

# Death Valley National Park

National Park Service  
U.S. Department of Interior

Death Valley National Park  
California and Nevada



## Exotic Plant Management Plan and Environmental Assessment 2008



U.S. Department of Interior

National Park Service

Environmental Assessment  
Exotic Plant Management Plan

Death Valley National Park  
Inyo and San Bernardino Counties, California  
Nye and Esmeralda Counties, Nevada

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Summary

Death Valley National Park proposes to contain, reduce, or eliminate, as practical or appropriate, select species or populations of exotic (non-native) plants from the Park, with the goal of environmental restoration. The Park is strongly impacted by the presence of exotic plants, which lower water tables, exclude wildlife and native plants, alter fire regimes, and change the environment in many other ways. The purpose of the Exotic Plant Management Plan is to identify methods that will be used to remove exotic plants, and thereby restore natural conditions and prevent further degradation of natural resources in the Park.

This Environmental Assessment (EA) documents the recent history of exotic vegetation management in the Park, which has occurred mainly under an direction of an Exotic Plant Management Policy. Because of the large scope of exotic plant management in terms of area and potential impacts, the Park has written this new, programmatic Exotic Plant Management Plan that gives species-specific and site-specific policies, proposes an annual planning framework, and provides a decision-making tool for newly detected exotic plant populations. The purpose of this Environmental Assessment (EA) is to examine the impact of the EPMP to natural and cultural resources.

Two alternatives are considered in this EA: 1) No action, continuing with the current management of exotic plants, and 2) Preferred alternative, implementing the EPMP.

Public Comment, Notes to Reviewers and Respondents

If you wish to comment on this EA, you may mail the comments to the name and address below. Our practice is to make comments, including names and addresses of respondents available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we would honor to the extent allowable by law. *If you want us to withhold your name and/or address, you must state this prominently at the beginning of your comment(s).* We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Written communication (hardcopy or electronic) is strongly preferred and will become a public record. However, you are free to call us if there are any questions we can answer, or if you need clarification.

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# Table of Contents

<b>ACRONYMS AND ABBREVIATIONS</b> .....	<b>7</b>
<b>SCIENTIFIC NAMES</b> .....	<b>7</b>
<b>1.0 PURPOSE AND NEED</b> .....	<b>8</b>
1.1 Introduction .....	8
1.2 Purpose for Taking Action .....	8
1.3 Need for Taking Action .....	9
1.4 Scope of the Exotic Plant Management Plan and EA .....	12
1.4.1 Public Participation and Scoping .....	12
1.4.2 Actions Included in the EPMP .....	12
1.4.3 Definition of Plants to be Managed.....	13
1.5 History of Exotic Plant Management at DVNP .....	14
1.6 Regulations, Policies, Laws, and Legal Jurisdiction.....	15
1.6.1 Federal Regulations, Policies, Laws .....	15
1.6.2 Legal Jurisdiction .....	16
1.6.3 State and County Regulations, Policies, Laws .....	17
1.7 Decision to be Made .....	17
<b>2.0 ALTERNATIVES</b> .....	<b>18</b>
2.1 Actions Common to Both Alternatives .....	18
2.2 Alternative 1: No Action, No Change from Current Management.....	19
2.3 Alternative 2: Exotic Plant Management Plan, Preferred Alternative .....	19
2.3.1 Introduction .....	19
2.3.2 Education.....	20
2.3.3 Prevention.....	20
2.3.4 Planning.....	21
2.3.5 Integrated Pest Management Techniques.....	25
A. <i>Plant Functional Types</i> .....	25
B. <i>Treatment Methods</i> .....	26
<u>1. Cultural</u> .....	26
<u>2. Mechanical, without Power Tools</u> .....	27
<u>3. Mechanical, with Power Tools</u> .....	27
<u>4. Chemicals Alone</u> .....	27
<u>5. Chemical and Mechanical</u> .....	28
C. <i>Chemical Certifications and Permits</i> .....	29
D. <i>Best Management Practices</i> .....	29
2.3.6 Monitoring and Record Keeping .....	30
2.3.7 Wilderness Considerations .....	31
2.3.8 Potable Water Collection Areas .....	31
2.3.9 Management of Exotic Plants in Cultural Landscapes.....	32
2.3.10 Slash Disposal .....	34
2.4 Alternatives Considered but Rejected.....	35
2.4.1 Chemical Treatment Only .....	35
2.4.2 Physical Treatment Only .....	35

