



Dinosaur National Monument

Invasive Plant Management Plan & Environmental Assessment

Finding of No Significant Impact



Steamboat Rock, Echo Park

December 2005

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Background

In compliance with the National Environmental Policy Act, the National Park Service (NPS) prepared an Environmental Assessment (EA) to examine various alternatives and environmental impacts associated with the proposal to adopt and implement a monument-wide, fully integrated invasive plant management plan. This EA provides the framework, guidance, and considerations necessary for the thoughtful development of weed management project and operating (work) plans for invasive plant management and control that will reduce negative impacts on native plant communities and other natural and cultural resources within the monument.

Non-native, invasive plants are invading our national parks, causing tremendous damage to our resources and thereby threatening the structure, organization, function, and overall integrity of the natural ecosystems we aspire to protect. Called exotics, aliens, non-indigenous species, and weeds, these invasive non-natives get into our national parks by various means. Seeds and plant parts are brought into the parks by wildlife, wind, water, and humans. Fast-growing non-native plants can also encroach from populations established outside park boundaries. Once inside park boundaries, the most aggressive of these non-natives spread quickly into undisturbed as well as disturbed areas. These invasive plants often cause irreparable damage by upsetting the ecological balance plants, animals, soil, and water have achieved over many thousands of years. Invasive nonnative plants infest an estimated 7 million acres of NPS lands.

Dinosaur National Monument began managing for invasive species because of three concerns: threats to native plant communities and the wildlife that depend on them; threats to natural river processes and aquatic resources; and concerns from downriver agricultural producers regarding the increased invasion of perennial pepperweed and Russian knapweed into irrigated pastures (Naumann 2003).

Selection of the Preferred Alternative

Three alternatives were evaluated in the EA including Alternative I (continuation of current management practices – use of mechanical, chemical, cultural controls and limited prevention techniques to manage invasive plants), Alternative II (full use of Integrated Pest Management (IPM) techniques to manage invasive plants – use of mechanical, chemical, cultural, biological controls and expanded early detection/prevention techniques to manage invasive plants), and Alternative III (limited use of IPM techniques to manage invasive plants – use of mechanical, cultural controls and expanded early detection/prevention techniques to manage invasive plants). Alternative II is the NPS preferred alternative because it best meets the purpose and need of the plan as well as the NPS mandate to preserve natural and cultural resources now and for future generations. Implementing the preferred alternative will assist the monument to meet this and other federal, state, and local invasive species mandates by implementing the most effective and efficient IPM techniques.

The preferred alternative allows employment of all treatment techniques that are currently available or that may be available in the foreseeable future. IPM treatments that may be used under the preferred alternative include:

Mechanical Control - Using hand-pulling and/or mechanical or simple tools to uproot or remove the aboveground portion of plants by mowing, digging, pulling, and cutting seed heads and plants. Mechanical techniques for control of weeds in Dinosaur National Monument (DINO) include mowing, cutting/sawing, digging, pulling, spudding (severing of roots below the root crown), discing/plowing and smothering.

Cultural Control - Providing competition, stress, or control of invasive species through the use of prescriptive fire and/or livestock grazing, or by establishing native, desirable vegetation through various means (e.g. restoration, revegetation, etc.).

Chemical Control - Applying herbicides according to label requirements to kill or severely stress invasive plants. Examples of application methods include backpack (portable) sprayers and motor vehicle (truck, tractor, ATV-mounted sprayers).

Biological Control - Also called 'biocontrol', deliberately introducing or manipulating a pest's natural enemies (such as insects and pathogens) to stress targeted plants with the goal of suppressing the pest (invasive) population. Examples include plant-feeding insects, such as leaf beetles (*Diorhabda elongata*) for tamarisk. Approved biocontrol agents will be host-specific and have a negligible risk for becoming a pest.

Prevention - Preventing or reducing the likelihood of future weed infestation establishment. IPM includes actions that don't directly impact weed populations but are still an integral part of a successful weed management plan. These actions include prevention and early detection of weed introductions and spread, inventory, monitoring, and education.

No single management technique is perfect for all weed control situations. Often times, combinations of multiple types of treatments provide more effective and economical control of weeds with fewer detrimental impacts to people and the environment (Sheley et al. 1999a, DiTomaso 2000). IPM is the application of many kinds of technology in a mutually supportive manner that utilizes the strengths of different treatments while minimizing the weaknesses. It involves the deliberate selection, integration, and implementation of effective weed control measures with due consideration to economic, ecological, and sociological consequences. Often, a combination of techniques (mechanical, chemical, cultural, biological) is chosen that together will control a particular weed species or infestation efficiently and effectively, with minimal adverse impacts to non-target organisms.

IPM differs from ordinary weed management in attempting to address the ultimate cause of weed infestation, rather than simply focusing on controlling weeds (typically by using only herbicides) by combining two or more control actions which will interact to provide better control than any one of the actions might provide. It requires a thorough understanding of the biology and ecology of the weed species and the environment before selecting appropriate control techniques as well as more persistence and time than simply addressing the symptoms of weed infestation.

However, the long-term rewards are far greater and should lead to greater success in meeting management objectives.

IPM strategies are often species and site-specific, tailored to exploit the weaknesses of a particular weed species, and designed to meet the desired level of control and to be practical with minimal risk to desirable organisms and their habitats. In this way, the IPM program incorporates an adaptive management approach into its planning and program implementation.

Under the preferred alternative, resource management will use an IPM Decision Matrix that was developed specifically for this plan. This tool illustrates the decision-making process and considerations a resource manager uses in implementing true IPM to arrive at the most effective and efficient solution to an invasive species problem. Using the matrix, managers will identify potentially invasive species and prioritize them, identify a realistic management goal for the population or species based on site considerations and viability and feasibility of available techniques, identify conservation measures to eliminate or mitigate any adverse impacts caused by those techniques, and finally monitor the implementation of the management strategy. Resource management will be able to use this process to explain to other staff and the public how each of these factors was considered in selecting the management strategy that is compliant with this plan.

The preferred alternative provides for the proactive and full implementation of all 10 proposed management actions that embody the Invasive Plant Management Plan. Those actions are:

1. *Prevent new infestations by employing prevention and early detection techniques*
2. *Educate visitors and staff about invasive plants and their management in Dinosaur National Monument*
3. *Inventory invasive plants in Dinosaur National Monument*
4. *Monitor effectiveness of control efforts*
5. *Track invasive plant management efforts*
6. *Prioritize both invasive plant species and locations to be controlled*
7. *Work with adjacent landowners, local, state and federal agencies, local interest groups, weed cooperative networks, and others to develop and achieve common goals of invasive plant management*
8. *Identify control techniques most appropriate for each species*
9. *Create annual work plans to guide invasive plant management activities*
10. *Restore natural conditions*

Mitigation Measures Included Under the Preferred Alternative

Resource management staff responsible for supervising the implementation of the invasive plants management plan is responsible for ensuring the awareness of and adherence to mitigation measures. In addition to implementing the mitigation measures below, DINO will also implement a comprehensive set of Best Management Practices, or BMPs, as part of the Invasive Plant Management Plan that focus on planning and prevention of unnecessary disturbance and accidental species introductions that may occur as part of normal monument maintenance and operations. These BMPs can be found in Appendix D of the Plan and EA.

