plants.

Indirect effects to native vegetation from spray drift are possible; however the project design minimizes the drift potential. Label directions recommend spraying when wind speeds are less than 15 mph, this project would not spray when wind speeds are greater than 5 mph. Some wind is recommended, when less than two mph, wind direction is variable and inversions are likely which increase drift potential (Dow AgroSciences 1999). Spray drift is also regulated by nozzle size and type. Equipment that produces the largest droplet size is recommended, and is part of the project design. Using a low-boom ground spray, a predicted drift of less

than 100 feet shows a no observable effect concentration on susceptible vegetation, and using a backpack sprayer, little to no drift is expected (SERA 2003). Using the maximum drift prediction of 100' around the perimeter of the infestation, approximately two acres of vegetation have the potential to be weakened by spray drift.

Indirect effects to native vegetation from movement within the soil profile, or root uptake would not occur. Glyphosate adsorbs strongly to soils and is not expected to move through the soil profile or off site through leaching (EPA 1993). Because the herbicide binds to soil particles, it would not harm emerging plants or be taken up by the roots of plants. There is the possibility that overland flows could transport soil particles bound with herbicide during periods of extreme precipitation, however the project design incorporates measures to minimize this likelihood. The slopes in the project area are also generally flat which limits the potential for the transport of soil particles.

Cumulative Effects - Past activities have actually made the potential for effects to native vegetation less. The construction of the rock pit and road permanently changed the nature of the site. The native bunchgrass community that once covered the area is now absent at the pit site. Rock pits invite use by the public. People are drawn to the flat, open area for camping, riding ATV's, target shooting, etc. This further causes damage to native vegetation because the use is never confined strictly to the already disturbed area. Because of this disturbance, rock pits are often chosen for large-scale activities such as fire camps, to avoid impacts to new areas. This was the case for the 747 Fire camp, which is suspected to have introduced the medusahead infestation.

The minor effects to native vegetation described above are not expected to result in a change in the surrounding plant community. An un-checked invasion of medusahead into native plant communities has more of a potential for long lasting effects to plant communities. There would also be less potential for medusahead spread by humans, livestock, wind and wildlife compared to the No Action Alternative.

Controlling the medusahead infestation also reduces the risk of spread from future activities, such as the Hardcorner Fuels project described under the No Action cumulative effects section.

Alternative 3

Direct and Indirect Effects – This alternative calls for hand pulling, which means no spraying of herbicides would occur. Therefore, native vegetation would not be directly or indirectly affected from herbicide application, or from spray drift. This alternative would have less effect to native vegetation through displacement by medusahead than the No Action Alternative, however, the estimated time for control of the infestation (10 years) makes it more likely for spread to occur into native plant communities.

Cumulative Effects – Past and future actions that have affected the area and vegetation are the same as described under Alternative 1. The proposed activity of hand pulling medusahead would not contribute an added effect to native vegetation. Reducing the density of medusahead helps reduce the risk of invasion of native plant communities. Hand methods are highly selective and have little impact on soil.

Issue 2: Human Health Risk

Measure #1 Number of worker days exposed to treatment hazards.

Existing Condition

There are hazards associated with each type of noxious weed treatment, whether it involves hand pulling or spraying herbicides. A hazard is defined as the array of potential effects that an action may induce in an

exposed human or organism. The publication "A Guide to Conducting Vegetation Management Projects in the Pacific Northwest Region" evaluated risk of treatment types which will be used here as a basis of evaluating alternatives. In addition, a new risk assessment has been completed for glyphosate by Syracuse Environmental Research Associates (SERA) under contract by the Forest Service. This risk assessment uses the most recent health effects information and risk assessment procedures.

No herbicides are currently being used in this area. Glyphosate is an approved herbicide for use on the Ochoco National Forest in the 1998 Integrated Noxious Weed Treatment EA that only covered use on weed sites that were known to exist at that time. This EA is being developed to include the turnpike pit as a treatment area where glyphosate may be used. The 1998 EA called for standard operating procedures for using herbicides, the proposed Turnpike Pit project would adapt those procedures.

There are no private lands within the vicinity of the project area, the closest private land is one mile to the southwest, nor are there any municipal or other drinking water sources in the area. The Turnpike Pit is regularly used by the public for recreation purposes, however there is no developed recreation sites within or adjacent to the project area.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – No control of medusahead would occur in this alternative, therefore there are no effects to human health, including zero working days of exposure to any hazards.

Cumulative Effects – No control of noxious weeds using herbicides have occurred in the project area in the past. There was a spotted knapweed area along the Forest Road 58 shoulder, approximately 1.5 miles to the south, where the herbicide Tordon was sprayed from 1995 to 2000. Monitoring shows there has been no incidents of unexpected exposure to the licensed applicator. Incidental manual control (hand pulling) of knapweed has been done along the 5840 Road since approximately 1995 with no known health effects reported. The Ochoco NF has recently initiated an environmental assessment to control noxious weed infestations that have become established since 1998. Herbicide use would be one of the control methods considered for sites along the 5840, 5850 and 58 roads, which are in the vicinity of the Turnpike Pit. This new analysis will also evaluate different herbicides recently developed for control of noxious weeds. At this time, the environmental assessment is in its early stages. Treatment locations and herbicides proposed for use have not been finalized. This future environmental assessment will conduct a comprehensive assessment of the direct, indirect, and cumulative effects associated with any sites proposed for treatment.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Hazards associated with using glyphosate are low. Glyphosate is a non-selective herbicide registered for use on food and non-food field crops as well as non-crop areas where total vegetation control is desired. Glyphosate prevents the plant from producing amino acids that are the building blocks of plant proteins. The plant, unable to make proteins, stops growing and dies (USDA 1997). This metabolic pathway occurs in plants but does not occur in humans or other mammals (SERA 2003). Like all chemicals glyphosate may be toxic at high exposure levels. The EPA, on a scale of I to IV, rates it as a Toxicity Category III with I being the highest degree of acute toxicity. It has also been categorized as a Group E herbicide, one that is non-carcinogenic for humans (EPA 1993).

The active ingredient (a.i.) in Glypro is glyphosate isopropylamine salt, which is 53.8% of the total ingredients, with the other 43.2% being inert ingredients. This equates to 5.4 pounds a.i. per gallon of herbicide (Dow AgroSciences 1999). The reference dose, or estimated daily exposure that would not cause

adverse effects throughout a lifetime, is 2 mg per kilogram of body weight per day (EPA 1993). The estimates of worker exposure for standard herbicide application range from 0.026 mg/kg/day to 0.045 mg/kg/day (SERA 2003).

Other possible hazards include inhalation exposure and dermal exposure. Glyphosate is non-volatile, and therefore has very low toxicity in inhalation studies (EPA 1993). Glyphosate is considered a slight dermal irritant, and is rated as a Toxicity Category IV by the EPA. Dermal absorption studies indicate glyphosate is very poorly absorbed into the skin, with very low risk or effects from skin exposure. Of all the exposure incidents reported, 98% resulted in no injury. The remaining 2% of the incidents were classified as temporary injuries, which included injuries such as stinging and blurred vision. There have been no reports of permanent injury to the skin or eyes from exposure (SERA 2003).

In considering the above findings on glyphosate, general exposure hazards and risk to workers are considered minimal. Spraying three acres of medusahead is expected to take approximately two hours twice per year resulting in 0.5 days of potential exposure time. Mitigations measures have been incorporated into Alternative 2 to minimize the potential for exposure, see the Alternative description in Chapter 2 for a list of mitigations.

The highest exposure risk to workers is accidental exposure, which involves handling the chemical in its undiluted state while preparing the tank mixture (adding glyphosate to water in the tank). Skin and eye irritation is possible if an accident occurs and the worker is not wearing the personal protective equipment required by the herbicide label. This may require medical attention for temporary effects from exposure.

Cumulative Effects – the Crook County Weed Master, a State of Oregon Certified, professional Herbicide Applicator, would apply the glyphosate at the Turnpike Pit. This occupation results in a high risk of repeated exposure to different herbicides. An additional one-half day per year of applying a low toxicity, non-carcinogenic herbicide is expected to add little exposure hazard to the worker. There have been no herbicide spills on the Paulina Ranger District since herbicide spraying of noxious weeds began in 1995, nor has the Crook County Weed Master had accidental exposure while mixing or transporting herbicide (Alexanian pers. comm.). Long-term worker health effects fall into two categories, synergistic effects and additive cumulative effects. Synergistic effects come from exposure to multiple chemicals that interact other than by additive effects. Additive effects are repeated exposures to the same chemical. Both scenarios are possible for the herbicide applicator. The potential for these cumulative health effects are low. Most herbicides do not bioaccumulate in humans, they are rapidly eliminated from the body, and they persist in the environment for short periods of time (USDA 2004).

Alternative 3

Direct and Indirect Effects – Manual treatment of the medusahead site includes hand pulling plants and possibly using non-powered hand tools such as a hoe. Most removal is expected to be by hand pulling since it is easier than digging with a hoe. Flowering plants can easily be pulled and bagged, which allows the seed source to be physically removed from the site. Inherent hazards of manual labor include:

- Exposure to adverse weather conditions, including extreme cold and heat, which can be exacerbated by very dry or wet conditions.
- Slipping or tripping.
- Insect bites and stings.
- Sharp edges on tools, if used.
- Minor cuts, sprains, bruises and abrasions.
- Ergonomic injury from bending, crouching, lifting and repetitive motion.

In the case of hand-pulling medusahead, the greatest hazard would be musculo-skeletal injuries related to improper body mechanics. Based on several medusahead populations that were hand-pulled elsewhere on Paulina Ranger District in 2004 (up to ¼ acre in size), it is estimated that the Turnpike Pit population would take 42 person days for one treatment at this site. A second treatment is anticipated to be necessary before seed maturity. This treatment would probably take fewer person days, approximately 40% less time, or an additional 26 person days. This results in a total of 68 person days in the first year, all of which would be days exposed to the potential hazards listed above. Hand treatment of medusahead is not often used as a control method, and is known to be marginally effective (Sheley pers. comm.) therefore it is not unreasonable to expect that the total treatment days each year would decrease only slightly.

The potential for hazard exposure (risk of injury) increases when workers are fatigued, poorly trained, or poorly supervised (USDA 2004). Proper training would be provided, and compliance with the Occupational Health and Safety Administration standards would be followed, reducing the risk of injury to the worker.

Cumulative Effects – The cumulative risk of injury from weed pulling is great. This risk can be applied to an individual worker who is involved in the control efforts each year or to the Forest Service employees cumulatively over time. Control is estimated to take 10 years; the potential for injury occurring to any one individual over the life of the project is considerable. Chronic exposure to hand pulling noxious weeds may lead to injury, such as carpal tunnel syndrome or back problems, that manifest themselves at a later date. This risk is probably greatest for the District Weed Coordinator, who would be involved in hand pulling projects throughout the field season, for many years.

Hand pulling of noxious weeds other than medusahead, is common practice on the National Forest. Over the last three years Paulina Ranger District spent 746 person days controlling weeds using manual means, including grubbing with hand tools such as hoes and pulaskis. Contract labor was responsible for 92% of these days. Known lost time equals 5.5 days due to blisters, arm sprain and muscle strains.

Concentrated hand pulling of weeds would continue in the near future. Plans for 2005 include a minimum of 250 person days. Planning efforts are underway to analyze the use of herbicides on noxious weed infestations established after 1998. When finalized, this would lower the amount of manual treatment done each year.

Measure #2 Area (in acres) of potential exposure to the public from treatment.

Existing Condition

There is no private land, developed campgrounds, cropland or drinking water sources within or adjacent to the project area. The nearest private land is one mile to the southwest, and the closest residence is 3.5 miles to the southwest. The Turnpike Pit area is intermittently used for recreational purposes such as camping, shooting and parking. Native Americans gather root crops and other plant materials from the Paulina Ranger District.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – No control of medusahead would take place under the No Action alternative, therefore no area would pose a potential risk of exposure to the public.

Cumulative Effects – The Paulina Ranger District treats noxious weeds with herbicides in accordance with the Integrated Noxious Weed Management decision from 1998. An average of 18 net acres per year are treated with the herbicides picloram, glyphosate and dicamba. This treatment is primarily along road shoulders, where most infestations occur. Other infestations occur within rock pits, conifer plantations, and skid roads and landing areas from timber sale activities. The amounts of herbicide applied in the past three years are:

2002 – 2.8 gallons
2003 – 4.0 gallons
2004 – 5.7 gallons

It is unlikely that the public is exposed to these spraying activities; they are done selectively using an ATV-mounted wand sprayer or a backpack sprayer, no truck-mounted boom sprayers or aerial spraying is done on the District. Herbicide spraying does not occur when the public is present at the site.

The Ochoco NF has recently initiated an environmental assessment to control noxious weed infestations that have become established since 1998. Herbicide use will be one of the control methods considered for sites along the 5840, 5850 and 58 roads, which are in the vicinity of the Turnpike Pit. This new analysis will also evaluate different herbicides recently developed for control of noxious weeds. At this time, the environmental assessment is in its early stages. Treatment locations and herbicides proposed for use have not been finalized. This future environmental assessment will conduct a comprehensive assessment of the direct, indirect, and cumulative effects associated with any sites proposed for treatment. This additional herbicide application increases the risk of public exposure as described above.

Alternative 2 – Proposed Action

Direct and Indirect Effects – Risk of exposure to the public from herbicide spraying the medusahead infestation is low. Mitigation measures to minimize public exposure are a part of the project design for this alternative see, Chapter 2 for a list of mitigation measures. There are two ways the public may be exposed to glyphosate as proposed in this alternative:

1) Exposure to herbicide drift during application.
2) Exposure to contaminated soil, water or vegetation.

The risk of exposure during herbicide application is unlikely but not impossible. Spraying would not take place if members of the public were present at the project area. It is possible however, for a hiker, ATV rider, or hunter to enter the area from adjacent lands, unknowingly, while spraying is commencing. In this scenario herbicide drift may result in dermal exposure to the public. The treatment area is three acres, and as explained in Issue #1, herbicide drift potentially adds an additional two acres of area, resulting in a maximum five-acre area that the public could enter. Glyphosate is not readily absorbed by the skin, and is rated as a slight irritant, Category IV of IV (EPA 1993). Mitigations measures have been incorporated into Alternative 2 to minimize the potential for exposure. See the Alternative description in Chapter 2.

The risk of exposure to the public from contaminated soil, water or vegetation is also low. Glyphosate adsorbs strongly to soil and is not expected to move through the soil profile or off site through leaching, it stays within the top 6 inches of soil and there is no risk of contaminating ground water (EPA 1993). The half-life of glyphosate is 7-8 days, it metabolizes into amino methyl phosphoric acid (AMPA), then into carbon dioxide. If consumed, glyphosate and AMPA are both eliminated from the body through urine and feces, neither are broken down by the body or absorbed by tissue.