2.4.3 Burning.....	35
2.4.4 Complete Physical Removal of Woody Exotics .....	35
2.4.5 Biological Control .....	36
2.4.6 Blanket Approval for Chainsaw Use on Woody Exotics.....	36
2.5 Environmentally Preferred Alternative .....	36
<b>3.0 AFFECTED ENVIRONMENT .....</b>	<b>38</b>
3.1 Project Area.....	38
3.2 Physical Resources.....	38
3.2.1 Air Quality and Visibility.....	38
3.2.2 Noise.....	39
3.2.3 Soils.....	39
3.2.4 Water .....	40
3.3 Biological Resources.....	41
3.3.1 Vegetation .....	41
A. <i>Threatened, Endangered, and Sensitive Plants</i> .....	41
3.3.2 Wildlife.....	42
A. <i>Birds</i> .....	42
B. <i>Mammals</i> .....	42
C. <i>Reptiles and Amphibians</i> .....	43
D. <i>Fish</i> .....	43
E. <i>Invertebrates</i> .....	44
3.4 Cultural Resources .....	44
3.4.1 Historic and Prehistoric Resources .....	44
3.4.2 Cultural Landscapes .....	46
3.5 Wilderness.....	47
<b>4.0 ENVIRONMENTAL CONSEQUENCES .....</b>	<b>48</b>
4.1 Impact Topics Addressed.....	48
4.2 General Methodology .....	48
4.3 Definitions of Terms .....	48
4.3.1 Resource Impact Intensity .....	49
4.3.2 Cumulative Impacts.....	52
4.4 Impact of Alternative 1 (No Action).....	54
4.4.1 Physical Resources .....	54
A. <i>Air Quality</i> .....	54
B. <i>Noise/Soundscape</i> .....	55
C. <i>Soils</i> .....	55
D. <i>Water Quality and Potable Water Collection Systems</i> .....	56
4.4.2 Biological Resources.....	57
A. <i>Vegetation</i> .....	57
B. <i>Birds</i> .....	58
C. <i>Mammals</i> .....	59
D. <i>Reptiles and Amphibians</i> .....	60
E. <i>Fish</i> .....	61
F. <i>Invertebrates</i> .....	62
4.4.3 Cultural Resources .....	63

<i>A. Historic and Prehistoric Resources</i> .....	63
<i>B. Cultural Landscapes</i> .....	64
4.4.4 Wilderness and Backcountry Aesthetic Qualities .....	65
4.5 Impact of Alternative 2 (Proposed Action) .....	66
4.5.1 Physical Resources .....	66
<i>A. Air Quality</i> .....	66
<i>B. Noise/Soundscape</i> .....	67
<i>C. Soils</i> .....	68
<i>D. Water Quality and Potable Water Collection Systems</i> .....	68
4.5.2 Biological Resources .....	70
<i>A. Vegetation</i> .....	70
<i>B. Birds</i> .....	71
<i>C. Mammals</i> .....	72
<i>D. Reptiles and Amphibians</i> .....	73
<i>E. Fish</i> .....	74
<i>F. Invertebrates</i> .....	75
4.5.3 Cultural Resources .....	76
<i>A. Historic and Prehistoric Resources</i> .....	76
<i>B. Cultural Landscapes</i> .....	77
4.5.4 Wilderness and Backcountry Aesthetic Qualities .....	78
4.6 Other Factors Considered .....	79
4.6.1 Cost Effectiveness, Practicality, and Sustainability .....	79
4.7 Issues Dismissed from Consideration .....	80
4.7.1 Socioeconomic .....	80
4.7.2 Environmental Justice .....	80
4.7.3 Public Health and Safety .....	80
4.7.4 Floodplains .....	80
4.7.5 Geography and Topography .....	80
4.7.6 Prime and Unique Farmlands .....	80
4.7.7 Information Technology and Management .....	80
4.7.8 Funding .....	80
4.8 Summary .....	81
<b>5.0 CONSULTATION AND COORDINATION .....</b>	<b>85</b>
5.1 Summary of Public Involvement .....	85
5.2 Contact and Consultation with Other Agencies .....	85
5.2.1 Tribal Consultation .....	85
5.2.2 Forest Service and Bureau of Land Management .....	85
5.2.4 State Historic Preservation Offices .....	88
5.2.6 County Agencies .....	88