The following mitigation measures are organized by resource topic under the preferred alternative:

Soils and Vegetation; Wetlands and Floodplains

- Type of mowing equipment will be selected based on the patch size, density of the target species, and terrain. Large, dense patches are suitable for vehicle-drawn mowing equipment, while small, dispersed patches are more suitable for control with hand-held equipment, such as a weed-whip.
- Tractor-drawn equipment will also be limited to use in areas where access is not restricted.
- Off-road vehicles used for control will avoid wetland areas with standing water or saturated soils, to the extent practical and will be operated to minimize disturbance to vegetation and soils. They will not be operated where soil is susceptible to compaction, erosion, or creation of wheel ruts.
- Off-road vehicles will be transported by trailer from one general area of the monument to another to avoid unnecessary cross-country travel and tracks.
- All mowing activities will be timed so that they are performed before there is a danger of contributing to the spread of viable seed.
- Cut plant material will be removed from the site if it may prevent establishment/growth of desirable vegetation and appropriately transported and disposed of in a way so that no propagules are spread. If plant material can or must be left, it will be piled or scattered in a way that it does not re-root or interfere with desirable vegetation.
- Revegetation will be implemented as quickly as possible to large areas of bare soil to reduce the danger of erosion caused by any loss of vegetative cover. Small areas that are adjacent to healthy native vegetation will be allowed to recover naturally, whenever possible.
- Smothering will only be used on infestations that are pure or nearly pure monocultures of target species.
- Heavy equipment use will be limited to areas where there is no danger of major compaction and tire ruts will be raked out.
- Damage to soils will be minimized by using existing access routes, when possible, avoiding sensitive soils and moving supplemental water sources to spread out congregating livestock.
- Where soil destabilization is not desired, the full removal of root systems will not be employed.
- Spudding will not be utilized in large or high-density patches to prevent excessive soil disturbance, unless all other potential treatments are deemed unfeasible.

- Any plowing or discing will be limited to sites and to depths where there is evidence of historic plowing or discing and will be limited to very specific conditions in areas where all other treatments are deemed ineffective or have a higher probability of negative effects.
- If deemed necessary, erosion control techniques, such as wetting to promote soil structure formation, biodegradable fiber-based erosion control netting or vegetal-based soil tackifiers will be used to stabilize soils.
- Temporary and existing permanent fencing will be used to ensure that grazing does not occur in areas where it is not intended.
- In plant communities composed of target and desirable species, prescribed grazing will only be used where a difference in phenology or palatability is sufficient to protect desirable species from damage or when litter removal is the management goal.
- To prevent the unintentional introduction of weed species through feces, livestock will be quarantined for a minimum of 48 hours prior to entering Dinosaur National Monument, where they will be fed a weed-free diet. Required quarantine periods could be longer depending on prior location of the animals, invasive species present in that area, biology of weed seeds and length of time required for animals to pass them, or at the request of the allotment permittee. At this time they will be inspected for weed seed attached to fur and cleaned sufficiently.
- Revegetation will be implemented as quickly as possible where necessary to reduce the risk of undesirable erosion.
- Selection of restoration species will be limited to native species that exist naturally in the region to prevent the accidental introduction of new invasive species. To minimize genetic contamination, propagules will be collected or propagated from the closest sites possible, as long as the collection site remains healthy and resilient to future disturbance. The benefits of local propagule collection must be weighed against the need for prompt revegetation. In many cases it may be more important to prevent establishment of non-desirable species and stabilize soils than to wait for sufficient seed to be collected locally. Planning will be utilized to assure that appropriate seed is available at the necessary time, and local collections will be prioritized based on available information concerning each species' genetic site-specificity.
- The use of non-native species will only be considered if it can be justified based on the need to establish vegetation under conditions that are not suitable for native species and if the non-native species is known to be non-invasive. Reference sites will be used whenever possible to help guide species selection and composition.
- Only certified weed-free seed will be used.
- All prescribed fires for weed management will be coordinated by a qualified fire management officer and be conducted in accordance with existing fire policy at Dinosaur National Monument.
- When possible, prescribed burns for invasive species management will be limited to monotypic stands of target species that respond negatively to fire or mixed communities where desirable vegetation benefits and target species are negatively impacted.
- Areas with sensitive soils and where excessive fuel build-up is likely to lead to high intensity fires will be excluded from burning.
- Erosion will be minimized by taking into account soil type and slope before burning, and by implementing any necessary revegetation afterwards as quickly as possible.
- All equipment will be washed prior to entering DINO and will be cleaned before leaving the site to prevent the spread of viable propagules to other sites.

- The use of a seed drill will be limited to species and project sites that require it for successful establishment. Appropriate techniques will be used to prevent the formation of obvious rows, and drill use will be limited to soils that are not prone to compaction. Decompaction treatments will only be used if necessary for the establishment of vegetation (i.e. road removal) or if performed as an initial weed management treatment.
- Harrowing will be limited to sites where there is no risk to desirable vegetation or danger of soil compaction.
- Hand raking will be used in smaller-scale sites if there are potential impacts to desirable vegetation or soil.
- In order to ensure that herbicides do not cause damage to existing desirable plant communities, all applications will be performed in accordance to the manufacturers specification label and by qualified applicators. In addition, the following guidelines will be observed:

Herbicide:	Mitigation to limit impacts to desirable vegetation due to selectivity:	Mitigation to limit impacts due to herbicide persistence and soil activity:
Chlorsulfuron	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable dicots and annual grasses and desirable perennial grasses.	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include dicots or annual grasses or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Clopyralid	Limit application to painting/wicking/squirting, spot spraying, monocultures, or to communities composed of undesirable dicots and desirable grasses.	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include dicots or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Fluazifop-p-butyl	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable grasses and desirable dicots.	None
Glyphosate	Limit use to painting/wicking/squirting, spot-spraying or monocultures.	None
Hexazinone	Limit use to painting/wicking/squirting, spot-spraying or monocultures.	Limit use to sites where active revegetation is not necessary or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Imazapyr	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable dicots and perennial grasses	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include dicots or perennial grasses, or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby

Herbicide:	Mitigation to limit impacts to desirable vegetation due to selectivity:	Mitigation to limit impacts due to herbicide persistence and soil activity:
	and desirable annual grasses.	desirable vegetation.
Imazameth/ Imazapic	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable dicots and annual grasses and desirable perennial grasses.	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include dicots, annual grasses or affected perennial grasses (see herbicide label) or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Metsulfuron	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable dicots and annual grasses and desirable perennial grasses.	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include dicots or annual grasses or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Sulfometuron-methyl	Limit use to painting/wicking/squirting, spot spraying or monocultures.	Limit use to sites where active revegetation is not necessary or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
Triclopyr	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable woody or annual dicots and desirable grasses and perennial forbs.	Limit use to sites where active revegetation is not necessary, sites where revegetation does not include woody or annual dicots, or to time of year when revegetation will not be affected. Follow label directions to prevent damage to susceptible nearby desirable vegetation.
2,4-D	Limit use to painting/wicking/squirting, spot spraying, monocultures or communities composed of undesirable dicots and desirable grasses.	Limit use to sites where active revegetation is not necessary, to sites where revegetation does not include dicots, or wait at least 10 days after application to revegetate. Follow label directions to prevent damage to susceptible nearby desirable vegetation.

- Adjuvants that include fertilizers will be excluded from use. Adjuvants are, for the most part, unregulated since they are considered “inert” ingredients; however, Washington and California do regulate them along with all pesticides. Therefore, only adjuvants that are registered with the state of California will be used.
- *Painting/wicking/squirting*: Affects to non-target species will be minimized by using an appropriately scaled application device. Damage from spills will be minimized by limiting the amount of concentrated herbicides to one liter in any one container carried into areas composed of non-target vegetation. In addition, procedures established by DINO for responding to hazardous material spills will be adhered to.
- *Backpack sprayer*: Damage caused by over spray will be minimized by adjusting the spray nozzles to deliver the appropriate droplet size and spray area for the scale of the target plant.

Spray nozzles will be held as closely as possible to the target plants and application will be limited to days with negligible wind and appropriate temperatures.

- *Granular application:* Because of the lack of selectivity of this treatment technique, it will be limited to monocultures of target species or to communities composed of target species and desirable species that are not susceptible to the herbicide. A buffer zone is required when applying herbicide in granular form in the vicinity of desirable susceptible vegetation. For monocultures, revegetation will be implemented as quickly as possible to prevent re-colonization by undesirable species and reduce the risk of erosion.
- *ATV/tractor-mounted sprayer:* Damage caused by overspray will be minimized by adjusting the spray nozzles to deliver the appropriate droplet size and spray area for the scale of the infestation. Spray nozzles will be mounted as closely as possible to the target plants and application will be limited to days with no appreciable wind. Use of heavy equipment will be limited to soils that are not prone to compaction. Tire ruts will be raked out. Revegetation will be implemented where necessary in a timely manner to prevent re-colonization by undesirable species and reduce the risk of erosion.
- To minimize the risk to desirable vegetation, Dinosaur National Monument will only use bio-control agents approved for release by APHIS and the Biological Pest Control Section of the Colorado Division of Plant Industry and supported by USFWS.