Digging of root crops by Native Americans is possible in the scablands surrounding the Turnpike Pit. This area is not known to be a gathering area, but desirable root crops such as bitterroot, wild onions and lomatium, are present near the project area. Following label directions and mitigation measures, drift potential for the herbicide is 100 feet beyond the edge of the infestation, potentially exposing two acres of native vegetation. Plants do not take up glyphosate through the root system, therefore dietary consumption of glyphosate is not possible. Risk of exposure would come from dermal contact through handling contaminated plant foliage.

The re-entry level for areas sprayed with glyphosate is 12 hours, after this time, the herbicide dries and exposure is minimal. Signs would be posted near the project area to further minimize the exposure hazard.

Cumulative Effects – Spraying herbicide on medusahead at the Turnpike Pit location only slightly raises the possibility of cumulative risk of exposure to the public. See the Cumulative Effects section under Alternative 1 for past and future herbicide application information.

Alternative 3

Direct and Indirect Effects – This alternative proposes to control the medusahead infestation by manual means, which include hand pulling and digging with non-motorized tools. The general public is not exposed to any hazards from this treatment.

Cumulative Effects – See the Cumulative Effects section under Alternative 1 for past and future herbicide application information. Manual control of medusahead at the Turnpike location does not raise the possibility of cumulative risk of exposure to the public. Manual control of noxious weeds occurs across the Paulina Ranger District, machinery, or other motorized tools are not used. This practice is expected to continue in the future, and poses no exposure hazards to the public.

Issue 3: Cost of Treatment

Measure #1: Cost per acre by treatment type.

Existing Condition

Management of noxious weeds on the Paulina Ranger District is accomplished through Forest Service appropriations, and grant monies such as Title II (Payment to Counties Act). Previous treatment in the project area is limited to a small medusahead infestation at the intersection of the 5840 road and the road that accesses the Turnpike Pit. This site was hand pulled in 2004. Monitoring of the medusahead population by Forest Service personnel is also occurring each year.

Environmental Effects

Alternative 1- No Action

Direct and Indirect Effects – The No Action alternative would not expend funds to control medusahead in the project area. The estimated cost for implementing Alternative 1 is zero dollars.

Cumulative Effects – Treating the small associated population at the road intersection would continue in an attempt to keep the medusahead from spreading beyond the intersection. This would help keep the main population confined to the pit for as long as possible. The infestation is small, approximately 10’ x 20’. The cost of this treatment is approximately $80. This treatment is expected to continue twice per year in the future, for a total cost of $160 per year. Monitoring of the Turnpike Pit medusahead population would also continue once per year at an approximate cost of $40 per year. In the long-term (10 years) the infestation is expected to spread to over 5,100 acres (see Issue 4). At that level of infestation, herbicide would be the practical means of control and would cost approximately $450,000 at today’s rate.

Alternative 2 – Proposed Action

Direct and Indirect Effects – This alternative proposes to control the medusahead infestation with the herbicide glyphosate. Glyphosate would be applied by contract using an ATV-mounted boom sprayer, and by backpack sprayer applied by Forest Service personnel twice per year. Control is estimated to occur within four years.

By years three and four, there would be less backpack work necessary, and less herbicide applied. Monitoring would take place over a ten-year period. Table 2 outlines the cost of treatment over time.

Cumulative Effects – Treatment and monitoring of the associated medusahead site at the road junction near the Turnpike Pit would continue twice each year until eradicated, at a total cost of $160 per year.

Table 2. Cost of Implementation – Alternative 2

Year	Backpack Spray Costs	Herbicide and Contract Cost	Monitoring Costs	Total
1 and 2	$580	$1290	$596	$2,466
3 and 4	$360	$1200	$596	$2,156
5 through 10	$0	$0	$840	$840
			TOTAL	$5,462
			TOTAL COST PER ACRE	$1,821

Alternative 3

Direct and Indirect Effects – This alternative proposes to control medusahead by using manual labor, handpulling the infestation. Control efforts would be done twice per year; this analysis projects costs through year 10, however it may actually take longer. Due to the highly invasive nature of medusahead an aggressive effort is necessary, therefore a crew would be hired rather than rely on volunteers or youth groups. Through time, it is estimated that control would take fewer days, and at year five could be accomplished by a youth group such as the Youth Conservation Corps.

Table 3. Cost of Implementation – Alternative 3

Year	Contract Costs	Administrative Costs	Monitoring Costs	Total
1 through 4	$42,676	$11,520	$560	$54,756
5 through 10	$6,720	$5,100	$840	$12,660
			TOTAL	$67,416
			TOTAL COST PER ACRE	$22,472

Cumulative Effects – Treatment and monitoring of the associated medusahead site at the road junction near the Turnpike Pit would continue twice each year until eradicated, at a total cost of $160 per year.

Measure #2: Cost to Government in having to use alternative material sources.

Existing Condition

A prevention measure was put in place in 2004, in an attempt to slow the spread of medusahead. This measure prohibits the use of materials. No rock or gravel was removed from the pit in 2004. Based on the last 10 years, the Paulina Ranger District used an average of 2,500 cubic yards of rock annually, valued at $3,795 per year. The Turnpike Pit supplies crushed rock, a more valuable material compared to many other pits. The fair market value of crushed rock is $6.40 per cubic yard. Turnpike supplied 25% of the value of material used on the District during this ten-year period.

As a result of the closure of the pit in 2004, the District incurred $2,394 of additional cost to the Government. This is due to the need to purchase rock from a private source and additional haul costs associated with using Government-supplied rock from pits further away for maintenance projects such as Rager Airstrip, South Fork Trailhead, and Mud Springs Campground. Several projects, including spot-rocking the 5840 road and the entrance to Frasier campground, were deferred due to budget constraints. These projects did not have sufficient funds to cover rock purchase and haul.

Environmental Effects

Alternative 1- No Action

Direct, Indirect and Cumulative Effects – If the medusahead infestation is not controlled, the Turnpike Pit would remain closed to administrative use resulting in a direct loss of a material source that provides high quality crushed aggregate. In addition, increased costs to the Government would continue from either hauling rock from other material sources further from project areas or the purchase of rock when crushed aggregate is required. Rock haul costs are approximately $2.42 per cubic yard of material. See Table 4 below for projected costs associated with increased haul costs. Indirect effects would occur from deferring projects into the future; it is not unreasonable to expect rock prices and transportation costs to increase through time, further adding expense to future projects. This results in the ability to accomplish less road maintenance.

Through time, the Government would loose access to the mineral material available at the pit, which is valued at $88,000. The Willowpine fuel reduction and vegetation management project (1 million board feet) is a foreseeable action that may require spot rocking and maintenance of existing roads. Although not in the immediate vicinity of the pit or within the estimated area of medusahead spread, Willowpine would require rock to be hauled in from other pits on the district. There are other undeveloped material sources in the general area of Turnpike Pit that have comparable quality crushed aggregate, including Beaver, 4 miles away, and Brer Rabbit, 14 miles away. To provide material, these sites would require environmental analysis to expand the areas beyond existing disturbance limits. In addition, all available material sources would need updated, long-term management plans.

Alternative 2- Proposed Action

Direct, Indirect and Cumulative Effects – Controlling the medusahead infestation with herbicide would make rock material available faster than the other alternatives. It is expected that the pit would be available for use within four years, at which time additional expenses of rock purchase and haul would end. See Table 4 below for projected costs associated with increased haul costs. The Turnpike Pit has large quantities of high quality material, capable of providing asphalt-grade aggregate. There would be no need to complete additional environmental analysis since the pit would be available in the short term. The exact dates of log haul from the Willowpine project is not known, but the buyer is usually given 4 to 5 years after purchase to complete operations. Purchase is expected in 2006. Rock material would be available for this project from the Turnpike Pit starting in 2008.

Alternative 3

Direct, Indirect and Cumulative Effects – The pit is expected to remain closed for approximately 10 years during manual treatment efforts. During this time period the District would incur additional costs for projects requiring crushed rock. Effects are based on the cost of hauling material from other currently developed and available sources, namely Six Corners Material Source, 25 miles away. It is estimated that there would be an additional $8,100 of increased cost for projects scheduled in the next five years (see the Geology Report in the Analysis File for the list of projects). Table 4 depicts the comparison among alternatives projected for 15

years, assuming additional haul costs would continue for each 5 year period at the same rate as the currently scheduled projects.

Table 4. Projected Increased Costs by Alternative

Haul costs associated with a 5-year maintenance schedule	Alternative 1	Alternative 2	Alternative 3
Years 1 through 5	$8,100	$6,480	$8,100
Years 6 through 10	$8,100	$0	$8,100
Years 11 through 15	$8,100	$0	$0
TOTAL COST	$24,300	$6,480	$16,200

Issue 4: Treatment Effectiveness

Measure #1 Plant Density Reduction and Potential for Spread

Existing Condition

Treatment effectiveness can be determined by two factors 1) the control measure's effect on the medusahead density (how many plants are left) and 2) the potential for the residual plants to spread beyond the existing site. Noxious weed spread depends on several factors including: a receptive seedbed, climate, prevention measures, and vectors of spread such as wind, water, animals and humans; predicting spread is therefore based on professional judgment.

The area in the vicinity of the medusahead site is shallow, rocky, residual soil (clay) and sparse vegetation. The elevation of the area ranges from 4160' to 4520' above sea level and prevailing winds are from the southwest. Available plant moisture is limiting due to shallow soils and low precipitation, 17 inches per year. As a result of soil type and low moisture the vegetation is dominated by stiff and low sagebrush, and bunchgrasses, including, Sandberg's bluegrass, Idaho fescue, bluebunch wheatgrass and squirreltail. The Interior Columbia Basin Ecosystem Management Project considers this vegetation type as a cool shrub zone (Hann et al 1997).

The medusahead went from less than $1/100^{th}$ of an acre when discovered in the spring of 2003; to 3 acres in the summer of 2004, despite manual control efforts in 2003. This represents a substantial increase in just over one year's time. There is also a small satellite population of medusahead that was established in the early summer of 2004, at the junction of the 5840 road and the road leading to the pit.

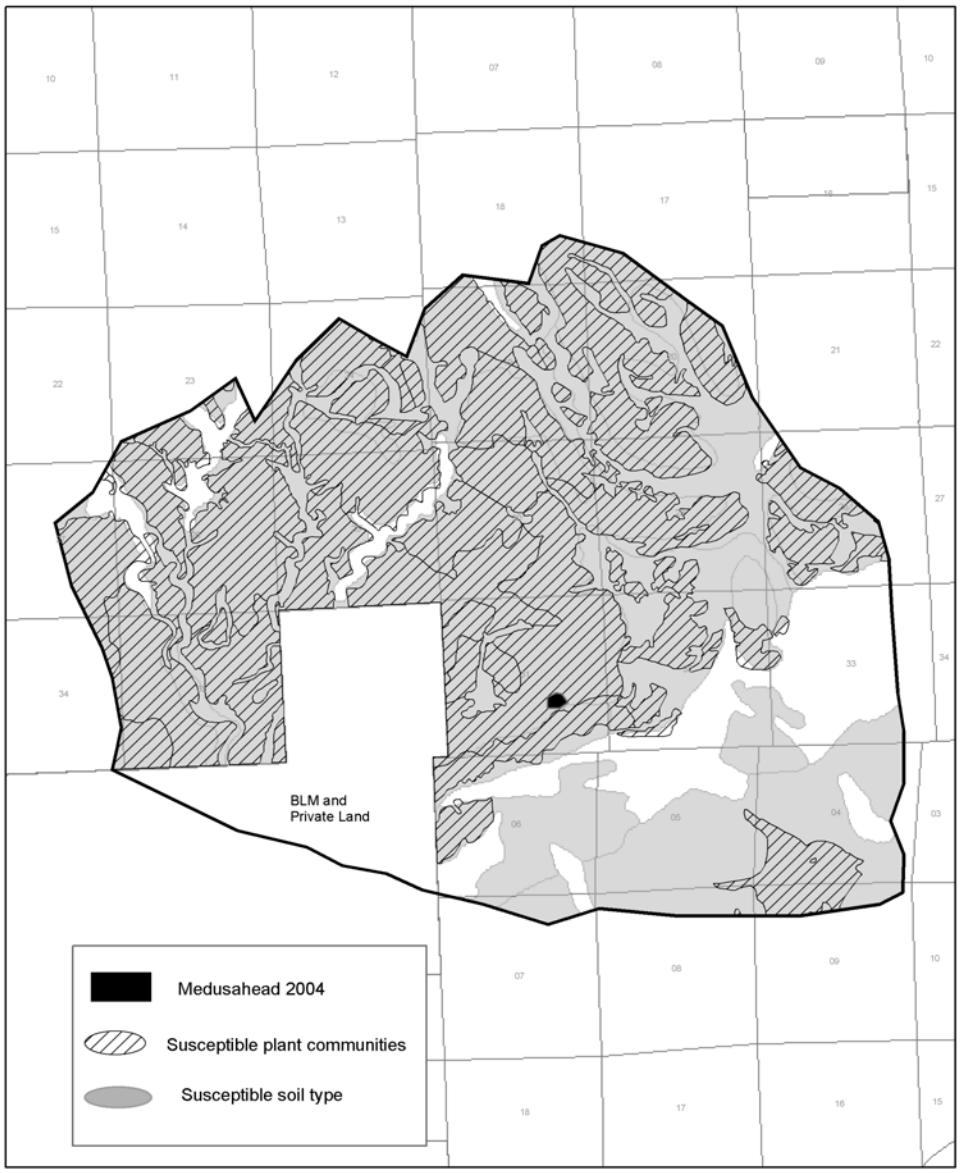
Environmental Effects

Alternative 1- No Action

Direct and Indirect Effects – The No Action Alternative would not use control methods to stop or slow the spread of the medusahead population. Density of the population would increase and spread outside the pit area is certain. The open low sagebrush plant communities on heavy clay soils that dominate the area surrounding the Turnpike Pit are a preferred habitat for medusahead (Young and Evans 1970). This cool shrub zone vegetation type is particularly vulnerable to noxious weed invasion (Hann et al. 1997). Medusahead is a winter annual, taking advantage of soil moisture before native plants. This along with being a prolific seed producer, makes the plant a highly aggressive invader which spreads quickly. Sheley (1999) reports that since the discovery of medusahead in southwest Oregon, it has spread to over one million acres across Oregon and Washington, within 100 years (and to over 5 million acres in California within 100 years).

If the population continued to spread at the same rate as last year, there potentially could be over 175,000 acres influenced by medusahead within 10 years. However, not all years are expected to be as prolific seed production years as 2003/2004, nor is there potential medusahead habitat to that extent in the area. Within a 3 mile radius surrounding the current infestation, there is approximately 8,175 acres that are potentially susceptible to invasion, this was determined using an elliptical shaped zone of potential increase, based on prevailing winds, soil type, and topography. Within this area there are certain vegetation types more susceptible to invasion than others. These include plant communities dominated by grass, low sagebrush,

Figure 3. Plant Communities and Soil Types Susceptible to Medusahead Spread.



western juniper, and low productivity ponderosa pine. Intersecting these susceptible vegetation types with soil type and topography results in 5,175 acres that are highly susceptible to medusahead invasion. See Figure 3 for a map of the described area.