<b>6.0 LIST OF PREPARERS AND CONTRIBUTORS.....</b>	<b>89</b>
<b>7.0 REFERENCES.....</b>	<b>90</b>
<b>APPENDIX A. 2004 DVNP EXOTIC PLANT POLICY .....</b>	<b>92</b>
<b>APPENDIX B. INVASIVE, EXOTIC PLANTS IN DVNP.....</b>	<b>95</b>
<b>APPENDIX C. ENVIRONMENTAL SCREENING FORM.....</b>	<b>98</b>
<b>APPENDIX D. MINIMUM REQUIREMENT DECISION GUIDE .....</b>	<b>107</b>
<b>APPENDIX E. BORROW PITS AND MIXING TABLES .....</b>	<b>114</b>
<b>APPENDIX F. SAFETY AND THE USE OF HERBICIDES .....</b>	<b>115</b>
<b>APPENDIX G. MAPS .....</b>	<b>119</b>
<b>APPENDIX H. POTABLE WATER COLLECTION SITES .....</b>	<b>120</b>
<b>APPENDIX I. PARK SENSITIVE PLANTS.....</b>	<b>126</b>

## Acronyms and Abbreviations

BMP	Best Management Practices
CAL-IPC	CA Invasive Plant Council
DO	Director's Orders
DVNP	Death Valley National Park
EA	Environmental Assessment
EPMP	Exotic Plant Management Plan
ERC	Environmental Review Committee
GMP	General Management Plan
IPM	Integrated Pest Management
LAME EPMT	Lake Mead Exotic Plant Management Team
NEPA	National Environmental Policy Act
NPS	National Park Service
PUPS	Pesticide Use Proposal System
QAC	Qualified Applicator Certificate
TES	Threatened, Endangered, and Sensitive
US EPA	United States Environmental Protection Agency
US FWS	United States Fish and Wildlife Service

## Scientific Names

Scientific names for plant species are given upon first mention in the text. Otherwise, species are referred to by their common name. Scientific and common names of exotic plant species are listed in an Appendix.

# 1.0 Purpose and Need

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## 1.1 Introduction

Death Valley National Park (DVNP) staff propose to control (contain, reduce, or eliminate, as practical or appropriate) select species or populations of exotic (non-native) plants from DVNP, in accordance with established management requirements, with the overall goal of environmental restoration. Specifically, the purpose of the actions described in this plan is to restore natural conditions and prevent further degradation of natural resources by removing or preventing the spread of exotic plants.

Up until this time, exotic plants in DVNP have been managed according to the direction of the Park's General Management Plan (GMP; National Park Service, 2002a), which states:

“The management of populations of exotic plant and animal species, up to and including eradication, will be undertaken whenever such species threaten Park resources or public health and when control is prudent and feasible.” (p. 31, Biological Environment, Introduced Species)

In addition, management has been guided by the Park's Exotic Plant Management Policy, signed by the Superintendent in 2004, which gave more specific direction concerning Integrated Pest Management (IPM) policies, including prevention practices, and appropriate methods of eradication for specific species and in specific environments (Appendix A). Shortly thereafter, the Park determined that an Environmental Assessment (EA) was necessary to adequately address the potential effects of implementing such a programmatic plan.

As a result, the Park has developed a programmatic Exotic Plant Management Plan (EPMP) that is based upon the 2004 Policy, but includes more recent prevention and treatment information and site-specific data and precautions. This plan follows an Integrated Pest Management (IPM) strategy that includes prevention, planning, treatment, and monitoring components. For species and locations described in this Environmental Assessment, treatment selection is determined through the use of a decision tree that ensures the least intrusive treatment method is selected. The decision tree also allows for appropriate and consistent decisions as new populations are detected, and relies strongly on annual planning for treatment of new populations. These treatments will be covered by this EA, but the annual plan will be subject to review through the DVNP National Environmental Policy Act (NEPA) compliance process, to allow for new mitigations or restrictions as new data become available. Any new treatment methods are outside the scope of the EPMP, and would require that further review regarding compliance with NEPA. The EPMP has a life-span of 10 years, after which time the EPMP may be reconsidered for renewal through the NEPA process.

## 1.2 Purpose for Taking Action

The National Park Service Director's Order 12 (DO-12; NPS, 2001) outlines agency regulations for environmental planning and analysis. Under this guidance, all actions must have a purpose,

which is defined as a statement of goals and objectives that the National Park Service (NPS) intends to fulfill by taking action. Under this definition, the primary purpose of this project is:

- To restore or preserve natural environmental conditions and native flora in the National Park.