Wildlife

- DINO staff will be consulted so that invasive species control occurring in sensitive wildlife habitat will not occur during critical times of year, such as nesting or calving.
- Domestic livestock used for prescribed grazing will be contained during the grazing event (pen, fenced pasture) and wildlife/large animal veterinarians will be consulted before each prescribed grazing event to ensure any risks to domestic animals and wildlife are negligible.
- Use of domestic livestock for prescriptive management purposes will be limited to times of the year when disturbance will not disrupt critical wildlife activity. Critical habitat and food sources will also be protected during grazing events, though wildlife will not be excluded from these areas.
- Prescribed fire may be implemented in weed monocultures or in plant communities that will benefit from burning.
- Critical wildlife habitat features, such as snags or nonfire-adapted vegetation will be excluded from burning through the use of fuel breaks or other protective measures.
- Streams, rivers, and ponds will be avoided when applying fire suppressant agents other than water.
- Restoration activities will be timed to the extent possible so that the least disturbance to wildlife occurs.
- Where possible, natural recolonization of habitat will be the preferred restoration technique unless substantial risk of erosion or reinfestation is present.
- All of the herbicides considered for use in DINO have a slight to low toxicity rating for wildlife and those with shorter half-lives will be used preferentially. If an herbicide with a long half-life is deemed necessary for use near wildlife, all efforts will be made to use it a time of year when the least amount of exposure will result and/or applied in the most selective manner to reduce the amount of herbicide used.
- Only adjuvants registered with the State of California will be used.

- Only ground-based equipment, including backpack sprayers and spray units on ATV, trucks, etc. will be used in low wind conditions. There will be no aerial pesticide applications.
- Herbicide will be applied in spot applications using hand equipment (backpack sprayer) during the post-flood stage in low-wind situations where particular riparian invasive species (namely tamarisk and Russian olive) grow up to the water's edge and indirectly threaten habitat for riparian and aquatic wildlife. No applications will be made along the major river corridors within six months prior to the earliest peak flow date (May 15) to ensure an immeasurable amount to no active ingredient remains in the vegetation or soil when natural floods return.
- Biocontrol agents will only be considered when high value wildlife habitat is substantially threatened by the target weed and the scientifically predicted risk to non-target native vegetation and wildlife is acceptably low.

Threatened and Endangered Species

- All areas where weed management activities (including access routes) are proposed that coincide with potential habitat for listed species will be surveyed prior to implementation. Staff will also consult monument botanist or plant database, if available, to identify known locations of rare plants.
- Surveys will be conducted at a time of year when the listed species can be readily detected, and individuals or areas where they exist will be marked.
- All invasive plant personnel and crews removing plants will be able to identify invasive species and at least one crewmember will be able to identify rare species expected to be present in the area.
- After comprehensive surveys have been completed, the control technique that best fits the characteristics of the plant community will be chosen. Efforts will be made when possible to time herbicide applications when the target species is vulnerable but the listed species is not. If there is a need to use herbicide in a community composed of both target and listed species the label will be followed and the application technique that poses the least risk of application to non-target species will be used. It isn't possible to plan for every combination; however, the following chart can provide basic guidelines for appropriate tool selection:

Target Sp. Density	Listed Plant Species Density		
	High	Medium	Low
High	Mechanical controls may not be appropriate; spray selective herbicide (do test section first).	Mark listed species. Weed-whip, pulling, spudding or cutting; spray selective herbicide (do test section first).	Mark listed species. Plowing, mowing, weed-whip, pulling, spudding or cutting; spray selective herbicide (do test section first).
Medium	Mark listed species. Weed-whip, pulling, spudding or cutting; wick application or cut-stump.	Mark listed species. Weed-whip, pulling, spudding or cutting; wick application or cut-stump.	Mark listed species. Weed-whip, pulling, spudding or cutting; wick application, spot-spraying or cut-stump.
Low	Pulling, spudding or cutting; cut-stump or wick application.	Pulling, spudding or cutting; cut-stump or wick application.	Mark listed species. Pulling, spudding or cutting; wick application, spot-spraying or cut-stump.

If mechanical controls appear likely to cause damage to listed species from trampling or soil disturbance caused by operator foot traffic, other techniques will be considered. If herbicides are used, modifications to the guidelines will need to be made depending on the size and growth form of both target and listed species, soil characteristics and proximity to water.

- Prior to implementation of mechanical controls, areas that are potential habitat for listed wildlife species will be surveyed. If they are found in the vicinity of the treatment area, treatments will be limited to ones that are unobtrusive or to times of year when the listed species are not present or less affected by disturbance.
- Domestic livestock used for prescriptive management of invasive species will be excluded from sites (including access routes) where listed plants are known to occur or during seasons when listed plants are vulnerable to damage or where there is a risk of transmitting diseases to wildlife or during critical times of the year.
- Prescribed fire will only be used at sites where listed plants or animals are known to benefit from burning. Otherwise, fire will be excluded, either spatially or temporally to prevent damage to listed plant or wildlife species habitat values.
- Fire suppressants (foams) will not be applied on or near open water (rivers, streams, ponds).

- Selection of restoration species will be limited to native species that exist naturally in the region, or non-native species that are known to not spread, to prevent the accidental introduction of new invasive weeds that will endanger listed plant or wildlife values.
- Seed must be certified weed free, and all equipment used must be washed prior to entering the monument.
- Larger equipment associated with restoration, such as seed drills, seedbed preparation equipment or harrowing equipment will not be used in the vicinity of listed plant species unless there is a direct benefit to the listed species.
- Restoration activities will be timed so that negligible disturbance to listed wildlife occurs.
- Herbicide use will be avoided in the vicinity of listed plant species.
- All restrictions outlined on herbicide labels will be followed.
- Chemical controls will be used in the vicinity of listed wildlife or their habitat when other weed management techniques might cause undue disturbance to listed wildlife or their habitat or are deemed infeasible.
- Herbicides that are of low toxicity to wildlife and/or that will degrade before wildlife are likely to encounter them will be used and will be applied in a manner that uses the least amount, but still remains effective and that best protects habitat for listed species.
- Herbicides that are toxic to aquatic species and/or have high mobility in soils and/or persist in the environment will not be applied to soils or sprayed on foliage near water. Instead, when a particular herbicide is deemed necessary for control of the target species, it will be applied either as a cut-stump application or to foliage with a wick or during periods when its potential to impact aquatic species is at a minimum (e.g. post-flood stage in river corridors, after critical spawning or nursery periods). No applications will be made along the major river corridors within six months prior to the earliest peak flow date (May 15) to ensure an immeasurable amount to no active ingredient remains in the vegetation or soil when natural floods return.
- Only ground-based equipment, including backpack sprayers and spray units on ATV, trucks, etc. will be used in low-wind conditions. There will be no aerial pesticide applications.
- Only biocontrols that are deemed host-specific and have been approved by APHIS and USFWS are approved for release. Biocontrol agents for target species closely related to native plants of the Colorado Plateau, and especially listed species, will be excluded from intentional release in DINO.
- Populations of listed wildlife that are considered at risk of competition from other wildlife will be evaluated for the effect of a biocontrol release. If a biocontrol release is expected to cause an increase in such competition, based on the size of the target infestation, the type of biocontrol agent, the proximity of listed wildlife to the infestation and the proximity of competing wildlife, it will be excluded from use in DINO.

Water Quality

- Treatments will be avoided that create large areas of bare soil near open water to reduce the risk of increased turbidity from mechanical controls in areas where vegetated banks are desirable. If they cannot be avoided, they will be stabilized with erosion-control methods and bare soil will be revegetated as quickly as possible, where appropriate. In some instances (within or along the river channel) the desired outcome may be unvegetated sand, gravel, or cobble.