The most probable vector of spread of this population is wind. Strong winds from the southwest blow across the scab flats all year long, but particularly in the winter and spring, pushing the seed into receptive habitat at a time of the year when germination is likely. Other vectors include livestock, wildlife and human activities. Human transport of seedheads is of particular concern because new infestations can be started far from the Turnpike Pit, and may go undetected until they are quite large. Current prevention measures taking place (informational signs and administrative closure of the pit) is expected to slow the spread of medusahead, especially the likelihood of transporting medusahead seed to other parts of the District by heavy equipment.

Based on current spread rates of the Turnpike medusahead population, historical medusahead spread, and local vectors, it is not unreasonable to assume that 5,175 to 8,175 acres would be impacted by medusahead within 10 years.

Cumulative Effects – Past activities in the project area including road construction, construction of the rock pit and recreation use by the public, has had a detrimental effect on native vegetation. Constant disturbance has compacted soil and changed species composition, making the area more susceptible to noxious weed invasion. The Turnpike Pit was used as the primary camp and staging area for suppression activities during the 747 Fire during July 2002. There was further soil disturbance to the pit area and surrounding scablands, and medusahead may have been introduced from equipment brought in to fight the fire.

Current use of the pit that may influence the spread of medusahead includes livestock grazing. Cattle can transport medusahead seed in their hair or hooves. Cattle use in the pit area is low because there is little forage on the scablands, especially in mid-summer, but they do use the pond as a watering source, which may spread medusahead. No control treatments on the main medusahead infestation have been done to date. The small population at the road junction was hand-pulled in the summer of 2004, and will continue into the future.

A future activity planned in the area that may affect the rate of spread of the medusahead infestation is the Hardcorner Fuels project, which includes precommercial thinning and prescribed burning. Several burn units are within ¼ mile of the medusahead site. Burning can often create a seedbed for noxious weed introduction. These units are in the direction of the prevailing winds, and along the 5840 road, a major travel route on the District. There are 414 acres of burning planned within the projected zone of spread. The burning may initially result in a faster rate of weed spread due to exposed soil where wind, cattle, wildlife or public travel could deposit medusahead seed. Through time, the reduction of understory pine and juniper would allow more light and less competition for resources for native herbaceous vegetation, which is expected to result in increased plant vigor.

Alternative 2 – Proposed Action

Direct and Indirect Effects – Spraying the medusahead with herbicide is expected to substantially reduce plant density, and effectively check the rate of spread the first year. Glyphosate would kill or severely weaken all medusahead plants it comes in contact with, thus diminishing the population and preventing further seed production. Plants are killed both in the leaf and flowering stages.

This alternative proposes two treatments per year, one month apart, to ensure most germinated plants are killed, and little seed production occurs during the year. Dave Langland, a noxious weed specialist with the Oregon Department of Agriculture, anticipates a 95% density reduction after the first herbicide application. The second application, one month later, is expected to further reduce the residual plant density another 90 to 95%, leaving very few plants on site with little opportunity to spread. However, climate could have an affect

on the population density. For example, a fall season with cool temperatures and abundant rainfall could stimulate germination of the seed bank late in the year. This is a compact, confined infestation at present, with the herbicide effectiveness; it is not expected to spread beyond current boundaries in spite of new germination. Prevention techniques and mitigation measures, such as not using rock material from the pit, are expected to further reduce the risk of medusahead spread.

Treatment would continue each year until the seed bank in the soil is depleted. Lesser amounts of herbicide would be needed in successive years, and the infestation is expected to be controlled within 4 years or less.

Cumulative Effects – Past activities affecting medusahead density and potential spread are the same as reported for Alternative 1. Current activities including recreation, livestock and big game use of the area would have less potential to spread weeds compared to the other alternatives. Medusahead individuals would be killed each year, leaving only the seed bank in the soil deposited through 2004 that could be spread. There would be very few standing medusahead plants with seed that are susceptible to spread by any vector. The Hardcorner Fuels project may provide a receptive seedbed for medusahead; however the potential for spread is reduced by herbicide spraying.

Alternative 3

Direct and Indirect Effects – Hand pulling medusahead plants and taking the seed off-site for disposal would reduce the density of the population. Residual plants left on site would be higher when compared to Alternative 2, and would therefore have more potential for spread. Small medusahead sites elsewhere on the District are being hand pulled with some success. On sites less than ¼ acre in size, the density is reduced 30-50%. Medusahead is easy to pull when seedheads are on the plant, but pulling grass leaves is intricate work. Because this is a large site with a high plant population, the lower figure is expected to be more realistic.

With the proposed two treatments per year, it is estimated that about a 33% reduction in density would occur each year of treatment. Control of the population is expected in 10 years. Mitigation and prevention measures designed as a part of this alternative would help reduce the chance of spread. In particular, working the site from the outer perimeter would help contain the infestation. However, there is still a high potential for spread beyond the existing perimeter due to the remnant population left on site after control efforts, especially during the early years of treatment. This is demonstrated by the fact that this site expanded from less than 1/100th of an acre to 3 acres in 2004, even with some hand pulling treatment.

Cumulative Effects – Past activities affecting medusahead density and potential for spread are similar as reported for Alternative 1, however adjacent disturbed native plant communities would be at a higher risk of medusahead invasion due to the residual plant density after control efforts. The potential for spread by cattle, wind, and wildlife is higher for the same reason.

Future activities, including road maintenance and the Hardcorner Natural Fuels project are more likely to have additional effects under this alternative in comparison to Alternative 2, due to the expected residual medusahead density and length of time till the infestation is controlled. Burn units adjacent to the 5840 Road, less than ¼ mile away, are particularly vulnerable to medusahead establishment if bare soil is created, or if native plants are weakened as a result of fire intensity.

Other Concerns: Water Quality

Measure #1 Potential Effects to Water Quality Parameters

Existing Condition

The Turnpike Pit Material Source is located at the headwaters of Bronco Creek, an intermittent tributary to Beaverdam Creek (HUC=170703030801) a non-anadromous subwatershed. For much of their length, Beaverdam and Bronco Creeks are commonly dry in the summer months. The project area lies in a largely flat scab near the ridgeline and is approximately 1800 feet away from the nearest stream channel. Beaverdam Creek was added to the Oregon Department of Environmental Quality (DEQ) 303(d) list of impaired water bodies in 1998 for violation of temperature criteria. No information exists to describe water quality conditions in Bronco Creek since it is largely intermittent or ephemeral on the Ochoco National Forest (and completely so within the vicinity of the Turnpike Pit).

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – No direct effects to water quality would occur from implementing Alternative 1. Indirect effects will be negligible or slightly negative. Continued expansion of medusahead populations would likely have no affect on water quality conditions or possibly preclude the recovery of properly functioning conditions. Properly functioning water quality conditions could be affected, as medusahead is likely to become established in riparian areas with dry, shallow, clay soils. This could prevent the establishment of future riparian vegetation such as willows that would have a beneficial effect on stream temperatures. Any establishment of medusahead alongside the stream channel would result in areas of localized streambank instability and increase in-channel sediment production.

Cumulative Effects – Adverse cumulative effects to water quality under Alternative 1 may occur but would likely be limited in severity. Continued livestock grazing would probably help spread medusahead to riparian areas. Where it becomes established, localized bank instability may occur and an increase in sediment production is likely. Prescribed fire activities associated with the Hardcorner Fuels project may have nearly the same effect by creating sections of bare ground where fire has been allowed to back into riparian areas. Medusahead could establish here and again increase sediment production.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Alternative 2 will yield no direct effects to, and a very low possibility of indirect effects to water quality. No direct flowpaths are evident at the proposed treatment site and the nearest channel is approximately 1800 feet away. This distance is more than sufficient to negate any potential negative effects to water quality in Bronco Creek. The only nearby water is a small, perennial pond at the bottom of the Turnpike Pit, and mitigations for drift will reduce impacts within the Pit.

The current Programmatic Biological Assessment for the Deschutes and Ochoco National Forests (USDA 2004b) concludes that INFISH riparian buffers (RHCAs) are sufficient to filter any potential negative effects from herbicide application. It allows for the use of herbicides outside of riparian areas in non-anadromous watersheds.

Any herbicide that is not taken-up by vegetation will quickly bind with soil particles. The affinity for glyphosate to bind with soil particles for the duration of its lifespan means that little possibility for interaction with groundwater exists (DOW 1999). The half-life of glyphosate is 20-40 days; therefore, the possibility of the herbicide/surfactant reaching a stream channel during the dry summer months is extremely low. Some potential does, however, exist for very intense spring rainfall events to carry contaminated soil away from the application site. Due to the distances involved and the effectiveness of vegetation at filtering contaminants, this still is not expected to reach stream channels. Moderate intensity, sustained precipitation events are more

common during the winter in this area, by which time the chemicals will be practically inert. This conclusion is also supported by surface water and groundwater modeling (GLEAMS) assessments conducted during the SERA Risk Assessment (SERA 2003).

The only possibility of direct effects on water quality exists at the small pond in the Turnpike Pit. Although no aquatic animals have been observed here, the possibility of overspray exists if wind conditions are conducive during spraying. The prescribed mitigations concerning wind speed and direction should be adequate to prevent any herbicide reaching this pond.

Cumulative Effects – Under Alternative 2, glyphosate will not reach stream channels due to the disconnected nature of the treatment site and the distance to the nearest channel. Prescribed fire activities under the Hardcorner Fuels project are currently only slated for lands in the adjacent Wind Creek watershed. The only way that glyphosate could reach Wind Creek would be via considerable drift and further facilitated through an increase in bare/burned soil. Prescribed fire would also have to "escape" into the Beaverdam Creek subwatershed to have any cumulative effect on water quality under Alternative 2. Alternative 2 would produce additional bare ground, but of insufficient quantity, to affect water quality in any stream.

Alternative 3

Direct and Indirect Effects – Alternative 3 (manual control) wouldl result in no direct or indirect effects to water quality assuming effective control is achieved.

Cumulative Effects – Alternative 3 would have no cumulative effect on water quality, although there is a slightly greater risk that medusahead would spread to riparian areas since it would probably take longer to control. Similar to Alternative 2, Alternative 3 would cumulatively produce additional bare ground, but of insufficient quantity, to affect water quality in any stream. Prescribed fire activities under the Hardcorner Fuels project are currently only slated for lands in the adjacent Wind Creek watershed. Prescribed fire would also have to "escape" into the Beaverdam Creek subwatershed to have any cumulative effect on water quality under Alternative 3.

Other Concerns: Proposed, Endangered, Threatened, Sensitive Aquatic, Wildlife, and Plant Species

Measure #1 Effects to Aquatic Species

Existing Condition

There are no known occurrences or habitat for threatened, endangered, or sensitive aquatic species (fish or amphibians) within the immediate project area. A biological evaluation for aquatic species is on file at the Paulina Ranger District. No Effect determinations have been made for the following threatened species: bull trout and Mid-columbia steelhead trout, based on the fact that no habitat exists within the project area. No Impact determinations have been made for the following Region 6 Sensitive Species: Columbia spotted frog, westslope cutthroat trout, and redband trout.

Resident redband trout (*Oncorhynchus mykiss gairdneri*) are a sensitive species designated by the Regional Forester and an Ochoco National Forest management indicator species. They are known to inhabit downstream portions of Bronco and Beaverdam Creeks. The distance downstream to where fish populations are known to exist is approximately 2.7 stream miles (via the channel to the north of Turnpike Pit) and 2.9 stream miles via a channel to the south. In addition, a field visit confirmed that no continuous flowpaths were

evident in the vicinity of the proposed treatment area and nearly all surface water appears to infiltrate before reaching a channel. The Columbia spotted frog is the only amphibian on the Region 6 Sensitive Species list found in this watershed.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – No direct impacts are expected to any aquatic PETS species. The project area does not contain habitat and there is no presence of species documented. There is some potential that fish populations downstream could be affected indirectly through upstream changes in habitat, particularly an increase in sediment production resulting from medusahead out-competing native plants and leading to localized areas of bank instability. While there is probably very little amphibian habitat available in the immediate vicinity of the project area, there is the potential to see it reduced in a similar fashion as described for fish populations.

Cumulative Effects – The Turnpike Pit material source is not likely having any significant effect on fisheries resources due to the disconnected nature of the site. Other past and ongoing activities in this area include livestock grazing, dispersed site recreation, and the "747 Fire" in July of 2002. Livestock grazing continues in this area and although little utilization of the pit itself has been observed, potential to further spread medusahead into riparian areas via domestic livestock, wildlife, and public use exists under Alternative 1. This would not affect fish directly but through subtle changes in stream habitat over time. Reasonably foreseeable prescribed fire activities (associated with the Hardcorner Fuels CE), however, might have the effect of producing localized areas of bare ground where it has backed into Riparian Habitat Conservation Areas (RHCAs). Consumption of the vegetation, litter, and duff could prepare the site for potential medusahead establishment. Seed that is locally available could easily be transported by wind, water, or animals. A proposed burning unit lies just east of Forest Road 5840 and it is likely that medusahead would then begin to spread east into the Wind Creek subwatershed under this alternative.

The cumulative effects of no-action to amphibian populations could include a further reduction in available habitat. As livestock, ungulates, and wind disseminate medusahead farther from the Turnpike Pit it is more likely to affect nearby amphibian habitat. Since habitat is known to exist within the Beaverdam Creek subwatershed, susceptible sites could become drier as a result. A local shift in species composition is possible if enough habitat were lost, particularly through additive losses from livestock trampling, compaction, hummocking, and headcutting (i.e., loss of water table) of riparian areas. Consumption of vegetation and litter in riparian areas by fire may contribute to conditions for medusahead colonization.

Alternative 2 – Proposed Action

Direct and Indirect Effects - The implementation of Alternative 2 (Proposed Action) would have no effect on T&E species and no impact on sensitive species. The site characteristics are such that the area is hydrologically disconnected from any stream channel and no direct flowpaths are evident. The site lies approximately 1800 feet from the closest channel and the nearest known fish populations are 2.7 miles downstream. Technical grade glyphosate is toxicologically inert to both fish and amphibians, although some commonly mixed surfactants are not. Any residual glyphosate and its associated surfactants would immediately bind with soil and thus be less likely to travel to streams. For this same reason interactions with groundwater are also highly unlikely.

Cumulative Effects – SERA (2003) concludes that glyphosate has a "minimal" [direct] effect on fish and, due to the distal nature of the site to any fish populations, it is expected that the cumulative effects of Alternative 2 is negligible. Control of this population would minimize the likelihood of medusahead establishment in a

riparian area, either in existing areas of bare ground, or new ones created from prescribed or natural fires. Alternative 2 would not affect stream habitat negatively in any way. The Turnpike Pit Material Source is hydrologically disconnected from Bronco Creek and thus the cumulative effect of this action will not combine to degrade stream channels or injure fish. The only reasonably foreseeable action likely to occur in this sub-watershed is the application of prescribed fire with the Hardcorner Fuels project. A proposed unit lies directly east of the Turnpike Pit off Forest Road 5840. Prescribed burning may take place in the spring in this area, thus potentially interacting with glyphosate that may still be present in the soil. Consumption of the ground cover as a result of prescribed or natural fire would reduce the effectiveness of vegetation at filtering any possible overland flow. Glyphosate rapidly binds with soil particles and SERA (2003) reports numerous studies that have determined its half-life in soil to be 20-40 days. Thus, the removal of vegetation from spring burning might increase the risk of glyphosate reaching a stream channel since the herbicide application will take place in March and June of each year. However, as stated previously, no concentrated flowpaths are evident and the ground is actually quite flat. Mitigations for drift would further reduce any likelihood that soils would even be contaminated outside the current extent of the infestation, see Chapter 2 for a list of mitigations.