Supplementary purposes:

- To reduce or eliminate the ability of exotic plants to invade natural areas, or to re-invade previously treated areas
- To re-establish natural ecosystem function in areas previously impacted by exotic plants
- To accomplish goals without harming wilderness character, natural resources, or cultural resources
- To ensure human health and safety during project implementation
- To implement the project without significantly impacting visitor experience

### 1.3 Need for Taking Action

Death Valley National Park is impacted by the presence of exotic plant species, which lower water tables, exclude wildlife and native plants, alter fire regimes, and change the environment in many other ways. Exotic plant species also impact or change cultural resources, such as historic structures, or springs that have been traditionally used by Native Americans. Exotic plant management is mandated by a variety of agency policies and state and federal laws (see Section X). To undertake this management in compliance with NEPA, the affected environment and impacts must be defined.

Current surveys document the presence of 97 exotic plant species in uncultivated settings in DVNP. Some of these plants have escaped from cultivated settings; there is a total of 34 documented cultivated, non-native species in the Park. Approximately half of the exotic species outside of cultivated settings can be feasibly managed at this time, and have significant populations or pose a threat. These manageable but threatening species occur at approximately 200 localities, covering more than 8568 acres of the Park, which are documented in this EA. However, this survey is by no means complete, and the number of sites and acreage increase as further surveys are undertaken.

In addition, there are other species that pose a threat, but cannot be controlled over wide areas, at least not with currently known methods, including many annual grasses and forbs. These species have not been mapped in most locations, but are very widespread in the Park, and are estimated to cover over 500,000 acres. Widespread control of these species is not considered practical at this time and is not addressed in this document, although control at specific, high priority sites may be attempted and is addressed.

Exotic plant control is a high priority for both DVNP and the NPS. The 2002 DVNP General Management Plan states that “The management of populations of exotic plant and animal species, up to and including eradication, will be undertaken wherever such species threaten Park resources or public health, and when control is prudent and feasible.” In accordance with this

direction, the Government Performance and Results Act (GPRA) goals for DVNP include Exotic Plant Control (Goal 1AIB).

Exotic species cause resource damage through a number of means. The damage is caused by many traits that exotic species generally have in common:

### Exotic Origin

Exotic species did not exist in Death Valley National Park until Euro-American settlers brought them here in post-Colombian times. After that, they spread beyond human settlements, and started new, feral populations. In the context of this document, 'Exotic' and 'Non-native' are synonymous.

### Invasiveness

Many exotics do not stay in one place; they expand their range by invading new areas. Exotic species that do not expand their range are not always a problem. However, other exotic species do spread to new areas very quickly. The seeds are spread by wind, wildlife, vehicles, construction equipment or fill dirt, by stock animals or feed, hikers, dogs, or by other means.

### Alteration of the Natural Resources

Alteration of ecosystem processes is the primary reason for the need to control exotic species in DVNP (Bossard et al, 2000). Exotic plant species alter the environment in many ways, including:

- **Formation of Monocultures:** Exotics often form monocultures; in other words, they grow so densely that other species are excluded from an area. If exotics become established in an area, they can cause a localized extinction of native flora and/or fauna. Some exotics form monocultures through allelopathy; they exude toxins into the environment which prevent other species from growing nearby. Salt cedar and athel (*Tamarix* sp.) both do this by exuding salt onto their leaf surfaces, and then building up a thick layer of salty leaves in the area where they grow. Salt cedar and athel are both salt tolerant, and are thus unaffected, but willow, mesquite, and other native species are excluded. Some exotics outcompete native vegetation for nutrients, sunlight, or water. For example, date palms (*Phoenix dactylifera*) shade out native species like Death Valley blue eyed grass (*Sisyrinchium funereum*), and mesquite (*Prosopis* sp.).
- **Altered fire regime:** Many exotics alter fire regimes to a state that native plants are not adapted to survive (D'Antonio and Vitousek, 1992). For example, cheatgrass (*Bromus tectorum*) and red brome (*Bromus madritensis* ssp. *rubens*) create fine fuels that allow fires to occur more frequently. These exotics are annual plants that thrive with repeated disturbance, but many native herbs and woody plants cannot tolerate frequent fires. Thus, over time, the presence of exotic plants can convert a native shrubland or Joshua tree forest into a non-native grassland.
- **Increased Water Use:** Exotic plants can use a tremendous amount of water (CA Weed Society, 2002). As water tables are lowered, native floristic composition may change, or surface water may become unavailable for wildlife. For example, now that date palm trees have caused USGS and Scrapper springs to go dry, bighorn sheep almost never travel back and forth between

Nevares Spring and Indian Pass Canyon. The sheep have lost the use of a migration route because they have lost a water source that was an important part of the route.