- Vegetated buffer strips may be maintained between denuded areas and riparian corridors where appropriate to reduce the danger of increased turbidity from cultural controls in areas where vegetated banks are desirable. If these cannot be maintained, artificial erosion control measures will be installed to act as a buffer strip.
- Revegetation, if needed, will be implemented as quickly as possible.
- Impacts to water quality from livestock will be minimized by preventing access by livestock to open water or saturated soils.
- All herbicide labels will be followed to ensure that contamination of water does not occur.
- All herbicide applied to soil as a spray or granules or applied to foliage with a spray within 500 ft. of open water or with a depth to groundwater of less than 50 ft. will be evaluated using the Relative Aquifer Vulnerability Evaluation (RAVE) system for assessing risk to water quality. If a site scores above 65, then a wick, basal bark, or cut-stump application will be used. Consideration will be given to toxicity, soil mobility, persistence and selectivity in evaluating risk.
- Applications of pesticides within 50 feet of surface water bodies (including streams, rivers, lakes, and waterways) will be done by hand or with vehicle mounted ground equipment to minimize the potential impacts to surface waters.
- Pesticides will only be applied when meteorological conditions at the treatment site allow for complete and even coverage and will prevent drifting of spray onto non-target sensitive resources or areas used by humans.
- If possible, infestations near or in water will be treated with glyphosate (marketed as Rodeo) or imazapyr (marketed as Habitat) since they are two of the few herbicides registered for use in or near water. If glyphosate or imazapyr are not effective against the target species and no other effective techniques are feasible for the infestation, the next effective herbicide with the lowest risk to aquatic organisms will be applied with a wick or as a cut-stump or basal bark application.
- Only adjuvants registered with the State of California will be used.

Wilderness

- A minimum tool analysis will be conducted to determine the least intrusive tool, equipment, device, force, or practice that will achieve both Wilderness and invasive weed management objectives. Planned actions that involve the use of mechanized tools or equipment (e.g. chainsaws) will be subjected to a minimum tool analysis by the monument's interdisciplinary team (IDT) that is described in Appendix H.
- If Wilderness is designated in the future, IPM practices will be evaluated to ensure consistency with an approved Wilderness management plan.
- Where grazing is permitted within the monument, use of domestic livestock for prescribed grazing will be managed under conditions and requirements identified within any future Wilderness plan and the corresponding allotment management plan.
- Only biocontrols that are deemed host-specific by APHIS and other associated federal agencies using the best available science and monitoring techniques will approved for release in DINO, should they match the monument's need for management of a particular species.
- Efforts will be made to minimize the number and duration of trips and reduce the visibility of IPM activities.

- Unavoidable impacts, such as vehicle tracks, will be mitigated immediately after invasive plant control activities are completed. Mitigation methods will be included in the administrative record for the Minimum Requirement Analysis.
- Whenever possible, invasive plant management activities in Wilderness will be timed to avoid peak visitor use periods.
- Visitor complaints regarding management activities in Wilderness will be directed to the Chief of Research and Resource Management. Whenever possible, the Chief will contact the visitor directly to try to resolve the complaint. The Chief and resource management staff will then review the Minimum Requirement Analysis, re-evaluate alternatives and, if appropriate, consider implementing additional mitigation measures to address visitor concerns.

Air Quality

- Most pesticides recommended for use have a low volatility. Those pesticides with higher volatility will be used at low concentrations and will be used in conditions and in a manner consistent with product labeling, as required by law.
- Pesticides will only be applied when meteorological conditions at the treatment site allow for complete and even coverage and will prevent drifting of spray onto non-target sensitive resources or areas used by humans.
- Pesticides with high volatility will not be used to treat areas located adjacent to sensitive areas because of the potential for unwanted movement of pesticides to these areas.
- Prescribed fire plans will be developed for each prescribed fire. Appropriate signing will be posted if smoke will affect roadways or designated visitor areas (visitor centers, campgrounds, river canyons) and the appropriate authorities will be contacted regarding smoke or visibility.
- Any off-road vehicles used for control treatments will be transported by trailer from one general area of the monument to another and trailers will be used to avoid unnecessary cross-country travel.

Soundscape

- Any use of mechanized equipment for management in more closed canyon environments will be limited to less than four hours per day, less than 3 days a week, and scheduled (to the degree practicable) during low visitor use seasons (late summer through fall) to reduce impacts to park visitors.
- DINO will disseminate information to the public and staff on various control projects as to how and why particularly loud techniques, such as ATVs or chainsaws, are necessary to accomplish project goals.

Historic Structures, Cultural Landscapes, and Archeological Resources

- Weed management personnel will be briefed about working in and protecting cultural resources sites.
- Consultation will occur with the staff archeologist and State Historic Preservation Office, if necessary, during the planning phase of invasive species management projects to determine sensitive areas and acceptable levels of disturbance will reduce or eliminate any potential adverse effects to historic and cultural resources.
- When practical and possible, a temporary fence will be installed to protect historic and cultural resources structures while grazing animals are present.

- Equipment used for revegetation and restoration projects will be evaluated and chosen that is determined to be the most effective to accomplish restoration goals while causing the least disturbance to historic and cultural resources.
- Severity of fire-related effects will be controlled where possible by controlling the fireline intensity in resource-rich areas at the time of the burn and inventories of previously unsurveyed areas will be conducted prior to the prescribed burn.
- Structures or features in or near proposed prescribed burn footprint will be protected when practical and without causing damage by ‘blacklining’, treating with fire retardant, and or/ establishing sprinkler systems prior to fire ignition.
- Fire crews will be briefed about working in and protecting cultural resources sites and any slash will be disposed of in areas lacking cultural sites.
- Ground disturbance will be avoided during preparation and fire mitigation in cultural resource areas.
- Structure surfaces will be washed off as soon as possible after exposure to foam fire suppressants.

Paleontological Resources

- Foot and vehicle traffic will be limited to vegetated areas where possible to protect vulnerable paleontological resources.
- Consultation with staff paleontologist during planning phase of invasive plant management projects will help to determine sensitive areas and acceptable levels of disturbance.
- When practical and possible, areas rich in resources will be temporarily fenced during grazing events.
- Equipment used for revegetation and restoration projects will be evaluated and chosen that is determined to be the most effective to accomplish restoration goals while causing the least disturbance to paleontological resources.
- Severity of fire-related effects will be controlled where possible by controlling the fireline intensity in resource-rich areas at the time of the burn and inventories of previously unsurveyed areas will be conducted prior to the burn.
- Sites in or near proposed prescribed burn footprint will be protected when practical and without causing damage by ‘blacklining’, treating with fire retardant, and or/ establishing sprinkler systems prior to fire ignition.
- Fire crews will be briefed about working in and protecting paleontological sites.
- Ground disturbance will be avoided during preparation and fire mitigation in paleontological resource areas.
- Weed management personnel will be briefed about working in and protecting paleontological resources sites.

Land Use and Park Operations

- Capital improvement and natural resource funding will be sought to implement necessary improvements in facilities or park operations to help alleviate any additional cost burden on the monument caused by proposed invasive plant management requirements.

Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the six criteria suggested in §101 of the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). According to these criteria, the environmentally preferred alternative should 1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; 2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings; 3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences; 4) preserve important historic, cultural, and natural aspects to our national heritage and maintain, wherever possible, an environment that supports diversity and a variety of individual choice; 5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and 6) enhance the quality of renewable resources and approach the maximum attainable recycling of renewable resources.

Based on the analysis prepared in this EA, the preferred alternative is the environmentally preferred alternative. This alternative provides the greatest flexibility in mitigating and responding to the unique and individual nature of all invasive species problems that are present in DINO by using the full range of available IPM techniques, including those available now and yet to be shown as effective in the future. Using true integrated pest management reduces dependence on one or few techniques to manage invasive species, thereby lessening any repetitive and potentially cumulative adverse impacts of those same techniques to the safety, health and integrity of resources, visitors, and staff.