There would be no net cumulative effect to Columbia spotted frogs through implementation of Alternative 2. Frogs are not known to exist within the Beaverdam Creek sub-watershed and certainly not within the intermittent channels of Bronco Creek. Any herbicide possibly reaching the stream would be bound to sediment and in extremely minute quantities. Livestock grazing will continue to be the predominant effect on amphibian habitat and implementation of Alternative 2 will have no bearing on this. Prescribed fire effects to amphibians would be the same as for fisheries.

Alternative 3

Direct and Indirect Effects – The implementation of Alternative 3 would have no effect on T&E species and no impact on sensitive species due to the site characteristics described under Alternative 2.

Cumulative Effects – It is expected that the cumulative effects to fisheries of Alternative 3 is negligible. Control of this population would minimize the likelihood of medusahead establishment in a riparian area, either in existing areas of bare ground, or new ones created from prescribed or natural fires. Use of manual (hand-pulling) control under Alternative 3 would completely eliminate any possibility of harm to fish, however, habitat conditions would remain degraded as they are now.

There would be no net cumulative effect to Columbia spotted frogs through implementation of Alternative 3. Frogs are not known to exist within the Beaverdam Creek sub-watershed and certainly not within the intermittent channels of Bronco Creek. Livestock grazing would continue to be the predominant effect on amphibian habitat and implementation of Alternative 3 would have no bearing on this. Prescribed fire effects are similar to that described for fisheries above.

Measure #2 Effects to Proposed, Endangered, Threatened, and Sensitive Wildlife Species

Existing Condition

A biological evaluation for wildlife species is on file at the Paulina Ranger District. No Effect determinations have been made for the following threatened species: Canada lynx and Northern Bald Eagle. No Impact determinations have been made for the following Region 6 Sensitive Species: California wolverine, pygmy rabbit, peregrine falcon, bufflehead, upland sandpiper, and the Tri-colored blackbird. A brief summary follows and these species will not be discussed further.

No habitat for the Canada lynx exists within the project area or the surrounding landscape. A No Effect determination has been reached due to the lack of suitable habitat or established populations. Use of habitat as dispersal habitat would not be affected.

None of the alternatives would alter Northern bald eagle habitat in a manner that would alter use or distribution. The amount of herbicide proposed for application under Alternative 2 would not result in effects to eagles from the indirect consumption of herbicide. Potential for consumption would be negligible due to low risk of poisoned prey or carrion being consumed.

No impact would occur to the California wolverine. The activities proposed would not alter or otherwise affect any suitable or available habitat with the project area for wolverines. The potential for effects from the consumption of herbicide under Alternative 2 would be negligible due to the lack of foraging habitat.

No Impact would occur to the pygmy rabbit, peregrine falcon, bufflehead, upland sandpiper and the tri-colored blackbird due to the lack of suitable habitat in the project area.

Sage grouse is a sagebrush-obligate species that inhabit sagebrush dominated shrub steppe habitats. Sagebrush makes up a significant portion of the sage grouse's diet, particularly in winter months, and also provides important cover from predators, particularly during breeding and nesting season. Mountain and big sagebrush communities are the most commonly used communities, but low sage and other similar habitats are also used.

Suitable habitat for the greater sage grouse exists around the Turnpike Pit. That habitat consists of low sagebrush steppe habitat with patches of mountain big sagebrush scattered on deeper soil hummocks. The habitat is occupied, with individual and small flocks of males and broods of females with chicks sighted near the project area. Habitat is primarily a summer and early fall habitat, providing insects and forbs for broods and other sage grouse. The sagebrush habitat is not tall enough to provide winter habitat. A determination has been made that all alternatives may impact individuals or habitat but will not likely contribute to a trend towards federal listing.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – Alternative 1 has the greatest potential for adverse impacts upon the sage grouse populations by allowing for the greatest potential for spread of medusahead rye outside the Turnpike Pit into low sagebrush shrub-steppe habitat. Low sagebrush habitat is used by brooding sage grouse hens and chicks, as well as individual males. These habitats provide important forb and insect forage for the species at critical times in the year. Spread of the medusahead rye, as it is projected under this alternative, would reduce that habitat quality and forage production for the sage grouse, resulting in further loss of suitable habitat.

Cumulative Effects – Alternative 1 has the greatest risk of spread of medusahead rye outside of the Turnpike Pit. Livestock grazing (current and historic) elevates that risk through the disturbance of plant communities and soils, setting up a seed bed for medusahead rye to take hold. Livestock also function as a vector for the transport of seeds to previously unaffected areas. Timber harvest elevates the risk in similar ways through soil disturbance from harvest activities and changes to vegetation communities. Road building creates vectors for spread of medusahead rye, as well as a disturbed soil bed that can be infested. All-terrain vehicle and other off-road vehicle travel, both recreational and administrative, provides a vector for seed dispersal and spread of medusahead rye to previously unaffected areas. Implementation of prescribed fire units (Hardcorner Project proposes several units in the vicinity of the Turnpike Pit) creates a vegetation disturbance and soil bed for

medusahead rye to establish in. Each of these activities has occurred, is occurring or will occur in the foreseeable future in the subwatersheds and watersheds surrounding the Turnpike Pit.

The alternative's contribution to the cumulative effects of the described activities is displayed in how each alternative contributes to a "source" population of medusahead rye for which the spread can be enabled by the other activities discussed, and how that ultimately affects wildlife habitat. That is measured in the amount of time and the extent of the existing infestation is maintained. Alternative 1 would have the greatest cumulative effects because there would be no treatment, thus no reduction in the existing infestation, and would result in the greatest risk for spread through the other activities described. This population would be maintained indefinitely, with low success of future control of this population were it tried in the future. This would ultimately result in the greatest reduction in habitat, as this alternative would enable the quickest and largest scale of spread into those habitats of any of the alternatives.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Alternative 2 has the least potential for adverse impacts upon the sage grouse populations that seasonally inhabit the area surrounding the Turnpike Pit. This alternative would provide the most effective control of the infestation, in the shortest period of time, and would have the least amount of risk of spread of the infestation outside the pit. This alternative would provide the highest probability of success in preventing the infestation from spreading into suitable sage grouse habitat, and have the greatest benefit to sage grouse. There is potential for direct impacts through the consumption of the herbicide through foraging or collection of grit. However, literature accompanying the product, as well as USDA and EPA analyses of toxicity, indicate that the concentrations proposed in application would not pose a risk of mortality or other life threatening side-effects, or otherwise impact individuals that consumed coated grit or plants. The potential impacts from the consumption of the herbicide would be negligible.

EPA studies (1993) on glyphosate determined that the amount of chemical, at 83% active ingredient, given to bobwhite quail to obtain a 50% mortality rate was greater than 2,000 milligrams per kilograms of quail body weight. At the proposed formulation rate of 53. 8%, a sage grouse would require more than 2,500 mg per kilogram body weight to obtain a 50% mortality rate (LD_{50}).

The following table (Table 5) identifies the acute dosage scenario that could occur through ingestion of contaminated vegetation as described in Glyphosate: Human Health and Ecological Risk Assessment (SERA 2003).

Table 5. Level of Daily Acute Exposure to Glyphosate For a Large Bird, at the application rate of .25 gallons/acre.

Range of Dose	Amount of Exposure (mg/kg/day)
Low	26.9
Central	26.9
High	76

The highest rate of acute exposure is 76 mg/kg/day. This is 3% of the LD_{50} dosage that EPA (1993) identified as a mortality standard for game birds (bobwhite quail). The low and central dose levels are equivalent to 1% of the LD_{50} dosage level described by the EPA.

Further, avian subacute dietary toxicity findings concluded that mallard ducks and bobwhite quail fed a long-term diet of glyphosate was no more than slightly toxic and resulted in no reproductive impairment.

Table 6 identifies the long-term exposure level scenario relevant under Alternative 2 expressed in milligrams per kilogram of body weight per day of glyphosate that could be ingested or otherwise effect a large bird, as defined and described in SERA (2003).

Table 6. Level of Daily Long-term Exposure to Glyphosate For a Large Bird, at the application rate of .25 gallons/acre.

Range of Dose	Amount of Exposure (mg/kg/day)
Low	1.48
Central	4.42
High	41.6

For long term exposure levels for a large bird, dosage levels for low and central ranges are less than 1%, and 2% for the high end range of the LD_{50} dosage that EPA (1993) identified as a mortality standard for game birds.

Given the very low percentage of potential consumption in comparison to the standard for lethal levels (less than 3% acute and 2% long-term), compounded by small percentage of forage habitat affected relative to habitat available outside the immediate project area (3 acres vs. several thousand acres of suitable un-treated foraging habitat), further compounded by the poor quality of the project area as foraging habitat (project area is within an open rock pit with no shrub cover in the treated areas), the risk that individual sage-grouse would consume sufficient amounts of the herbicide that would result in mortality to individuals is negligible. The risk of individuals consuming contaminated forage in the rock pit is low, due primarily to poor habitat conditions (absence of cover habitat) and the very small area affected relative to the total acres of suitable habitat available. In the event that individuals do consume contaminated vegetation, the level of consumption would not occur at lethal levels, due primarily to the low application rate of herbicide proposed.

In the unlikely event that enough contaminated forage was consumed to result in mortality that level of mortality would not contribute to a trend towards listing under the Endangered Species Act (ESA). Habitat in and around the project area is moderate to low quality forage habitat, based upon comparison of suitable sage-grouse habitat as defined in Connolly et al. (2004). Telemetry and sightings data indicate low levels of habitat use, with only a few scattered sighting and no telemetry recordings in the project area. This would indicate a small percentage of the sage-grouse population in the upper Crooked River basin/Beaverdam Creek area utilize these habitats, and thus a low percentage of the population that would have the potential to be exposed. As a result, mortality in individuals that utilize those treated habitats would not affect overall population levels or trends, as they are currently monitored, because they would make up a only a small percentage of the total population

Cumulative Effects – Cumulative effects would be similar to Alternative 1, however Alternative 2 would have the least cumulative effects of all the alternatives, as this alternative has the greatest potential for effective control and elimination of this initial population. Effective control or complete removal would reduce the risk of additional spread through the other activities described above.

Alternative 3

Direct and Indirect Effects – Alternative 3, which proposes the hand-pulling of the medusahead rye infestation, would provide more benefits to the greater sage grouse than Alternative 1, but much less than Alternative 2, due primarily to the limited effectiveness of the hand-pulling technique. While hand-pulling would reduce incrementally the ability for the infestation to spread outside the pit into sage grouse habitat, there would still

be a high risk of spread. Residual seed banks, as well as incomplete removal of individual plants would result in a longer period of time the infestation would be viable and able to spread. It would be unlikely that the infestation could be completely removed with hand pulling, and would require many additional treatments over an extended period of time to substantially reduce the population. This alternative would likely result in the spread of the infestation into sage grouse habitat; with the potential for adverse impacts to habitat quality.

Cumulative Effects – Alternative 3 provides an intermediate level of risk for cumulative effects when compared to the other alternatives. The treatment would not likely be as affective as Alternative 2 in controlling the medusahead rye infestation, and would be drawn out over a longer period of time. As such, there would be an elevated risk of spread through the other activities described, as the initial population would be around longer than under Alternative 2. There would also be the risk of unsuccessful control, which would further increase the risk of cumulative effects, and degradation of habitat. If treatment were not fully successful, there would be potential for adverse cumulative effects similar to Alternative 1, as the infestation spreads into habitats surrounding the pit, and is further enabled to spread through the other actions described under Alternative 1.

Measure #3 Effects to Proposed, Endangered, Threatened, and Sensitive Plant Species

Existing Condition

A biological evaluation for plant species is on file at the Paulina Ranger District. There are no known occurrences of federally listed endangered or threatened plants within the analysis area. The Ochoco National Forest has no habitat recognized as essential for listed or proposed plant species recovery under the Endangered Species Act. There are 28 species on the Regional Forester's Sensitive Species List that are documented or are suspected to occur on the Ochoco National Forest. Of the 28 sensitive species, two species, *Achnatherum hendersonii* and *A.wallowensis*, have suitable habitat that occurs within the project area.

Two sensitive ricegrass species, *Achnatherum hendersonii* and *A. wallowensis*, were recently split out from one former species, *Oryzopsis hendersonii*. Habitat requirements for both species are the same. Although it is possible for both species to occur on the Paulina Ranger District, it is thought that populations here are all *A. hendersonii*, therefore only Henderson's ricegrass will be referred to in this analysis. Typical ricegrass habitat is found on level ground with dry, shallow, stony lithosols or welded tuffs subject to frost action in the winter. There are no Henderson's ricegrass populations within or adjacent to the project area. There are five populations to the west of the project area, approximately ¾ miles away.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – There would be no direct effects to Henderson's ricegrass populations or habitat under the No Action Alternative. However, indirect effects are likely to occur. Henderson's ricegrass and medusahead occupy the same type of habitat, shallow clay soils with high rock content. The medusahead population is expanding rapidly and is currently at the edge of the disturbed area surrounding the rock pit. It is possible by spring 2005 medusahead will have moved into more undisturbed adjacent lands considered as ricegrass habitat. Medusahead is a very invasive annual grass that is known to out-compete native grasses and forbs. It grows in the winter and spring, germinating and putting down roots before native species have begun their growth cycle. Therefore medusahead takes available soil moisture out of the soil profile early, putting it at a distinct growth advantage. Further, medusahead seed heads have a high silica content, which means they do not break down, creating a mat that excludes the growth and germination of native plants (Young 1970).

There are over 5,000 acres of native vegetation that would be vulnerable to medusahead invasion in the long-term (>10 years) based on soil attributes and plant community types. Approximately 10% of this is potential ricegrass habitat, most of which is to the east and north of the current infestation, in the direction of prevailing winds. Left untreated, it is also possible that the ricegrass populations, 27.2 acres, which occur to the west of the pit, may be affected in the long-term.

Cumulative Effects – Past actions in the project area include the establishment of the rock pit that has been active for many years. The Forest Service removes rock and gravel from the pit using heavy equipment, which has resulted in permanently changed site conditions from the native scabland that was present before pit establishment. Topsoil has been removed on approximately three acres, leaving a mix of highly compacted soil and gravel only a few inches down to bedrock. There is a series of roads associated with the pit that also get heavy use by the public. The pit was used as a command post during the 747 Fire in 2002, further disturbing the area.

Currently the pit is closed to use for extracting gravel, and the area has been signed to inform the public of the noxious weed infestation. These actions will help prevent the spread of the weed to other areas of sensitive plant habitat. Grazing of livestock is an on-going activity that would continue. Cattle do not congregate in this area since the forage availability is low, however incidental passage from cattle moving through the area has the potential to further spread the medusahead. Not treating the noxious weed infestation has the highest potential for cumulative effects to sensitive plant species through habitat modification of any of the alternatives.