- **Altered Wildlife Habitat:** Most exotic plant species are less useful to wildlife than native species (Cronk and Fuller, 1995). Fewer birds nest in exotic trees than in native species of trees – many birds will nest in exotics only if all of the native vegetation is eliminated, and then in much smaller numbers. There is growing evidence that the single largest reason for the continuing decline of the desert tortoise might be the presence of herbaceous exotics in desert tortoise habitat. The herbaceous exotics are unpalatable to the tortoise, and have reduced the amount of native vegetation that was the primary food source for the tortoise. Some exotics are toxic to wildlife, including oleander (*Nerium oleander*) and halogeton (*Halogeton glomeratus*), or may physically obstruct an animal's digestive tract, such as ripgut grass (*Bromus diandrus*).

These environmental alterations caused by exotics tend to work together. Salt cedar, for instance, is constantly expanding its range, forms monocultures, crowds out the natives, exudes salt (i.e. is allelopathic), draws down the water table, and is unpalatable to wildlife. As a result, most major environmental organizations now consider exotic species to be the second greatest threat to the world's environment today, second only to habitat destruction.

#### Wilderness Degradation

Approximately 97% of DVNP is designated wilderness, managed according to the standards set forward in the Wilderness Act (1964). Through all the processes described above, exotic plants degrade the natural ecosystem structure and function that is integral to wilderness. In addition, exotic plants degrade the fundamental character of wilderness, which is meant to be "untrammeled by man". Although humans might not have planted the individual exotic plants, the very presence of these plants is an indication of human influence on the environment. This is especially true when the plants were introduced inadvertently by hikers, livestock, or pets in remote areas. Large-scale eradication of non-native plants in wilderness can also compromise wilderness character, because many people, specialized tools, and/or chemicals may be required to accomplish the task.

#### Loss of Research Value

The importance of healthy ecosystems for research opportunities in DVNP is given in the Park's mission statement itself. DVNP provides one of the largest undisturbed reference sites for understanding ecological structure and function of the Mojave Desert, and non-native vegetation degrades this resource.

#### Alteration of Cultural Resources

The presence of unplanned exotic vegetation can impact cultural, as well as natural, resources. For example, altered fire regimes can result in more frequent or more intense wildfires that can damage or destroy archaeological resources.

Exotic vegetation can damage structures by growing in cracks, on roofs, in rain gutters, and elsewhere. This can damage structures by widening existing cracks, harboring animal pests,

changing the appearance, creating fire hazards, and even by sheer weight. Non-native trees can shed limbs or fall over, sometimes causing massive damage to adjacent buildings.

Exotics can damage cultural landscapes and ethnographic resources by changing the species composition, appearance, fire regime, and functionality of the area. One example of such an impact is the replacement of willows used by the Timbisha Shoshone for basketry with non-native date palms.

### Safety Threats

Finally, exotics can pose a safety hazard to people who visit or live in the Park. Palms and salt cedar may block the line of sight along roadways. The large branches of athels can fall in campsites, and other areas frequently used by visitors. Oleanders are known to be highly poisonous to humans, especially children who are drawn to the bright flowers. The large stands of some exotics, such as the oleander at Warm Springs Camp, create fire hazards that could endanger human safety.

## 1.4 Scope of the Exotic Plant Management Plan and EA

### 1.4.1 Public Participation and Scoping

The goal of the public participation effort for the Exotic Plant Management Plan is to inform the public about the need for the plan, identify key issues, and provide the public with opportunities for meaningful involvement in the planning process. The Park provided informational materials on the Exotic Plant Management Plan to the businesses, agencies, and newspapers listed in Chapter 5, when?

The Park held two public meetings to discuss the plan—one in XX on XX, and one in XX on XX. A total of XX individuals attended the meetings. The park received XX comment letters during the public scoping process, including XX from individuals and XX from organizations. Written comments arrived via mail, e-mail, and fax. What is the intention of public meetings - if they are in the past then there should be a connection to the present alternatives. In the future, “scoping” they should occur fairly soon, before you finalize the draft and go out for the 30 days of the draft?