It provides opportunities for selection and tailoring of individual or combined treatments of invasive species, and thus should be most effective in managing the most infestations. Protecting and restoring native vegetation communities and natural processes altered by invasive species through IPM will ultimately provide for better health, safety, and enjoyment of visitors and employees and protection of natural and cultural resources for succeeding generations. This alternative further provides for invasive species management prescriptions intended to contribute to the maintenance of long-term stability and diversity in native vegetation communities and will protect people and cultural and natural resources with minimum disturbance. This alternative will satisfy each of the provisions of the national environmental policy goals.

Why the Preferred Alternative Will Not Have a Significant Effect on the Human Environment

As defined in 40 CFR §1508.27, significance is determined by examining the following criteria:

Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal Agency believes the balance of the effect will be beneficial.

Resource topics that were addressed in the EA include soils and vegetation, wetlands and floodplains, wildlife, threatened and endangered species, water quality, Wilderness, air quality, soundscape, historic structures, cultural landscapes, archeological and paleontological resources, land use and park operations, and socioeconomics. All other resource topics were dismissed from further evaluation in the document because the associated impacts will be negligible or less. Impacts to natural resources, paleontological resources, land use and park operations, and socioeconomics are summarized below while impacts to cultural and historic resources are discussed later under “*Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*”

The preferred alternative will have no significant adverse effects.

Soils and Vegetation

Integrated pest management will assist DINO to achieve the desired condition to have vegetation communities restored and to maintain long-term ecological diversity and stability. Manual and mechanical, cultural, and chemical treatments for invasive plant removal could cause negligible to minor temporary damage to soils and non-target species. Because biological control agents are specific to a species of invasive plants, there will be negligible adverse impacts to native plant species. Thus, overall impacts of an integrated plant management program on soils and vegetation will be directly adverse on target exotic species, but indirectly beneficial, site-specific and monument-wide, short- to long-term, and minor to moderate on native plant species. By controlling invasive plants using IPM, the chance for successful restoration of native plant and soil communities is high, thereby benefiting native plant species and the habitat they provide.

Wetlands and Floodplains

Integrated pest management will assist DINO to achieve the desired conditions of preserving, enhancing, and restoring natural and beneficial floodplain and wetland values. Manual and mechanical, cultural, and chemical treatments for invasive plant removal could cause negligible to minor temporary damage to desirable wetland and floodplain species; however, these infrequent impacts to individual plants generally do not impact plant populations, plant communities, or ecological processes. Restoration activities, such as reseeded, could have beneficial effects of promoting the reestablishment of native wetland and riparian vegetation. U.S. Army Corps of Engineers permits will not be required for any proposed IPM treatments. Because biological controls target a specific exotic plant, there will be no expected adverse impacts to non- target wetland plant species. The overall impacts of integrated pest management on wetlands and floodplains will be indirectly beneficial and directly adverse, site-specific, short and long-term, and negligible to minor. By controlling invasive plants using IPM, the chance for successful restoration of wetlands and floodplains is high, thereby benefiting native plant species and the habitat they provide. Effects to wetlands and floodplains will be detectable and readily apparent. In some areas, IPM may enhance the existing wetland areas or floodplain functions. Removal of exotic plants that affect riparian areas (such as Russian olive, and tamarisk) will help enhance riparian habitat. The minor short-term adverse impacts will be outweighed by the long-term benefits of habitat restoration.

Wildlife

The use of mechanical, cultural, and chemical techniques for invasive species management are not expected to have any long-term adverse impacts on native wildlife species, their habitats, or natural processes sustaining them. Mitigation measures will keep these effects site-specific and of little consequence to the species' population. Introductions of biocontrol agents will be beneficial to wildlife as native species replace invasive species and plant communities are restored. Using the full range of IPM techniques gives resource managers the best chance of restoring native plant communities and their function to the benefit of all wildlife, thereby best achieving the desired condition to preserve and restore pre-European abundances, diversities, distributions, and habitats of native animal populations. Beneficial effects to wildlife habitat may be detectable and readily apparent. Overall beneficial effects to wildlife are greater because the tools available have the potential to address the scale of management necessary in the monument to affect positive change in desired habitat. The minor, short-term, adverse impacts will be outweighed by the long-term benefits of aquatic, riparian, and upland habitat maintenance and restoration. The overall impacts of integrated plant management on all wildlife will therefore be directly beneficial, monument-wide, long-term, and moderate.

Water Quality

Any changes in water quality due to mechanical, cultural, and chemical techniques may be measurable, but will be short-term and site-specific and is likely to occur only in particular areas of extensive invasive species infestations. Restoration activities will have a beneficial effect of promoting the reestablishment of native vegetation, which could help reduce erosion and sedimentation. Resource managers considering application of herbicide in areas with low water tables will assess the risk of leaching using the RAVE. No known direct or

indirect impacts to water quality will occur from biological treatments. Removal of invasive plants that affect riparian areas (such as Russian olive and tamarisk) will help restore natural riparian geomorphologic processes, reduce visual obstructions along riverbanks, and create additional habitat. Changes in flows may be detectable in some areas. Overall beneficial effects to water quality is greater under this alternative because the full range of tools available have the best potential to achieve the desired conditions of protecting watershed function and riparian features. Any minor short-term adverse impacts will be outweighed by the long-term benefits of improved water quality and associated aquatic resources. The overall effects of integrated plant management techniques under this alternative will be directly adverse and indirectly beneficial, monument-wide, long-term, and negligible to moderate.

Wilderness

A temporary change in Wilderness character and associated values will occur during invasive plant management activities, creating site-specific, short-term impacts on Wilderness that may be noticeable to Wilderness visitors. Biocontrol agents will have indirect beneficial effects to Wilderness characteristic preservation by aiding in the gradual restoration of native plant communities. The reduction or elimination of invasive plants will ultimately restore the naturalness sought by visitors. There will be a beneficial change in Wilderness character and quality that will be measurable and site-specific. DINO will disseminate information to the public and staff on various control projects as to how and why particularly loud techniques, such as ATVs and aircraft, are necessary to accomplish project goals in recommended and proposed Wilderness areas. The minor, short-term, adverse impacts will be outweighed by the long-term benefits to Wilderness preservation. IPM will not inhibit and is expected to facilitate and improve the maintenance of the desired condition to have Wilderness areas in an unimpaired condition, except as necessary to meet minimum requirements for the administration of the area.

Air Quality

Any changes in water quality due to mechanical, cultural, and chemical techniques may be measurable, but will at most create a short-term and site-specific reduction in air quality from dust from vehicles and exhaust from equipment and is likely to occur only in particular areas of extensive invasive species infestations. Prescribed fire plans will be developed for each prescribed fire, with site-specific and short-term effects of smoke on local community activities and land users considered during the planning. Appropriate signing will be posted if smoke will affect roadways or designated visitor areas (visitor centers, campgrounds, river canyons) and the appropriate authorities will be contacted regarding smoke or visibility. No measurable adverse impacts to air quality from biological controls are known. IPM will not inhibit desired conditions of perpetuating the best possible air quality that meets or exceeds all federal, state, and local air quality regulations and permitting requirements.

Soundscapes

Some mechanical, cultural, and chemical management techniques, including tree and shrub removal, larger scale restoration projects, and prescribed fire activity can all involve the use of noise-generating equipment such as chainsaws, trucks/ATVs, and occasionally wood chippers and aircraft. Noise will be temporarily and quickly dissipated in the open environments of DINO and will have temporary site-specific negligible to minor adverse impacts. Further mitigation measures, such as limiting noise in closed canyon environments to less than four hours per day and scheduling noise-generating work in low visitor use times and/or seasons will be employed to maintain desired conditions. DINO will disseminate information to the public and staff on various control projects as to how and why particularly loud techniques, such as ATVs and aircraft, are necessary to accomplish project goals. Some degradation caused by noise will result from operation of equipment, such as chainsaws, pump motors, and wood chippers but this will be short-term and site-specific and only occur between sunrise and sunset. No adverse impacts to soundscape from biological controls or invasive plant prevention strategies are known. Such infrequent noise will not chronically impair the desired solitude and tranquility (natural soundscape) associated with the monument.