Future activities planned for the project area include prescribed burning under the Hardcorner Fuels project. There are 414 acres planned for natural fuels burning within the projected area of medusahead expansion identified in Figure 3. Depending on implementation of the burning, these acres may be highly susceptible to medusahead infestation. Weather factors and fire behavior can often result in a higher intensity of fuel consumption than expected. A fire that consumes duff and exposes mineral soil creates a seedbed that would be prone to medusahead germination. Approximately 128 acres of the 414 planned are within ¼ mile of the present medusahead site, in the direction of the prevailing wind.

The pit will continue to be used by the public in the future for camping and parking, which could result in transporting noxious weed seed to other areas.

Due to the above indirect, long-term, and cumulative effects, the no action alternative would result in a determination of "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 - There would be no direct effects to Henderson's ricegrass populations or habitat under Alternative 2, which proposes herbicide spraying of medusahead. There are no Henderson's ricegrass plants present, and at this time the weed infestation is contained within a disturbed site at the Turnpike Pit, which is not considered ricegrass habitat.

The proposed herbicide, glyphosate, is a non-selective herbicide that will kill both grasses and broad-leaved plants. It must come in contact with foliage, it is not soil active so would not harm emerging plants, or be taken up by the roots of plants. Therefore, direct effects would not occur to Henderson's ricegrass from spraying herbicide.

Indirect effects to ricegrass habitat or populations are possible only through herbicide spray drift. A chemical adjuvant is added to the herbicide to enhance penetration into plant foliage; this adjuvant also reduces drift potential. There are ricegrass populations about ¾ mile to the west of the Turnpike Pit, which is away from prevailing winds, however wind shifts are possible. It is unlikely that herbicide drift would reach these populations, however to minimize the possibility, mitigations for herbicide application are included in the Recommendations section of this report. These include spraying when wind speeds are low, and requiring a wind from the east would reduce the possibility of drift toward ricegrass populations.

Cumulative Effects – Effects from past actions are the same as identified for Alternative 1. Treating the infestation with herbicide has the least potential for affecting sensitive plant species and habitat. It would be the most effective means to quickly prevent medusahead from invading native plant habitat. The faster the medusahead population is controlled, the less likely other on-going activities such as livestock grazing and public use of the area would spread the weeds. Future activities such as prescribed burning would also be less susceptible to medusahead invasion if the seed source is eliminated quickly. Herbicide application would be the fastest and most effective way to control the medusahead population compared to either the no action or hand-pulling alternatives, and best protects Henderson's ricegrass habitat and populations. A determination of "No Impact" is found for this alternative.

Alternative 3

Direct and Indirect Effects – There would be no direct effects to Henderson's ricegrass populations from hand-pulling medusahead, as there are no plants within the project area. There would be no indirect effects in the short-term (2 years) to habitat; however it is possible for indirect effects in the long-term (10 years) from this alternative. Hand-pulling medusahead is not as effective in controlling medusahead as herbicide application. Even diligent hand treatment of an annual grass is apt to leave areas untreated, thus providing a continued seed source. This means that control of the infestation would take longer, which in turn means there is more likelihood of spread. It is anticipated that medusahead would invade adjacent plant communities in the long-term (5-10 years) under this alternative, reducing Henderson's ricegrass habitat quality.

Cumulative Effects - Effects from past actions are the same as identified for Alternative 1. Manual treatments of medusahead under this alternative is similar to no action in the long-term (5-10 years), there are potential effects to Henderson's ricegrass habitat, and possibly to populations, if the weed escapes treatment efforts. There is more potential for on-going activities such as vehicle traffic, to spread seed. In the short-term (<5 years), removing seed heads would reduce the population density. However on-going and future activities would still have potential to spread seed, increasing the size of the present infestation, or introducing seed to new areas. Adjacent Hardcorner prescribed burning units may be vulnerable to medusahead invasion due to treating with a less effective method. Hand pulling is not a very effective method to treat an annual grass such as medusahead. There is more chance for plants to remain on site, increasing the potential for spread to non-infested habitats in the long-term. Ricegrass habitat in the vicinity of the project area may be at risk of degradation, therefore a determination of "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" is found for Alternative 3.

Other Concerns: Heritage Resources

Measure #1 Potential Effects to Cultural Resources

Existing Condition

This project area is located within an area that was heavily used prehistorically for hunting as well as plant gathering and processing. Within three miles of the project area are over 50 recorded prehistoric sites. These sites range from a small (50 meters by 50 meters) surface lithic scatter to a large (100 acres) site that includes tools, ground stone, and hundreds of flakes. All sites seem to be associated with water, either intermittent drainages or springs. The Turnpike Pit has been surveyed in the past and no cultural materials were found within the boundaries for this proposed project. This pit was heavily impacted during the July-August 2002 747 Fire as it was the location of the main fire camp.

Environmental Effects

Alternative 1 – No Action, Alternative 2, and Alternative 3

Direct, Indirect, and Cumulative Effects – There would be no direct, indirect, or cumulative effects to cultural properties from the implementation of any of the alternatives, as sites would be avoided.

Other Concerns: Management Indicator Species

Measure #1 Effects to Rocky Mountain Elk and Mule Deer (Forage and Winter Range)

Existing Condition

The Turnpike Pit provides limited forage for elk and mule deer. Scattered willow associated with the pond in the pit may provide some forage, as well as scattered bitterbrush, sagebrush and rabbitbrush shrubs. Herbaceous forage is limited due to the disturbance in the pit. Medusahead rye is not considered a palatable plant for elk and mule deer. Once the inflorescence develops, with its silica-based structure, elk and mule deer avoid it. In surrounding habitat, the juniper and pine woodlands provide bitterbrush, mahogany, and other browse, as well as herbaceous forage, while it is still succulent. In the low sagebrush shrub steppe, bunch grass and forb communities provide forage for elk and deer, as well as some scattered and somewhat limited bitterbrush browse. Historic and current livestock grazing may limit the productive capacity for forage, but the systems are generally functioning, providing forage for elk and mule deer. Riparian areas provide limited hardwood browse and extended succulent forage through the dry summer and early fall seasons.

Winter range is designated west of the 5840 road to the District/Forest boundary. This area includes the Turnpike Pit and the medusahead rye infestation. In addition, winter range is designated east of the 5840 in the lower elevations of the South Fork Wind Creek drainage, approximately 1 mile from the project area. Winter range conditions are generally fair, with very low occurrences of noxious weeds or other undesirable vegetation. Livestock grazing, both historic and current, likely affects the amount of forage available to elk and mule deer. The extent of that effect is not quantified. Changes in fire regime through active suppression have also affected habitat conditions. Woodland habitats have higher densities of conifers and junipers then in historic times, and this is likely adversely affecting the quantity and quality of forage available in the winter range. The extent of this affect is also not quantified. Browse forage is present, though the condition of that forage varies. Symptoms of heavy browsing and reduced vigor or availability of forage is noted. Use of these ranges varies, depending upon the snow pack. Mule deer will use the winter range areas year around, unless snow pack forces animals to lower elevations during the winter. Elk generally use the areas during the winter, spring, and fall periods. During the summer, the lack of succulent herbaceous forage precludes use of the area by elk. During the winter, like the mule deer, habitat use is dictated by the snow pack.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – The presence of medusahead rye reduces the quality of forage and winter range habitat and quantity of forage available on habitat affected by the infestation. Under this alternative no action would be taken to control, reduce or eliminate this infestation. The existing condition would be maintained, with continued loss of forage habitat on acres infested. The infestation would likely spread, further reducing forage habitat. Medusahead rye is an effective competitor with other palatable herbaceous plants and would easily out compete and reduce these species in areas infested. Analysis indicates a likely spread rate would result in a maximum 8,000 acres of habitat potentially influenced by medusahead rye after 10 years, and continue to spread. These acres would no longer provide quality herbaceous forage habitat for elk and mule deer and likely adversely affect distribution and habitat use by these species. With this alternative, the infestation would spread beyond the pit into adjacent winter range habitats as well as habitats east of the 5840 road. Figure 3 delineates the expected spread of this infestation, within susceptible vegetation and soil types, over the next ten years. This would result in thousands of acres of winter range habitat degradation from this expansion. This alternative would result in the greatest level of adverse affect on winter range habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects - The proposed action has the potential to affect elk and mule deer through the application of the herbicide on the medusahead infestation. In addition to the direct application on the medusahead plants, surrounding native or desirable non-native vegetation could also be affected with over-spray or wind-drift. Based upon the information provided with the herbicide, as well as analyses done by the USDA Forest Service and the EPA, the concentration of the herbicide proposed for application would result in negligible and immeasurable effects upon animals that consumed the herbicide. Mortality would not result from consumption, and general life functions would not be affected.

This alternative would be the most effective in controlling, reducing, and eliminating the medusahead rye infestation. This alternative would result in the quickest rate of recovery and control of the infestation of the three alternatives. The affected area would improve in forage habitat quality as native forage species replace the medusahead rye. This alterative would have the lowest risk for expansion of the infestation, and thus the lowest risk for adverse affects to forage habitat surrounding the Turnpike Pit. It would pose the least amount of risk to spread of the infestation into surrounding winter range habitats, resulting in the lowest amount of habitat loss/modification of the three alternatives. Winter range habitat in the South Fork Wind Creek would not likely be affected by this infestation.

Alternative 3

Direct and Indirect Effects – This alternative would not expose big game animals to herbicides and noxious elements of those herbicides. Limited disturbance of individuals may occur through the implementation of hand pulling activities, but would not measurably affect distribution or habitat use within and surrounding the project area. Forage habitat would likely improve at incremental levels as removed medusahead rye was replaced by native forage species. However, the rate of improvement would be much slower than Alternative 2, with greater risk of failure to recover the infested area and potential for expansion beyond the existing infestation. With delays in the control of the infestation attributed to the effectiveness of the technique, there is a greater risk of spread of the infestation outside the pit area. While the rate of expansion my be slower than the No Action Alternative, once the infestation expands beyond the pit, effects would likely be similar to the No Action Alternative in the extent of area affected and the reduction in habitat quality.

The effects of Alternative 3 on winter range habitat would be similar to those described for Alternative 1 on forage habitat for elk and mule deer. This alternative would have a greater risk of expanding the infestation into winter range, and resulting degradation of winter range habitat, than Alternative 2. Winter range habitat in the South Fork Wind Creek would continue to be at risk for infestation and likely be infested with 10 years. Incremental improvements to forage condition within the pit may occur, but would be negated by the negative effects to habitat in surrounding winter range. Alternatives 1 and 3 would likely differ only in the timing and rate of habitat degradation that would occur with the expected expansion of the infestation into those habitats.

Cumulative Effects of All Alternatives - The primary effects of the three alternatives focus on the risk of spread of the current medusahead rye infestation out of the Turnpike Pit into surrounding wildlife habitat for deer and elk, as described above. Alternative 1 has the greatest risk of spread of medusahead rye outside of the Turnpike Pit; Alternative 2 has the lowest risk of spread. Alternative 3 would have an intermediate risk. Livestock grazing (current and historic) elevates that risk through the disturbance of plant communities and soils, setting up a seed bed for medusahead rye to take hold. Livestock also function as a vector for the transport of seeds to previously unaffected areas. Timber harvest elevates the risk in similar ways through soil disturbance from harvest activities and changes to vegetation communities. Road building creates vectors for spread of medusahead rye, as well as a disturbed soil bed that can be infested. All-terrain vehicle and other off-road vehicle travel, both recreational and administrative, provides a vector for seed dispersal and spread of medusahead rye to previously unaffected areas. Implementation of prescribed fire units (Hardcorner project proposes several units in the vicinity of the Turnpike Pit) creates a vegetation disturbance and soil bed for medusahead rye establishment. Each of these activities has occurred, is occurring or will occur in the foreseeable future in the subwatersheds and watersheds surrounding the Turnpike Pit.

Alternative 1 would have the greatest cumulative effects because there would be no treatment, thus no reduction in the existing infestation, and would result in the greatest risk for spread through the activities described above. This population would be maintained indefinitely, with a low success of future control of this population. This would ultimately result in the greatest reduction in habitat, whether it is big game foraging, winter range, migratory bird, antelope or sensitive species, as this alternative would enable the quickest and largest scale of spread into those habitats of any of the alternatives.

Alternative 2 would have the least cumulative effects, as this alternative has the greatest potential for effective control and elimination of this initial population. Effective control or complete removal would reduce the risk of additional spread through the other activities described above. Wildlife habitat for elk and mule deer, migratory birds, antelope and sensitive species has the least potential for adverse cumulative effects through implementation of this alternative.

Alternative 3 provides an intermediate level of risk for cumulative effects when compared to Alternatives 1 and 2. The treatment would not likely be as effective as herbicide control of the medusahead rye infestation, and would be drawn out over a longer period of time. As such, there would be an elevated risk of spread through the other activities described above. There would also be the risk of unsuccessful control, which would further increase the risk of cumulative effects, and degradation of habitat. If treatment was not fully successful, there would be potential for adverse cumulative effects similar to the No Action Alternative, as the infestation spread into habitats surrounding the pit, and is further enabled to spread through the other actions described in this section.

Measure #2 Effects to other Wildlife Species

Golden Eagle and Prairie Falcon: There are no effects to golden eagle or prairie falcon under Alternatives 1 or 3. Alternative 2 poses a potential risk for effects upon these species. Effects could come from the consumption of prey (black-tailed jackrabbits, other small mammals, small birds) that had ingested the herbicide, and through consumption of the prey, passed that herbicide on to the raptor. Similar effects are

known with other species and other forms of toxins. However, this would require significant levels of consumption of the herbicide by the prey species, and significant amounts of that herbicide being passed to the raptor through prey consumption. At the concentrations proposed for the treatment, risk for prey species mortality from consumption is negligible, based upon product label information and USDA and EPA analysis of the herbicide and effects to wildlife. Further, any herbicide that may be passed to the raptor through consumption of prey that had ingested the herbicide would not be in concentrations such that these raptors would be adversely affected. Effects to these species would be negligible. Indirect effects associated with habitat degradation through the expansion of the medusahead rye infestation would be negligible and essentially immeasurable.

Pronghorn Antelope: Forage habitat for the pronghorn antelope would be affected by the alternatives proposed in this project. The affects to forage and to individual antelope are similar to affects to forage habitat for elk and mule deer. Refer to the effects analysis for that section for a description of effects to antelope and antelope habitat.

Other Concerns: Land Birds, Including Migratory Species

Measure #1 Effects to Bird Species Dependant on Sagebrush Habitats

Existing Condition

Habitat for landbirds, including migratory species, is limited in the immediate vicinity of the medusahead rye infestation. Seed gathering and gathering of grit likely occurs in that area. In surrounding habitats, including the sagebrush shrub steppe (predominantly low and silver sage types, with scattered patches of mountain sagebrush), juniper and ponderosa pine woodlands, and riparian areas, habitats for a variety of species exist. All of these habitats are susceptible to infestations of medusahead rye. Past activities, including fire suppression, timber harvest, livestock grazing, road building, development of the rock pit, and natural conditions of soil and vegetation types increase the risk of this infestation spreading to these habitats. Currently, these habitats are providing for a variety of species, including some of those identified in the Birds of Conservation Concern list (US Fish and Wildlife Service 2002). Species suspected of occurring in and around the project area are listed in the table below. The Birds of Conservation Concern list provides a basis for comparison and assessment of effects of activities on migratory and other landbird species.

Table 5. Birds of Conservation Concern Suspected to Occur At Or Near the Project Area (Bird Conservation Region 10 – Northern Rockies)

Golden Eagle	Prairie Falcon
Flammulated Owl	Lewis' Woodpecker
Williamson's Woodpecker	Red-Naped Sapsucker
White-Headed Woodpecker	Brewer's Sparrow
Pygmy Nuthatch	

The document *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* also provides reference and a basis for comparison and assessment of effects of activities on landbird species (Altman 2000). Relative to the potential effects of the spread of medusahead rye, species dependent upon shrub steppe, grassland, or ground-based forage in forested types are addressed in these analyses. The Brewer's sparrow is the lone species from Table 5 that will be considered in this analysis. The Brewer's sparrow is a sagebrush steppe obligate species (dependent upon sagebrush habitat), and inhabits the low and mountain sagebrush shrub-steppe habitat adjacent to the pit. This species and similar species such as vesper sparrow, to it are most likely to be affected by the spread of medusahead rye into adjacent habitats. Species occupying similar habitats or with similar habitat needs would experience similar effects.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – This alternative would result in the greatest modification of habitat for the Brewer's and vesper sparrows, and other birds dependent upon the affected vegetation communities for forage, cover, and nesting habitat. A medusahead rye infestation would reduce or eliminate native grass and forb communities, and create conditions for adverse modification of shrub and forested communities as well (increased risk of frequent fire events, similar to cheatgrass interactions). Infestation of these habitats would adversely affect the function and suitability of habitat and would likely reduce the availability of habitat in the area identified in Figure 3 for those species. Beyond the ten year time span, this infestation would continue to expand, and would essentially be in a condition that was uncontrollable as far as spread.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Habitat modification through the expansion of the infestation, as described in Alternative 1 would have the least amount of risk associated with this alternative, with the scope of area outside the pit potentially affected greatly reduced. In regards to potential risk of adverse habitat modification for the bird species in the general project area and surrounding areas, this alternative has the lowest potential for adverse affects.

There is potential for adverse direct effects through the consumption of seeds, grit, and vegetation covered with the herbicide by individual birds. Although the infested area is not high quality habitat for foraging and grit gathering for most species, use would be likely. Analysis accompanying the product, as well as analyses done by the USDA Forest Service and EPA indicate that the concentrations proposed have a negligible potential for effect upon small birds (in the study cases, bobwhite quail). Some of the bird species are substantially smaller than the test subject, and thus may have a higher risk of adverse effects. The USDA Forest Service analysis of glyphosphate affects on small birds did note evidence of weight loss and reduction in food consumption. No mention was made of the extent or duration of those effects, though mortality was not noted. These effects were seen at concentrations higher than what is proposed. Because of the small area that would be sprayed (3 acres) relative to the area of suitable habitat surrounding the project area, the effects of consumption of the herbicide would likely have negligible effects upon populations of those species in and around the project area.

Alternative 3

Direct and Indirect Effects – This alternative proposes the mechanical treatment of the infested site through hand pulling. There is a higher risk for spread of the medusahead rye outside the pit area than under Alternative 2. Were the treatment not successful, expansion into suitable habitat for land and migratory birds would ensue, with similar effects described for Alternative 1. Because of seed banks in the soil, successive bi-annual hand-pulling efforts, over 3+ years, would be required to try and eliminate or at least control this population of medusahead rye. The extended period of treatment increases the risk of spread. Time and financial limitations for implementation may further increase the risk of spread and subsequent habitat loss and degradation.

Cumulative Effects of All Alternatives - The cumulative effects discussion presented under the elk and mule deer section above applies to birds as well. The effects are related to the effectiveness of control or the potential for loss of habitat if control were not achieved. Alternative 1 would ultimately result in the greatest

reduction in habitat for migratory birds, as this alternative would enable the quickest and largest scale of spread into those habitats of any of the alternatives. Alternative 2 would have the least cumulative effects, as this alternative has the greatest potential for effective control and elimination of this initial population. Effective control or complete removal would reduce the risk in additional spread through the other activities described. Wildlife habitat for migratory birds has the least potential for adverse cumulative effects through this alternative. Alternative 3 provides an intermediate level of risk for cumulative effects. The treatment would not likely be as effective as Alternative 2 in controlling the medusahead rye infestation, and would be drawn out over a longer period of time. As such, there would be an elevated risk of spread through the other activities described and degradation of habitat.

Other Concerns: Soil Productivity

Measure #1 Potential for Effects to Soil Productivity

Existing Condition

Turnpike Pit is used by the Forest Service as a material source for rock and gravel is located within a flat scabland area dominated by sagebrush, bunchgrasses, and forbs. The area surrounding the pit has been subjected to numerous disturbances resulting in the loss of topsoil and compaction leaving an area with just a few inches of rocky soil.

Sensitive scabland soils are those soil types that, because of their shallow nature, are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible (LRMP, 1989). The native plant species found on these soil types include low/rigid sage, bunch grasses, and forbs. These plants help stabilize soil from erosion forces. The desired future condition for sensitive scabland soils is to maintain and ensure the native plant species persist at a natural level in order to afford effective ground cover thereby contributing to soil stability and reduced rates of erosion.

Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects – There would be no direct effects to soils under the No Action Alternative. However, indirect effects are likely to occur. Invasive plants can have dramatic and irreversible effects on soil productivity due to changes in soil characteristics such as nutrient and water holding capacity, organic matter content, and the diversity and abundance of soil biota (US Forest Service, 2004). Medusahead thrives on the same type of habitat, shallow clay soils with high rock content, as do the native sagebrush communities. Indirect effects of no treatment would affect native plant habitat as the medusahead population expands outside the pit area into native scabland vegetation. The medusahead population is currently expanding and has reached the rock pit/scabland interface. There is the possibility that the medusahead will expand into more undisturbed adjacent lands due to prevailing winds blowing seed onto the areas currently unaffected. Based on soil types found in the area, current uses taking place, and the aggressive nature of medusahead it is estimated that a maximum of 8,000 acres are at risk for medusahead infestation within the next 10 years. The loss of native vegetation puts sensitive scabland soil types at risk from erosion forces and reduced productivity. Medusahead has a high silica content, which causes the foliage to decompose slowly; creating a dense litter cover that ties up soil nutrients and excludes the growth and germination of native plants (US Forest Service, 2004).

Cumulative Effects – Past actions in the project area include the founding of the rock pit (currently closed). The removal of rock and gravel has resulted in the permanent alteration of the former scabland soils. Topsoil

and native vegetation has been removed on approximately 3 acres leaving a shallow mix of compacted soil and gravel. The area currently has and will continue to get heavy use by the public for camping and off-road vehicle use increasing the probability of medusahead spreading onto adjacent scablands. The pit was used as the primary staging area during the 747 Fire in 2002 causing further soil disturbance to the pit and surrounding scablands. Livestock grazing occurs in the area after July 15 and would continue to do so. Livestock do not normally congregate in this area due to the lack of palatable forage, but they do use the pond as a watering source increasing the potential to further spread the Medusahead infestation. Not treating the noxious weed infestation has the highest potential for cumulative effects to sensitive scabland soils and native plant communities through habitat modification. Future activities planned for the project area include prescribed burning under the Hardcorner Fuels project (414 acres). High intensity fires can consume the soil organic matter exposing mineral soils, which are susceptible to noxious weed infestations. Overall, the No Action Alternative would result in the likelihood of a spread of the current extent of the medusahead population resulting in the loss of native vegetation and thus having a detrimental affect on sensitive scabland soils.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Glyphosate adsorbs strongly to soil and is not expected to move through the soil profile or off site through leaching (EPA, 1993). Monitoring studies found neither glyphosate nor AMPA were susceptible to leaching (US Forest Service, 2000). Because glyphosate binds with soil particles, it would not harm emerging plants, or be taken up by the roots of plants. There is the possibility that overland flows could transport soil particles bound with glyphosate during periods of extreme precipitation, however mitigation are included to minimize this likelihood. Studies have shown that glyphosate has no adverse effects on soil microorganisms (US Forest Service, 2000). Glyphosate persists in soil for 1-3 weeks (Valentine, 1971) and is readily degraded by soil microbes to amino methyl phosphoric acid, which is in turn degraded to carbon dioxide (EPA 1993). Therefore, direct effects from the herbicide would not occur. There is the possibility for the delivery system (ATV) to impact scabland soils along the pit/scabland interface by causing soil compaction and/or displacement. However to minimize the possibility, mitigations are included. These include:

- Herbicide application operations would be avoided/suspended during periods of excessive soil moisture conditions.
- Machinery (ATVs, Trucks) would be excluded from scab landtypes due to the sensitive nature of these areas. Existing roads and the pit may be used.
- Use backpack delivery systems along the pit/scabland interface.

Indirect effects to sensitive scabland soils, habitat or plant populations are possible through herbicide spray drift. Herbicide application operations would be avoided/suspended during periods when wind speeds exceed 5 mph in order to limit herbicide drift off the application area. A chemical surfactant is added to the herbicide to enhance penetration into plant foliage; this surfactant also reduces drift potential. The surfactant has a half-life of less than one week and is broken down by soil microorganisms into carbon dioxide (US Forest Service, 2000). There is the likelihood that scabland vegetation adjacent to the treatment area would be affected through direct contact with the herbicide or by drift. This would result in the loss of native vegetation on scabland soil sites. However to minimize the possibility, mitigations for herbicide application are included in the project. These include the use of backpack delivery systems along the pit/scabland interface.

Cumulative Effects – Effects from past actions are the same as identified for the No Action Alternative. Treating the infestation with herbicide has the least likelihood of affecting sensitive scabland soil types and native plant communities. It would be the most efficient method for preventing the spread of medusahead onto scabland soils and native plant habitat. Rapid control of the medusahead population is necessary to prevent the spread into other areas from current and future public and/or governmental activities. Future activities such as

prescribed burning areas would also be less susceptible to medusahead incursion due to a reduction in the available seed source. Herbicide application would be the fastest and most effective way to control the medusahead population compared to either the no action or hand-pulling alternatives, which best protects sensitive scabland soils and native vegetation.

Alternative 3

Direct and Indirect Effects – There would be no direct effects to scabland soils or native plant communities from hand-pulling medusahead. There would not be short-term indirect effects to scabland soils or native plant communities; however, it is possible for indirect effects in the long-term (0-5 years) from this alternative. Hand-pulling medusahead is not as effective in controlling medusahead as herbicide application. There is the possibility that areas of medusahead would be missed, which in turn means there is more likelihood of spread. It is probable that medusahead would invade adjacent scabland plant communities in the long-term (5+ years) under this alternative, reducing scabland vegetation habitat and ultimately affecting scabland soil quality and productivity.

Cumulative Effects - Effects from past actions are the same as identified for the No Action alternative. Manual treatments of medusahead under this alternative are similar to no action in the long-term (5+ years), there are potential effects to scabland soils and native plant communities. There is potential for on-going and future activities such as recreation use at the pit, to spread seed, increasing the size of the infested area. Hand pulling is not a very effective method to treat an annual grass such as medusahead. There is more chance for plants to remain on site, increasing the potential for spread to scabland soil and native plant communities in the long-term. Scabland soil and native plant communities near the project area may be at risk of degradation. Manual treatments can be effective on small infestations. However, manual treatments are labor intensive and the possibility that areas may be missed during treatment increases the time it would take to bring the medusahead under control. This leaves adjacent scabland soils and native vegetation vulnerable to damage.

OTHER EFFECTS AND DISCLOSURES

The following is a summary of other effects that were considered during the analysis process, not necessarily as issues, sometimes as required elements, and not always totally quantifiable. All effects for these elements were determined to be consistent with the Standards and Guidelines for the Ochoco National Forest Final Environmental Impact Statement.

Irreversible and Irretrievable Commitment of Resources

The term “irreversible commitment of resources” refers mainly to non-renewable resources or actions that disturb a resource to the point that renewal could only occur over a long period of time and/or at great expense. “Irretrievable commitment of resources” refers to the loss of production and/or use of renewable resources because of an allocation decision. It also relates to opportunities foregone for the period of time that resources cannot be used.

The No Action Alternative may have irreversible and irretrievable effects to natural resources. The uncontrolled spread of medusahead would cause a decline in native plant community health, including rare botanical species. Long-term (10 years) effects of medusahead proliferation would result in the replacement of native plants with a monoculture of a noxious weed. In turn this would result in elimination of range and wildlife forage, decreased soil productivity, lowered water quality, increased sedimentation and increased fire potential.

No permanent irreversible or irretrievable effects to any resource would occur under Alternatives 2 or 3. Alternative 2 would utilize the use of herbicides, which would affect native vegetation only in the short-term (< 4 years).

Farmland, Wetlands, or Other Critical Areas

There are no farmlands or wetland within the project area. This project does not involve nor would it affect floodplains as defined under Executive Orders 11988 and 11990.

Consumers, Civil Rights, Minority Groups and Women

None of the alternatives would adversely affect consumers, civil rights, minority groups or women. Alternatives 2 and 3 would involve hiring services to be preformed. Forest Service hiring practices and contract provisions include non-discrimination requirements. To the greatest extent possible, all members of the population of these groups have been provided the opportunity to comment before decisions are rendered on proposals and activities that may potentially affect them.

Environmental Justice

Under Alternative 1 current uses of National Forest lands would continue, including recreation, harvesting of non-forest products, special-use permits, subsistence uses, and spiritual/aesthetic uses. Effects to minority populations, disabled persons, and low income groups would not be disproportionate with other users of the National Forest.

The action alternatives provide opportunity for potential contracts. Opportunities to support employment and income would be available to all groups of people, subject to existing laws and regulations, such as for set-asides, contract size, competition factors, skills, equipment, etc, including State pesticide application regulations. Opportunities for all groups of people to collect forest products and participate in recreational activities would be maintained under all alternatives, and no disproportionate effect is anticipated to subsets of the general population. Under Alternative 2 there would be a short time frame after herbicide application where signs would be posted notifying the public that plant collection is not recommended. None of the alternatives would have disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes.

Tribal Interest

Members of the Confederated Tribes of the Warm Springs Reservation of Oregon continue to use the Ochoco uplands and hold off-Reservation treaty rights for fishing, hunting, gathering roots and berries, and pasturing livestock under the Treaty with the Tribes of Middle Oregon of 1855. Members of the Confederated Tribes of the Warm Springs, Burns Paiute, Umatilla, and Klamath Tribes use a wide variety of plant species that can be found within the project area. All alternatives would continue to provide for the rights afforded tribal members for taking fish, hunting, gathering roots and berries, and pasturing livestock on open and unclaimed land.