Paleontological Resources

Ground-disturbing activities during implementation of mechanical, cultural, or chemical techniques could damage sensitive and fragile undiscovered paleontological sites. Fire in general does not adversely impact the scientific value of the objects, since these impacts would have occurred naturally many times on the landscape over paleontological resources in their original deposition and are predicted to be within the normal expected range of fire effects. No catastrophic impacts to paleontological resources are expected since these activities will be planned and performed in areas suspected or known to contain resources of paleontological value only after consultation with the staff paleontologist. There are no known direct impacts from biological control to paleontological resources. IPM will not inhibit the maintenance of the desired condition to have paleontological sites remain in context. In general, disturbance to sites will be negligible to minor and site-specific within a relatively small area. Control of invasive plants in these areas is expected to improve or restore the context in which these resources exist as well as arrest further or potential destabilization of soils or rock that protect artifacts. Removal of invasive species in general using the full range of IPM techniques is expected to have long-term minor benefits for the protection, stabilization, and context of paleontological sites by enhancing native plant and soil communities. As native plant communities are restored, impacts to paleontological resources will be ameliorated. The overall impacts of IPM on paleontological resources will therefore be beneficial, negligible to minor, site-specific, and long-term.

Land Use and Park Operations

Implementation of the preferred alternative will result in the most effective, safe, and efficient management of invasive species in the monument. The availability and access to all management tools will allow more flexibility and creativity in achieving goals to benefit overall land uses and park operations. A proactive IPM approach will improve relations with park neighbors as well as state and local officials who have expressed concern about invasive plants spreading from the monument onto neighboring lands. Lessees and staff from other divisions and natural resource focus areas will have to increase awareness and possibly make changes in current operating procedures to accommodate proactive and preventative operating procedures. Funding for invasive plant management activities will come from new sources or from a continuation of existing funding used for management. There will likely be a negligible to minor increase in administrative support for personnel and procurement as well as increased storage space needs and fuel use. In the long-term, land use and monument operations will benefit overall as a more proactive and comprehensive management strategy reduces introductions and spread, thereby improving assets such as range, roadside, and fuel conditions. A net, long-term cost reduction is anticipated. The overall impacts of IPM on park operations and land use will therefore be beneficial, long-term, monument-wide and moderate.

Socioeconomics

The control at any level of invasive plants will decrease the opportunity for their spread onto private or federal lands adjacent to the monument and reduce the individual landowner's control costs (thereby indirectly benefiting monument neighbors and the greater region). The preferred alternative has the most beneficial impacts to the region since it will result in treatment of more acres and result in the most safe, effective, and efficient management of invasive species both in and outside the monument. The availability and access to all management techniques allows the most flexibility and creativity in solving invasive species issues that affect the larger region. Proposed measures, which involve the use of prescribed grazing specifically as a weed management tool, may have negligible to minor beneficial economic implications only to those operators and permittees willing to pursue such projects and do not affect general grazing management operations of current permittees. Other impacts such as volunteer participation, local employment and/or cooperative efforts with Moffat and Uintah Counties for weed management activities, infusion of budgeted dollars for weed management equipment into local economies, etc. are expected to be mostly beneficial, though variable over time and not easily measurable. IPM will not inhibit progress toward the desired condition to have an increased understanding of parks by park visitors, the non-visiting public, gateway communities and regions, and human

interactions with park resources provided. The impacts of invasive plant management on social and economic conditions will be indirectly beneficial, region-wide, long-term, and minor to moderate.

Degree of effect on public health or safety

NPS Management Policies (2001) advocate a safe work environment for employees and a safe experience for park visitors. The equipment proposed for use such as hand tools, chainsaws, portable sprayers, and ATVs are all standard devices with established safety protocols. Training on the proper use of equipment is included as part of the preferred alternative. Safety protocols for storing, mixing, transporting, handling spills, and disposing of unused pesticides and containers will be followed at all times. The pesticides proposed for use have very low acute toxicity to humans and personal protective equipment (PPE) will be used during application to reduce the potential for chronic exposure of employees. Training is required prior to use of pesticides and safety protocols for storing, mixing, transporting, handling spills, and disposing of pesticides and containers are an integral part of the preferred alternative. Treated areas subject to visitation will be marked during the no-entry period (as described on the pesticide label or until dry) to advise visitors against entering treated areas and thus exposing themselves to the chemicals. Meteorological conditions will be accounted for in planning to decrease the risk of pesticide drift or volatilization. Because of these and other safety precautions, the preferred alternative will not affect human health or safety for park employees or visitors.

Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas

Cultural resources (including cultural landscapes, historic structures, and archaeological resources) will not be adversely affected. Wetlands and ecologically critical areas (Wilderness, T&E species habitat) are addressed elsewhere in this document. There are no prime and unique farmlands; wild and scenic rivers do not occur in the monument.

Degree to which effects on the quality of the human environment are likely to be highly controversial

There were no highly controversial effects identified during either preparation of the environmental assessment or the public review period.

Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks

There were no highly uncertain, unique, or unknown risks identified during either preparation of the environmental assessment or the public review period.

Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration

The preferred alternative neither establishes a National Park Service precedent for future actions with significant effects nor represents a decision in principle about a future consideration.

Whether the action is related to other actions with individually insignificant but cumulatively significant impacts

There will be no significant cumulative effects.

Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical places

Impacts to cultural resources and archaeological sites will be negligible to minor. IPM will also not inhibit the maintenance of the desired condition to have archaeological sites protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. All surface disturbing activities will be avoided in areas where cultural or historic resources are identified or are known to occur.

Surface disturbing activities and prescribed fires may physically impact unknown cultural resources. However, BMPs will be implemented to minimize the potential for accidental impacts to unknown resources. Under the preferred alternative, areas that may contain cultural or historic resources and that have not been previously studied will be surveyed. If cultural or historic resources are identified or are known to occur, all surface disturbing activities will be restricted or avoided in these areas. Because of unknown effects, pesticides will not be directly applied to historic structures with limestone grout, hearth features, or cultural resources comprised of organic material, bone, pollen, seeds, and materials made from plant fiber. However, pesticides may be used in lands surrounding cultural or historic sites in accordance with BMPs. In the event that cultural resources are encountered during treatments, all work will stop immediately and will not continue until the site can be evaluated and cleared by a qualified specialist.

DINO sought concurrence from Colorado and Utah State Historic Preservation Officers (SHPO) regarding the planning approach to invasive plant management that is outlined in the plan and EA. Letters and copies of the plan and EA were submitted to the SHPOs for review and comment within the comment period. DINO has determined that this programmatic planning approach to the treatment of invasive plants will have no adverse effect on the cultural qualities and features within the monument, with the realization that at some point additional consultation will be needed on site specific management plans, such as Cub Creek, or should unknown sites be discovered. Concurrence with this determination was received via letter from the Colorado SHPO on December 16, 2005. Wilson Martin, Utah SHPO, responded on December 1, 2005 via phone message with a “no comment” reply.

Degree to which the action may adversely affect an endangered or threatened species or its critical habitat

The biological assessment of federally threatened, endangered, and candidate species describes accounts of 10¹ species that occur or potentially occur within the monument. In accordance with the Endangered Species Act, Section 7, consultation with the U.S. Fish and Wildlife Service (USFWS) concerning impacts to threatened and endangered species was initiated during the initial drafting of this Invasive Plant Management Plan and EA. Scoping letters requesting species lists for Moffat County, CO and Uintah County, UT were sent to the Colorado and Utah USFWS Field Supervisors in February 2004. Response to the letter, including threatened, endangered, and candidate species lists, was received from the Utah office on February 20, 2004 and from Colorado on April 9, 2004.

A draft biological assessment was then prepared that included determination of effect for each of the 10 species.

¹ The status of White-tailed prairie dog was “Petitioned for Listing” when the research and analysis for this document began in January 2004. However the species was removed from consideration on November 9, 2004 because FWS ruled that there was insufficient scientific information to warrant studying whether the species should be placed on the endangered species list. Dinosaur National Monument has chosen to keep all analysis and implement any relevant conservation measures that were completed for the species before its change in status because it provides critical habitat for the endangered Black-footed ferret, therefore making it a species of management concern to monument staff.