Short-Term Uses and Long-Term Productivity

NEPA requires consideration of the "relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). The Multiple Use-Sustained Yield Act of 1960 requires the Forest Service to manage the National Forest System lands for multiple uses (including timber, recreation, fish and wildlife, range, and watershed). All renewable resources are to be managed in such a way that they are available to future generations.

Maintaining the productivity of the land is a complex, long-term objective. The action alternatives protect the long-term productivity of the project area through the use of Forest Plan standards and guidelines, mitigation measures/design elements, and best management practices. Long-term productivity would improve as a result

of the noxious weed control activities proposed under the action alternatives. Long-term productivity would decline under the No Action Alternative.

Unavoidable Adverse Effects

Implementation of the action alternatives may result in some short-term environmental effects that cannot be completely mitigated or avoided, if the proposal takes place. The application of Forest Plan standards and guidelines, BMP's, design elements and mitigation measures, followed by monitoring (refer to Chapter 2) are intended to minimize the extent, severity, and duration of these effects. The specific environmental effects based on significant issues are discussed earlier in this chapter by resource.

Herbicide application has the potential for short-term (< 4 years) localized effects to native vegetation, but would promote long-term benefits to soil productivity, wildlife habitat and native vegetation. In all cases, the effects would be managed to comply with established legal limits.

Park Lands, Wild and Scenic Rivers, and Ecologically Critical Areas

No designated roadless areas exist within the project area. Old growth stands, Wild and Scenic Rivers, and/or parklands would not be adversely affected by the proposed activities because there are no activities proposed within these areas.

Energy Requirements

There are no additional energy requirements for activities described in this analysis beyond those mentioned in the Forest Plan (FEIS 4-105). Activities on the Forest and Grassland which may have a positive net energy balance are firewood gathering and forage production (left untreated noxious weeds have the potential to reduce the ability of forests and grasslands to produce forage). Generally, all other activities consume more energy than they produce.

Public Health and Safety

No significant adverse effects to public health and safety have been identified. See Chapter 3, Issue #2. All contractors and Federal employees who may be involved with project implementation would be required to meet Occupational Safety and Health standards (OSHA). Mitigations measures to protect public health are listed in Chapter 2, Alternative and the 1998 Integrated Noxious Weed EA.

Highly Controversial Effects on the Human Environment

The effect of implementing the alternatives are well known, not highly controversial, and do not involve unique or unknown risks. The activities proposed under the action alternatives have been performed in the past and evaluated in terms of past successes and failures. Alternative 2 proposes the use of glyphosate ph, an EPA-approved herbicide that is the most widely used herbicide in the United States. It has been successfully used on the Ochoco National Forest to control noxious weeds in accordance with the 1998 Integrated Noxious Weed Management EA.

Potential Conflicts with Plans, Policies, and Other Jurisdictions

Implementation of Alternative 1 (No Action) is inconsistent with the Ochoco National Forest Land and Resource Management Plan (LRMP) and Section 15 of Public Law 93-629, which requires the agency to take steps to control noxious weed populations. Alternative 2 (Proposed Action) and Alternative 3 are consistent with the LRMP and other relevant Federal, State and local laws, regulations, and requirements designed for the protection of the environment. None of the alternatives establishes a precedent for future actions or a decision in principle about a future consideration.

Cultural Resources with SHPO Concurrence

Surveys have been completed and concurrence has been documented with the State Historic Preservation Office (SHPO).

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:

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Robert Parrish – Fisheries Biologist/Hydrology
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LITERATURE CITED:

Alexanian, Kev. 2005. Crook County Weed Specialist, personal communication.

Dow AgroSciences (1999). *Specimen label: Glypro*. Dow AgroSciences, Indianapolis, IN 46268.

EPA. 1993. Reregestration Eligibility Decision Document Glyphosate. List A, Case 0178. United States Environmental Protection Agency, Washington, DC. Online at http://www.epa.gov/oppsrrd1/REDs/glyphosate.pdf

Bend Bulletin. 2004. "Seed Islands Can Fight Invasive Weeds", report of research by Roger Sheley, Weed Scientist, USDA. Byline by Chuck Chiang, November 16, 2004.

Hann, W.J. et al. 1997. An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Volume II, Chapter 3: Landscape Dynamics of the Basin. PNW-GTR-405. USDA Forest Service.

Sheley, R.L. and J.K. Petroff ed. 1999. Biology and Management of Noxious Rangeland Weeds. *Medusahead*. Oregon State University Press, Corvallis, OR.

Sheley, Roger. 2005. Weed Scientist, personal communication.

SERA (Syracuse Environmental Research Associates). 2003. Neurotoxicity, immunotoxicity, and endocrine disruption with specific commentary on glyphosate, triclopyr, and hexazinone. Final Report. SERA TR-01-43-08-04a. Available: http://www.fs.fed.us/foresthealth/peticide/risk_assessments.

Syracuse Environmental Research Associates (SERA) (2003). Glyphosate—Human Health and Ecological Risk Assessment: Final Report. Available: http://www.fs.fed.us/foresthealth/pesticide/risk_assessments/04a03_glyphosate.pdf

USDA Forest Service. 1992. A Guide to Conducting Vegetation Management Projects in the Pacific Northwest Region. Forest Pest Management Publication R6-FPM-TP-044-92. Pacific Northwest Region, Portland, OR.

USDA Forest Service. 1997. Glyphosate Herbicide Information Profile. Pacific Northwest Region, Portland, OR.

USDA Forest Service. 2004. *Deep Creek Vegetation Management Environmental Impact Statement.* Ochoco National Forest, Prineville, OR.

USDA Forest Service. 2004. R6-NR-FHP-PR-02-04 Pacific Northwest Region Invasive Plant Program Draft EIS

USDA Forest Service. 2004b. Joint aquatic and terrestrial programmatic biological assessment for Federal lands within the Deschutes Basin administered by Bureau of Land Management Prineville Office and all lands within the Deschutes and Ochoco National Forests. Prineville, OR.

Vallentine John F. 1971. Range Development and Improvements. Brigham Young University Press, Provo, Utah

Young, J.A. and R.A. Evans. 1970. Invasion of Medusahead into the Great Basin. Weed Science. 19:89-97.

Young, J.A., R.A. Evans, and J. Robison. 1972. Influence of Repeated Annual Burning on a Medusahead Community. Journal of Range Management. 25: 372-375.

GLOSSARY

Active ingredient (a.i.) – In any pesticide product, the component that kills or otherwise controls the target pest. Pesticides are regulated primarily on the basis of active ingredients.

Acute toxicity – The amount of substance, in a single dose, to cause poisoning in a test animal.

Adjuvant – A substance, such as a crop oil, that is added to a herbicide mix that increases the performance by breaking down surface tension or increasing penetration into plant foliage.

Alternative – In an EA/EIS, one of a number of possible options for responding to the purpose and need for action.

Annual plant – A plant that endures for not more that a year. A plant that completes its entire life cycle from germinating seedling to seed production and death within a year.

Carrier – A non-pesticide substance added to a commercial pesticide formulation to make it easier to handle or apply.

Chronic exposure – Long-term exposure studies often used to determine the carcinogenic potential of chemicals.

Federally listed species – formally listed as a threatened or endangered species under the Endangered Species Act. The Fish and Wildlife Service make designations.

Half-life – The time required for the concentration of the chemical to decrease by one-half.

Herbicide – A chemical preparation designed to kill plants, especially weeds, or to otherwise inhibit their growth.

Ingestion – The taking in of a substance through the mouth for digestion.

Interdisciplinary Team (IDT) – A group of individuals with varying areas of specialty assembled to solve a problem or perform a task.

Introduced species – An alien or exotic species that has been intentionally or non-intentionally released into an area as a result of human activity. Introduced species are those whose genetic material originally evolved and developed under different environmental conditions than those of the area in which it was introduced.

Invasive plant species – An introduced plant species that does or is likely to cause economic or environmental harm or harm to human health.

LD_{50} (lethal dose) – The dose of a chemical calculated to cause death in 50% of a defined experimental animal population over a specified observation period. The observation period is generally 14 days.

Label – All printed material attached to or part of the pesticide container.

Leaching – the process by which chemicals on or in soil or other porous media are dissolved and carried away by water, or are moved into lower layer of soil.

Management Area – A unit of land allocated to emphasize a particular resource, based on the capability of the area.

Management Indicator Species – Vertebrate species whose population changes are believed to best serve as an index of a biological community's response to the effects of land management activities or are important for fishing, hunting and trapping.

Material safety data sheet (MSDS) – A compilation of information required under the Occupational Safety Hazard Act communication standard on the identity of hazardous chemicals, health and physical hazards, exposure limits and precautions.

Native species – A species that historically occurred or currently occurs in an ecosystem.

Non-target – Any plant or animal that is not the intended organism to be controlled by a pesticide treatment.

Noxious weed – A legal designation that can be assigned at both the State and/or Federal level, that describes a species that has a negative impact on commercial agriculture or rangelands.

Prevention – To detect and ameliorate conditions that cause or favor the introduction, establishment, or spread of invasive plants.

Sensitive species – Those species that: (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species; (2) are on an official state list; or, (3) are recognized by the implementing agencies as needing special management to prevent their being placed on federal or state lists.

Toxicity – The inherent ability of an agent to affect living organisms adversely.

APPENDIX A

BIOLOGICAL EVALUATION SUMMARY FOR PROPOSED, THREATENED, ENDANGERED AND SENSITIVE WILDLIFE, FISH AND PLANT SPECIES

TE&S SPECIES BIOLOGICAL EVALUATION SUMMARY OF CONCLUSION OF EFFECTS

SPECIES	Alternative 1	Alternative 2	Alternative 3
Bull Trout	NE	NE	NE
Redband Trout	NI	NI	NI
Mid-Columbia Steelhead	NE	NE	NE
Chinook Salmon – Essential Fish Habitat	NE	NE	NE
Westslope Cutthroat Trout	NI	NI	NI
Malheur Mottled Sculpin	NI	NI	NI
Northern Bald Eagle	NE	NE	NE
Canada Lynx	NE	NE	NE
American Peregrine Falcon	NI	NI	NI
Bufflehead	NI	NI	NI
Upland Sandpiper	NI	NI	NI
Tricolored Blackbird	NI	NI	NI
Western Sage Grouse	MIIH	MIIH	MIIH
California Wolverine	NI	NI	NI
Pygmy Rabbit	NI	NI	NI
Columbia Spotted Frog	NI	NI	NI
Achnatherum hendersonii	MIIH	NI	MIIH
Achnatherum wallowensis	MIIH	NI	MIIH
Artemisia ludoviciana ssp. estesii	NI	NI	NI
Astragalus diaphanus var. dirnus	NI	NI	NI
Astragalus peckii	NI	NI	NI
Astragalus tegetarioides	NI	NI	NI
Botrychium ascendens	NI	NI	NI

TE&S SPECIES BIOLOGICAL EVALUATION SUMMARY OF CONCLUSION OF EFFECTS

Botrychium crenulatum	NI	NI	NI
Botrychium minganense	NI	NI	NI
Botrychium montanum	NI	NI	NI
Botrychium paradoxum	NI	NI	NI
Botrychium pinnatum	NI	NI	NI
Calochortus longebarbatus var. longebarbatus	NI	NI	NI
Calochortus longebarbatus var. peckii	NI	NI	NI
Carex backii	NI	NI	NI
Carex hystercina	NI	NI	NI
Carex interior	NI	NI	NI
Carex stenophylla	NI	NI	NI
Cypripedium parviflorum	NI	NI	NI
Camissonia (Oenothera) pygmaea	NI	NI	NI
Dermatocarpon luridum	NI	NI	NI
Lomatium ochocense	NI	NI	NI
Mimulus evanescens	NI	NI	NI
Penstemmon peckii	NI	NI	NI
Rorippa columbiae	NI	NI	NI
Scouleria marginata	NI	NI	NI
Thelypodium eucosmum	NI	NI	NI
Thelypodium howellii ssp. howellii	NI	NI	NI

NE No Effect
LAA Likely to Adversely Affect
NLAA Not Likely to Adversely Affect

BE	Beneficial Effect
NLJ	Not Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat.
LJ	Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat.
NI	No Impact
MIIH	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
WIFV*	Will Impact Individuals or Habitat With A Consequence That The Action May Contribute To ATrend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species
BI	Beneficial Impact
N/A	No Habitat or Species Present

***Trigger For A Significant Action As Defined in NEPA**
****Note: Rationale For Conclusion of Effect Is Contained In The NEPA Document.**
Form 2 (R-1/4/6-2670-95) Updated 5/99

APPENDIX B

RESPONSE TO COMMENTS

Turnpike Pit Medusahead Control Environmental Assessment

Response to Comments from the Blue Mountain Biodiversity Project

Control Method

1. There is no justification given as to why handpulling would take 10 years to achieve.

> *Page 27 of the EA describes results of past efforts on Paulina Ranger District at controlling medusahead by handpulling. Based on those results, and as stated in the document, it is reasonable to conclude there is a* ***maximum*** *potential of 33% plant density reduction in a given year. The range of density reduction observed is between 30-50% for sites <1/4 acre in size. Based on the size of the Turnpike Pit infestation, a lower figure within the range is more realistic. A 33% density reduction each year results in approximately 2% estimated residual plant cover by the 10th year (67% year one, 45% year two, 30% year three, etc.). Handpulling does not contain the spread of medusahead, the infestation will continue to increase in perimeter, despite density reduction, taking years to control the infestation.*

2. There is insufficient rationale for not using volunteers to handpull weeds.

> *The rationale for contracting out labor instead of using volunteers is given on page 22 of the EA. As noted, after year four costs are reduced to reflect using youth crews (a savings of 85%). Medusahead is an annual grass. The morphology of this plant, page 3 of the EA, results in prolific seed production. To be successful at containing the infestation, highly aggressive efforts are necessary to remove as much seed as possible; therefore contract labor was chosen as the most effective method for the first four years. Past efforts to secure volunteer labor for weed pulling on the District have been unsuccessful.*

3. How thorough and repeated were the past manual control attempts? Why did they fail? What was the timing?

> *Manual control efforts of medusahead on the District have not failed. Plant density has been reduced (EA page 27), this method would not be proposed if it was completely ineffective. Past handpulling of medusahead infestations have been very thorough, using a crew to pull plants while in seed, but before maturity, usually in July. Follow-up treatment is done in the fall to dispose of any additional seed head production.*

4. What are the parameters of the boom sprayer? Spraying Range? Accuracy?

> *The ATV-mounted boom sprayer is a Boom Buster, manufactured by Spraying Systems Inc. It is mounted directly behind the rider on the tank, and has a maximum spraying range of 25 feet using the standard tip. There are two nozzles that work independently to spray to*

the left and/or right of the ATV. The tips are calibrated for large droplet size which decreases drift. The accuracy of application to target species is very good with this small sprayer, especially with a 12.5' spray pattern per nozzle. The edges of the infestation would be sprayed using a backpack sprayer which has the ability to target individual plants (EA pages 9, 15).