Because DINO spans two states, the monument is technically responsible for consulting on T&E species in both CO and UT. On September 20, 2004, Al Pfister, FWS Western CO Field Supervisor, agreed with Henry Maddux, FWS UT Field Supervisor, via email exchange that Colorado will be the lead state for DINO's informal consultation process for the Invasive Species Management Plan.

General mitigation measures were developed to minimize potential impacts to threatened, endangered, and sensitive species and can be found on page 9 of this document. In addition, species-specific conservation measures will be implemented to further minimize potential impacts to these species and are described below. Some invasive plant management activities will likely be necessary within buffer zones established for each species. Any activities that are likely to cause a take of a species, as defined by the ESA, will be coordinated with the appropriate Service Field Office before any actions are taken. If these activities *may affect or are likely to adversely affect* a species, formal consultation will be conducted.

Bald Eagle

Haliaeetus leucocephalus

- No vegetative treatments within 500m of active bald eagle nest sites between February 1 (adult courtship) and July 31 (nestling fledge) or between November 1 and March 1 for wintering eagles.
- All chemical applications will be performed according to product label specifications and equipment used for application will be appropriately matched to scale of project work to reduce chance of accidental spills and drift that adversely affects non-target vegetation and aquatic resources. For example, use of herbicides that are known to be toxic to fish but are deemed the most effective on invasive species in riparian areas will be used during post-flood season and will be applied in spot applications using a backpack applicator or wick to eliminate chemical drift or leaching into the water table. No aerial application of retardant/foam will occur within 300 feet of any water body, including lakes, rivers, streams, and ponds whether or not they contain aquatic life.

Black-footed Ferret

Mustela nigripes

- Any herbicide treatment performed within the monument will be done according to label direction.
- Burrow mounds/entrances will be avoided by any vehicles (ATV/tractor/ truck) required in control activities.
- Tools appropriate in scale for the control work will be used to avoid unnecessary trampling or disturbance to habitat.

Mexican Spotted Owl

Strix occidentalis lucida

- None required – No direct or indirect effects are anticipated to occur to this species because the location where the species was heard is a relatively inaccessible region where only few people (mostly researchers) seldom visit. No known invasive species infestations occur in that area or in the few other areas with similar required habitat. No weed management activities, including prescribed fire, are planned for that area at this time or in the near future.

Ute Ladies'-tresses

Spiranthes diluvialis

- To the degree possible, weed control treatments will occur pre-emergence or post-seed set in *Spiranthes diluvialis*' habitat.
- IPM crews will consult with the monument botanist before control to correctly identify *Spiranthes* and be advised of its known and potential locations.
- Tools appropriate in scale for the control work will be used to avoid unnecessary trampling or disturbance to habitat.
- If herbicide use is deemed necessary, it will be applied in a manner that uses the smallest amount deemed effective under extant site conditions with carefully applied spot treatments.

- No biocontrol agents will be intentionally released by the monument for use on an invasive plant species of the same family as a threatened, endangered, or rare plant that occurs inside or adjacent to the monument.

Colorado pikeminnow

Ptychocheilus lucius

Razorback sucker

Xyrauchen texanus

Bonytail chub

Gila elegans

Humpback chub

Gila cypha

- Rivers, streams, and ponds will be avoided in the event fire suppressants (foams) need to be used for prescribed fire control.
- Chemical controls will only be used in the vicinity of aquatic habitats only if it is deemed that other weed management techniques are infeasible or will cause undue disturbance to fish or their critical habitat. All restrictions outlined on herbicide labels will be followed.
- Herbicides that are toxic to aquatic species and/or have high mobility in soils and/or persist in the environment will not be applied to soils or sprayed on foliage in standing water. If a particular herbicide is deemed necessary for control of the target species, it will be applied in spot applications (cut stump or wick) using hand equipment (backpack sprayer) during the post-flood stage in low-wind situations when its potential for accidental drift or contact with surface water is at a minimum.
- No herbicide applications will be made along the major river corridors within six months prior to the earliest peak flow date (May 15) to ensure an adequate breakdown time for active ingredients before any likelihood of inundation of treated areas due to flood events.
- Biological control of tamarisk is proposed for Echo Park, which contains compromised nursery habitat (due to tamarisk invasion of the river channel). This strategy will minimize herbicide use in critical fish habitat and will (we hope) slow or stop tamarisk invasion upstream into more critical habitat areas on the Yampa River.

White-tailed Prairie dog

Cynomys leucurus

- Any herbicide treatment performed within the monument will be done according to label direction.
- Burrow mounds/entrances will be avoided by any vehicles (ATV/tractor/ truck) required in control activities.
- Tools appropriate in scale for the control work will be used to avoid unnecessary trampling or disturbance to habitat.

Yellow-billed Cuckoo

Coccyzus americanus

- Invasive species treatments in potential yellow-billed cuckoo habitat will be timed so as not to displace cuckoos during the general nesting period between May 1 and July 31.
- All chemical applications will be performed according to product label specifications and equipment used for application will be appropriately matched to scale of project work to reduce the chance of accidental spills and drift that adversely affects non-target riparian vegetation. For example, herbicides will be applied in spot applications using a backpack applicator or wick to reduce chemical drift or leaching into the water table.
- Active restoration and follow-up treatments will occur where appropriate in areas where biocontrol activity has killed or denuded tamarisk stands in order to preserve migratory bird use of riparian habitats.

A may affect, but is not likely to adversely affect determination was made for all considered threatened and endangered species, except for the white-tailed prairie dog. Although the white-tailed prairie dog was removed from consideration *after* analysis began, it is of concern to the monument because it is considered a species of special concern and provides critical habitat for another listed species (black-footed ferret). Therefore the

determination for the white-tailed prairie dog is *not likely to jeopardize continued existence or adversely modify habitat*.

Concurrence with the above determination was received from the Colorado USFWS Field Office, and on behalf of the Utah USFWS Field Office, on June 13, 2005.

Whether the action threatens a violation of federal, state, or local environmental protection law

The preferred alternative violates no federal, state, or local environmental protection laws.

In addition to reviewing the list of significance criteria, the National Park Service has determined that implementation of the proposal will not constitute an impairment to Dinosaur National Monument's resources and values. This conclusion is based on a thorough analysis of the environmental impacts described in the environmental assessment, public comments received, relevant scientific studies, and the professional judgment of the decision-maker guided by direction in the NPS Management Policies (December 27, 2000). Although this plan/project has some negative impacts, in all cases these adverse impacts are the result of actions taken to preserve and restore other park resources and values. Overall, the plan results in benefits to park resources and values, opportunities for their enjoyment, and it does not result in their impairment.

Public Involvement

In January 2004, a letter and briefing statement was prepared that announced the intent to develop an Invasive Plant Management Plan for DINO. Public scoping letters were sent to 154 individuals and organizations. Interested parties were encouraged to submit comments on this project via mail, email, or fax. Additional opportunities for comment were afforded to cooperating partners (Uintah and Moffat Counties) during a draft review meeting of the document in the fall of 2004.

On October 19, 2005, notice of this plan and EA's availability for review was sent via U.S. mail, email, and press release to 175 individuals, including SHPO and tribal government representatives. The plan was posted on the National Park Service's Planning, Environment, and Public Comment (PEPC) website (<http://parkplanning.nps.gov/>). The document underwent a 30-day public review period from October 19, 2005 to November 17, 2005. A total of seven responses were received. All comments and letters received are in support for the preferred alternative.

Conclusion

The preferred alternative does not constitute an action that normally requires preparation of an environmental impact statement (EIS). The preferred alternative will not have a significant effect on the human environment. Negative environmental impacts that could occur are negligible to moderate in intensity. There are no unmitigated adverse impacts to public health, public safety, threatened or endangered species, sites or districts in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local environmental protection law. In addition to reviewing the list of significance criteria, the National Park Service has determined that implementation of the proposal will not constitute an impairment to Dinosaur National Monument's resources and values.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended: Mary Risser 12/20/05
Mary Risser Date
Superintendent, Dinosaur National Monument

Approved: Michael Snyder 1/3/06
Michael Snyder Date
~~Acting~~ Director, NPS Intermountain Region

Errata Sheets
Dinosaur National Monument Invasive Plant Management Plan and Environmental Assessment
October 2005

Page 2-3

Add following text immediately under Plant Protection Act of 2000

The Plant Protection Act of 2000 consolidates and modernizes (and thereby replaces) all major statutes pertaining to plant protection and quarantine, including the Federal Noxious Weed Act of 1974 and the Plant Quarantine Act of 1912. Only §2814 of 7 U.S.C 360 of the Federal Noxious Weed Act directing management of undesirable plants on federal lands remains in effect and is now incorporated in the Plant Protection Act.

Page 2-21

Add following text after 3rd paragraph:

Aircraft is commonly used in executing prescribed fire projects. As stated elsewhere in this plan, prescribed fire is one of the techniques available for invasive plant management. Any use of aircraft during prescribed fire will be considered and addressed in the burn plan that is required for all prescribed fire use and will be subject to all policies directing aircraft use in national park units. All reference within this invasive plant management document to aircraft noise or aerial application refers to prescribed fire activities only, as there will be no aerial application of pesticides in the monument.

Page 2-39

Add following bullet in Wilderness mitigation measures:

- DINO will disseminate information to the public and staff on various control projects as to how and why particularly loud techniques, such as ATVs and aircraft, are necessary to accomplish project goals.

Page 3-55

Add the following text to the beginning of 5th paragraph:

DINO will disseminate information to the public and staff on various control projects as to how and why particularly loud techniques, such as ATVs and aircraft, are necessary to accomplish project goals.

Page D-3, **Roads and Utilities**, *Pre-Project Planning*

Modify second bullet as follows:

- Fill materials brought into the park from commercial or other sources shall come from borrow pits that have been inspected by the NPS (or with prior consultation, County weed management staff) and approved as free of invasive non-native plants. Fill material includes, but is not limited to, gravel, sand, road base, pit run, crusher fines, or any similar materials that will be transported into the monument from outside sources. Inspect gravel pits and fill sources annually to ensure weed-free status.

Page L-20, Bio-Control Agent table
 Modified as follows:

Bio-control Agent	C A R N U T	C E N R E	C E N D I	C E N M A	C I R A R	C I R V U	E P H E S	L I N D A	T A M S P.
<i>Agapeta zoegana</i>			X	X					
<i>Bangasternus fausti</i>			X	X					
<i>Cyphocleonus achates</i>			X	X					
<i>Larinus minutus</i>			X	X					
<i>Larinus obtusus</i>				X					
<i>Metzneria paucipunctella</i>			X	X					
<i>Pterolonche inspersa</i>			X	X					
<i>Sphenoptera jugoslavica</i>			X	X					
<i>Terellia virens</i>			X	X					
<i>Urophora affinis</i>			X	X					
<i>Urophora quadrifasciata</i>			X	X					
<i>Subanguinea picridis</i>		X							
<i>Aceria acroptiloni</i> ²		X							
<i>Ceutorhynchus litura</i>					X				
<i>Urophora cardui</i>					X				
<i>Urophora stylata</i>						X			
<i>Apthona nigriscutis</i>							X		
<i>Apthona lacertosa</i>							X		
<i>Hyles euphorbia</i>							X		
<i>Oberea erythrocephala</i>							X		
<i>Spurgia esulae</i>							X		
<i>Brachypterolus pulicarius</i>								X	
<i>Calophasia lunula</i>								X	
<i>Mecinus janthinus</i>								X	
<i>Tricosirocalus horridus</i>	X								
<i>Diorhabda elongata</i>									X

² *Aceria acroptiloni* is in the late stages of the permitting process for Russian knapweed.

RESPONSES TO COMMENTS

Public comments were carefully reviewed for substantive comments. Substantive comments are those that challenge the accuracy of the analysis, dispute information accuracy, suggest viable alternatives, or provide new information that makes a change in the proposal. Of the public comments received on the environmental assessment, the following comments have been determined to be substantive. A response to the comment follows.

Comment 1

“The social economic section on page 3-92 briefly identifies social impacts, but not economic impacts. We suggest identifying dollars the NPS expects to pass through labor, contractor’s (planning as well as direct weed control efforts), or chemical expenses. A discussion about the way DNM weed management dollars flow through the local economy during weed control efforts will be important. Information at the broader economic level can be obtained from research CSU has performed involving Dr. George Beck, in the Biological Sciences and Pest Management Department. In addition, the 2004 Yampa Valley Indicators report by Yampa Valley Partners and the 2004 Economic Profile of Moffat County, conducted by Dr. Andy Seidel, Department of Agriculture and Applied Economics will provide general economic profiles that may assist in further defining the economic impacts of the NPS Weed Plan on the community.”

Response to Comment 1

Moffat County raised the issue of impacts to socioeconomics during a cooperating partner meeting in fall 2004. Initially, this impact topic was dismissed from further consideration because no difference was anticipated among alternatives. In response to Moffat County’s expression of concern this was re-evaluated and staff analyzed the topic along with others, but that analysis revealed no measurable differences in impacts regardless of alternative implemented.

As stated in pages 3-92 and 3-93 in the plan, control of invasive plants at any level under any of the alternatives will decrease the opportunity for their spread onto private or federal lands adjacent to the monument and reduce individual landowners’ control costs (thereby indirectly benefiting monument neighbors and the greater region). We expect implementation of the preferred alternative to have the greatest beneficial impact to the region since it will treat more acres and result in the most safe, effective, and efficient management of invasive species both in and outside the monument. The availability and access to all management techniques allows the most flexibility and creativity in solving invasive species issues that affect the larger region.

Other impacts such as volunteer participation, local employment and/or cooperative efforts with Moffat and Uintah Counties for weed management activities, infusion of budgeted dollars for weed management equipment into local economies, etc. are expected to be mostly beneficial, though variable over time and not easily measurable.

Aside from a few minor statistic updates, a review of the 2005/2006 Yampa Valley Indicators Report yielded little to no new information that would affect the outcome of the socioeconomic analysis. The report overall stresses the importance of particular resources, namely agricultural and water, to the environmental and economic health of the area. Invasive species (state-wide high priority species, in particular) is even identified in the report as a topic of regional concern. Although DINO does not have any of the species listed as highest priority, this Plan outlines a strategy for prevention and early detection of new invaders like the ones Moffat County has expressed as species of high concern as well.

Nearly 70% of Moffat County is publicly held. As one of those public land management agencies DINO has been and remains interested in opportunities for participation in locally based cooperative weed management

areas that benefit local communities and agricultural producers. Among the three alternatives analyzed, impacts are expected to be similar and of no measurable consequence to the human and regional economic environment. Weed managers throughout the U.S. are struggling with the problem of how we measure weed infestations that were prevented by employment of best management practices and effective prevention and early detection strategies. A solution to this question is not yet available.

Comment 2

“Moffat County is concerned that there is a large portion of the 10 proposed management actions focused on planning and goal setting to the point that an undue share of funds and resources may be consumed in the office rather than on the ground. We fully appreciate the need for planning, and understand the need to identify how education and goal setting will occur; so long as DNM does not get stuck in analysis paralysis. We suggest the introduction paragraph on page 2-13 clarify a commitment to spending funds and resources on identified on-the-ground projects to reduce weed infestations with a commitment to not consume resources with supplementary planning. Monument staff and weed partners such as the County clearly know the locations of infestations and we believe (once basic planning has been conducted), the Park Service should spend the largest portion of resources on-the-ground, treating and monitoring the effects of those treatments.”

Response to Comment 2

Now that the major planning effort for invasive plant management is nearing completion, Dinosaur National Monument agrees with Moffat County that finding ways to accomplish on-the-ground management is a top priority. However, this does not mean that no additional planning will be necessary to implement the plan. A certain level of planning and consultation is required by NPS under federal law, such as the National Historic Preservation Act and the National Environmental Policy Act. All site-specific and/or species-specific management/operating plans created under the guidance of this programmatic document will have some element of planning, both internally and with non-federal partners. In addition, DINO is bound to NPS strategic plans for integrated weed management in national parks, which includes efforts such as education and awareness, prevention, and research.