5. The potential for medusahead spread with glyphosate use is ignored.

The EA analyzes the key issue "Treatment Effectiveness" (page 24) which contains a measure of plant density reduction and potential for spread (pages 24-27). These pages go into detail about the expected spread of medusahead using glyphosate.

6. There is no consideration of other invasive plant control methods (other than herbicide use) that could be combined with hand-pulling for greater effectiveness. Why is hand pulling of medusahead considered marginally effective?

The interdisciplinary team considered other options for treating the medusahead infestation (EA page 12). The current infestation is within a rock pit, where topsoil has been removed, which limits control effectiveness of other methods.

Hand pulling is considered marginally effective (EA page19) because it does not contain the infestation. It does help slow the rate of spread by reducing plant density, which in turn helps reduce seed production. The fact that this particular weed is a small grass makes it easy to overlook plants while pulling.

7. Inerts in the glyphosate formula need to be identified and their potential impacts fully disclosed.

There are no additives in the Glypro formulation of glyphosate. Inert ingredients in Glypro are inert, meaning they display no pesticide activity. These ingredients are often not disclosed and are protected by the manufacturer because they enhance performance of the pesticide. All tests conducted by the EPA are on the herbicide formulation, not just the active ingredient; therefore toxicity results include the inert ingredients. Phase, a foliar penetrant (adjuvant), would be added to improve the effectiveness of the herbicide (EA page 9). Phase is a methylated seed oil (soybean). Adjuvant ingredients are not required to be disclosed as they are protected as Confidential Business Information, unless they include hazardous ingredients. Phase contains no hazardous ingredients; it carries a Caution label because it has potential to cause eye and skin irritation. Some toxicity testing has been done, finding Phase to be a class IV (lowest rating) for acute toxicity. The oral LD_{50} is >5 g/kg, and the dermal LD_{50} is >2 g/kg, indicating a very low potential for impacts.

Wildlife

1. We are especially concerned about potential toxicity to sage grouse. There is no basis given for the assumption that impacts to individuals will not lead to a trend toward listing. Glyphosate could be immediately toxic to sage grouse.

The effects of glyphosate on sage grouse is discussed on page 3 of the EA. Glyphosate could not be immediately toxic to sage grouse. EPA studies (1993) on glyphosate determined that the amount of chemical, at 83% active ingredient, given to bobwhite quail to obtain a 50% mortality rate was greater than 2,000 milligrams per kilograms of quail body weight. At the proposed formulation rate of 53. 8%, a sage grouse would require more than 2,500 mg per kilogram body weight to obtain a 50% mortality rate (LD_{50}).

The following table (Table 1) identifies the acute dosage scenario under the proposed action, Alternative 2, that could occur through ingestion of contaminated vegetation as described in Glyphosate: Human Health and Ecological Risk Assessment (SERA 2003).

Table 1. Level of Daily Acute Exposure to Glyphosate For a Large Bird, at the application rate of .25 gallons/acre.

Range of Dose	**Amount of Exposure (mg/kg/day)**
Low	26.9
Central	26.9
High	76

The highest rate of acute exposure is 76 mg/kg/day. This is 3% of the LD_{50} dosage that EPA (1993) identified as a mortality standard for game birds (bobwhite quail). The low and central dose levels are equivalent to 1% of the LD_{50} dosage level described by the EPA.

Further, avian subacute dietary toxicity findings concluded that mallard ducks and bobwhite quail fed a long-term diet of glyphosate was no more than slightly toxic and resulted in no reproductive impairment.

Table 2 identifies the long-term exposure level scenario relevant under Alternative 2 expressed in milligrams per kilogram of body weight per day of glyphosate that could be ingested or otherwise effect a large bird, as defined and described in SERA (2003).

Table 2. Level of Daily Long-term Exposure to Glyphosate For a Large Bird, at the application rate of .25 gallons/acre.

Range of Dose	**Amount of Exposure (mg/kg/day)**
Low	1.48
Central	4.42
High	41.6

For long term exposure levels for a large bird, dosage levels for low and central ranges are less than 1%, and 2% for the high end range of the LD_{50} dosage that EPA (1993) identified as a mortality standard for game birds.

Given the very low percentage of potential consumption in comparison to the standard for lethal levels (less than 3% acute and 2% long-term), compounded by small percentage of forage habitat affected relative to habitat available outside the immediate project area (3 acres vs. several thousand acres of suitable un-treated foraging habitat), further compounded by the poor quality of the project area as foraging habitat (project area is

within an open rock pit with no shrub cover in the treated areas), the risk that individual sage-grouse would consume sufficient amounts of the herbicide that would result in mortality to individuals is negligible. The risk of individuals consuming contaminated forage in the rock pit is low, due primarily to poor habitat conditions (absence of cover habitat) and the very small area affected relative to the total acres of suitable habitat available. In the event that individuals do consume contaminated vegetation, the level of consumption would not occur at lethal levels, due primarily to the low application rate of herbicide proposed.

In the unlikely event that enough contaminated forage was consumed to result in mortality that level of mortality would not contribute to a trend towards listing under the Endangered Species Act (ESA). Habitat in and around the project area is moderate to low quality forage habitat, based upon comparison of suitable sage-grouse habitat as defined in Connolly et al. (2004). Telemetry and sightings data indicate low levels of habitat use, with only a few scattered sighting and no telemetry recordings in the project area. This would indicate a small percentage of the sage-grouse population in the upper Crooked River basin/Beaverdam Creek area utilize these habitats, and thus a low percentage of the population that would have the potential to be exposed. As a result, mortality in individuals that utilize those treated habitats would not affect overall population levels or trends, as they are currently monitored, because they would make up a only a small percentage of the total population. It is also important to note that the US Fish and Wildlife Service determined that the greater sage-grouse did not warrant listing under the ESA as it was petitioned.

2. Assumptions of "negligible" toxicity to sage grouse (please define negligible) are based on industry studies by the corporation manufacturing the herbicide, which has a vested interest in selling their product. Further, what laboratory animals are these studies based on?

Additional information on the toxicity effects to upland birds was added to the EA to clarify why the effects are negligible to sage grouse. Webster's Dictionary defines negligible as "so insignificant as to be unworthy of consideration". The Environmental Protection Agency determines the conditions under which uses and products of herbicides will be allowed, not the manufacturer. All pesticides are regulated by two Federal laws, the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug and Cosmetic Act. The EPA, working in concert with these Acts, determines the human and environmental risks associated with the product, and also determines which studies will be performed on what species. For example the EPA determined that avian toxicity studies of glyphosate would be done on bobwhite quail to represent upland game species, and mallard ducks to represent waterfowl species.

The bobwhite quail weighs approximately 170 grams. The greater sage-grouse weighs approximately 1,500 to 2,900 grams depending upon sex. The greater sage-grouse is 9 to 17 times the size (in mass) of the bobwhite quail, and thus would require greater levels of available and consumed herbicide to induce mortality or other adverse effects to individuals. See the response to #2 above for further explanation of toxicity effects to sage grouse.

Document Analysis

1. The EA is systematically biased towards the proposed alternative. For instance, analysis of direct and cumulative impacts is based almost exclusively on the rate of spread of the medusahead rather than other factors such as the toxicity of glyphosate or its impacts to native plants.

> *The purpose of the project is to control the noxious weed medusahead before it moves outside of the area impacted by the rock quarry, and into native scabland vegetation. The effects of medusahead on native vegetation and subsequently to wildlife, soils and other resources is well documented in scientific literature (refer to pages 1 and 3 in the EA). Therefore, how each control option controls the rate of spread is the crux of meeting the purpose and need for the project.*
>
> *Direct, indirect and cumulative effects of the toxicity of glyphosate are addressed in Key Issue #2 Human Health Risk, which includes measures for assessing the risk to both the applicator and the public (EA p 16-18). Toxicity of glyphosate is also addressed under the issues: Water Quality (EA p.27-29), Proposed, Endangered, Threatened, Sensitive Plant, Animal and Fish Species EA p. 29-36), Management Indicator Species (EA p.38-41), Land Birds, including Migratory Species (EA p. 41-43), and Soil Productivity (EA p.43-45).*
>
> *Direct, indirect and cumulative impacts to native plants are addressed under Key Issue #1 Effects to Native Vegetation (EA p. 14-16)*

2. The cumulative effects of additional herbicide use need to be analyzed in connection with future herbicide spraying (qualitative and quantitative effects by species).

> *As stated on page 17 in the EA, future herbicide use under a site specific EIS for additional noxious weed control has not been developed at this time, therefore quantitative information as to type and amount of herbicide are unknown. Weed presence in the area is quite low. Weed species, location, and acreage in the vicinity of the Turnpike Pit are listed below:*

Species	*Size*	*Miles from Pit*	*Location*
Whitetop	*0.01 ac.*	*1.1*	*58 Road*
Canada thistle	*0.01 ac.*	*6.0*	*5850-400 Road*
Teasel	*0.1 ac.*	*5.8*	*5850-400 Road*
Spotted knapweed	*0.15 ac.*	*7.0*	*5840 Road*

Treatment Cost

1. There is no itemization or justification of the absurdly high cost attributed to hand pulling.

> *A document examining the cost breakdown for hand pulling medusahead is located in the analysis file. The costs are based on the required wage scale for Government contracts under the Fair Labor Standards Act. The current forestry labor rate is $12.75 per hour for*

each worker. These required rates are used for the first four years of treatment. Subsequent years (6-10) were calculated at the typical rate for cost-share type crews that include partnership funding from outside sources.

Soil Effects

1. What are the effects of glyphosate persistence in soils for 1-3 weeks to soil fertility, microorganisms, water uptake by plants, etc?

The Human Health and Ecological Risk Assessment for Glyphosate (SERA 2003) states "there is very little information suggesting that glyphosate will be harmful to soil microorganisms under field conditions and a substantial body of information indicating that glyphosate is likely to enhance or have no effect on soil microorganisms (Busse et al. 2001; Wardle and Parkinson 1990a,b; Wardle and Parkinson 1991)".

SERA also reports that soil concentrations of 100 ppm of glyphosate or AMPA had no significant effect on soil denitrification (Pell et al. 1998). Bromilow et al. (1996) noted no effects on soil fertility in repeated applications over 14 years – 1980 to 1993 – of glyphosate at 1.4 kg/ha based on assays
for microbial biomass and crop productivity. Several field studies involving microbial activity in soil after glyphosate exposures note an increase rather than decrease in soil microorganisms or microbial activity (Haney et al. 2002; Hart

Glyphosate is effective only as a foliar application, it is not soil active. It binds to soil particles; plants do not take up glyphosate (EA page 16).

Prevention

1. The Forest Service should be thoroughly exhausting prevention methods to prevent invasive weed introduction and dispersal first before using toxic herbicides.

The Forest Service regularly uses prevention measures to reduce the likelihood of noxious weed introduction, however once a weed is established, prevention measures only help to contain the spread. The Forest has implemented practical prevention measures to help contain the spread (closing the pit to FS use and signing the area, EA pages 4, 9). Other measures suggested in the comments, such as closing the area to forest visitors would not be effective due to the open nature of the surrounding area. Putting a gate on the road would lead to vehicles driving through sensitive scabland soils to go around the gate. The Hardcorner Fuels project is a proposed activity; no decision has been made as to the amount and location of burning units. The presence of medusahead in the vicinity of the Hardcorner Fuels area will be an issue that will help develop alternatives to the proposed action.

Human Health

1.) We are concerned about potential health impacts to Native Americans from eating contaminated levels of edible plants gathered that have been affected by herbicide drift.

The EA analyzes Key Issue #2: Human Health Risk, and contains a measure relating to the potential exposure risk to the public from the application on glyphosate (EA pages 19-21). Maximum drift potential is estimated at 100' from the rock pit perimeter. The majority of this 100' is poor habitat for root-crop vegetation because the soil is highly disturbed and compacted by past activities surrounding the rock pit. Plants do not take up glyphosate from the roots; therefore roots could not become contaminated and consumed.

Glyphosate is considered a mild skin irritant when wet; handling wet plant foliage therefore may result in irritation. The EPA does not require dermal penetration studies of glyphosate because there are no toxicological endpoints to indicate a study is necessary (EPA 2003). Mitigation measures would be in effect to reduce the potential for drift and the potential for handling wet plant foliage (EA page 10). In addition, the District Ranger has decided that phone calls would be made to the Tribes informing them of the day of application. The site re-entry timeframe recommended by the EPA is 12 hours, after which vegetation would be dry and exposure potential very low.

As stated on page 20 of the EA, glyphosate metabolizes into amino methyl phosphoric acid (AMPA); neither glyphosate nor AMPA are metabolized by the body and tissue does not absorb either compound, they are excreted from the body through feces and urine (EPA 2003).

2.) Synergistic and additive health impacts are not properly disclosed…some herbicides do bioaccumulate and additional short-term exposure to glyphosate may worsen overall health of the applicator.

Bioaccumulation was addressed in the cumulative effects (EA page 18) because no one can predict safe exposure to any substance; the probability of harm is never zero (Felsot 2001). There are many factors that determine the probability of harm, the largest of which is the exposure and the subsequent dose. All compounds, whether synthetic or natural, are toxic at some dosage; vitamin A for example, is highly toxic in large quantities. Accumulation of harmful doses of glyphosate is unlikely. Glyphosate is not absorbed readily by skin (2% at most), and is non-volatile, making inhalation exposure equally as unlikely. This leaves oral exposure as the highest probability of potential harm. The Crook County Weed Master is a licensed pesticide applicator with over 20 years of experience; proper protective gear is used while mixing and during application.

In the event of oral exposure, the chemical is absorbed into the blood stream and then carried to tissue. Pharmacokinetics is the mechanics and rate of absorption and distribution in tissue, and the enzymatic detoxification and elimination from the body. Glyphosate is an amino acid related chemically to glycine. In the environment glyphosate is broken down into amino methyl phosphoric acid (AMPA). Neither glyphosate nor AMPA is absorbed

readily by the intestines, and mammalian tissue is not capable of breaking down glyphosate into AMPA, therefore, if either compound were ingested, 99% is eliminated through urine and feces within 24 hours.

Synthetic chemicals that can be persistent in the body and thus bioaccumulate, have been banned from the U.S. in the 1970's. Examples include polychlorinated biphenyls (PCB) and the insecticide DDT. Modern herbicides are either metabolized, or in the case of glyphosate, excreted without transformation rapidly from the body. They are not stored in fatty tissues and therefore do not bioaccumulate.

Native Vegetation

1. Non-selective boom spraying could eliminated the sparse native plants needed for revegetation and further encourage the spread of residual medusahead plants.

As described in the EA, the medusahead is currently confined to the area directly affected by the rock pit. There is very little native vegetation in this area (approximately 2-5% total cover). The pit has had the topsoil removed and very few plants are able to grow in this environment, weedy annuals comprise most of the cover (including non-native plants such as cheatgrass, EA page 14). Weedy annual species are not effective at competing with medusahead, and would have little if any, value for revegetation. Where the infestation is beginning to move toward the edge of the scabland, and thus native vegetation comprising approximately 40% cover, boom spraying would not be used, a backpack sprayer is planned which is selective to where herbicide is applied (EA pages 4, 9, 10, 15, 16, 20, 44).