### 1.4.2 Actions Included in the EPMP

The scope of the Exotic Plant Management Plan (EPMP) and EA is to develop a long-term management plan that would reduce the impacts of and threats from exotic plants to native plant communities and other natural and cultural resources. The approach is to develop a general plan that provides resource managers with multiple treatment options for exotic plant management. Resource managers can select the most appropriate treatment option or combination of treatments included in this document to minimize potential impacts and maximize overall management success.

This plan covers activities to manage exotic plants on all NPS lands within DVNP, including wilderness and non-wilderness, and developed and undeveloped areas.

This plan was developed using an integrated pest management (IPM) approach. IPM is a decision-making process that coordinates knowledge of pest biology, the environment, and technology to prevent unacceptable pest damage, through the most safe and efficient means. The strongest emphasis is placed on minimizing risk to people, resources, and the environment. Each exotic species' natural history is evaluated before developing management strategies.

This plan considers all treatment methods currently used by the Park or that may be used in the foreseeable future. In addition to prevention practices, treatments include:

- Cultural Treatments — practices that promote the growth of desirable plants and reduce the opportunities for exotic plants to grow. Examples include planting native vegetation in developed areas.
- Manual/Mechanical Treatments — physical damage to or removal of part or all of the plant. Examples include hand pulling and cutting.
- Chemical Treatments — applying pesticides as prescribed by their labels.

During internal scoping meetings, it was determined that the EPMP should not be so general that it is difficult to interpret or implement. The document also should not be so specific that changing needs cannot be addressed. As a result, the Plan includes both site-specific information about known exotic plant populations, and an action plan for newly detected populations. Any treatment methods that have not been considered in this EPMP would require additional compliance with NEPA.

#### 1.4.3 Definition of Plants to be Managed

Under both alternatives, plants defined as exotic plants will be managed under the EPMP. Native plants will not be managed under the EPMP. Native plants are defined as those species that “have occurred or now occur as a result of natural processes on lands designated as units of the national Park system” (NPS, 2001). Exotic plants are defined in this EPMP as:

“Those species that occupy or could occupy Park lands directly or indirectly as the result of deliberate or accidental human activities. Exotic species are also commonly referred to as non-native, alien, or invasive species. Since an exotic species did not evolve in concert with the species native to the place, the exotic species is not a natural component of the natural ecosystem at that place” (NPS, 2001).

Exotic plants must meet additional criteria in order to be managed. NPS policy (NPS, 2001), outlines the conditions under which exotic plant management should occur:

“All exotic plant and animal species that are not maintained to meet an identified Park purpose will be managed - up to and including eradication - if (1) control is prudent and feasible and (2) the exotic species:

- Interferes with natural processes and the perpetuation of natural features, native species or natural habitats; or
- Disrupts the genetic integrity of native species; or
- Disrupts the accurate presentation of a cultural landscape; or
- Damages cultural resources; or
- Significantly hampers the management of a Park or adjacent lands; or

- Poses a public health threat as advised by the U.S. Public Health Service (which includes the Centers for Disease Control and the NPS Public Health Program); or
- Creates a hazard to public safety.”

All invasive exotic plants currently known to exist in the Park are listed in Appendix B. Exotic plants that may be detected at a later time, and that meet the above definitions, will also be treated under this EA. Any new species will be subject to the same annual planning and mitigation process as other species, outlined in this EPMP. It is important to note that climate change may result in distribution shifts of many plant species. DVNP will allow for the definition of exotic plants to be adapted, if necessary, in accordance with these changes, and with new federal, state, or county policy that may affect these definitions. However, any new species will still be subject to the same annual planning and mitigation process.

Prioritization of exotic plant treatments will be made at the discretion of the Exotic Plant Program Manager, or designated employee. Factors considered include the extent of the infestation, the potential for spread, the difficulty of control, and the value of the resources that may be damaged (Hiebert and Stubbendieck,1993).

## 1.5 History of Exotic Plant Management at DVNP

Up until this time, exotic plants in DVNP have been broadly managed according to the direction of the Park’s General Management Plan (GMP), which states:

“The management of populations of exotic plant and animal species, up to and including eradication, will be undertaken whenever such species threaten Park resources or public health and when control is prudent and feasible.” (p. 31, Biological Environment, Introduced Species)

Death Valley National Monument began attempting control of exotic plants in 1967, when Rangers burned salt cedar at Poison Spring in Indian Pass Canyon, and some control efforts continued before and after the Monument was designated a National Park in 1994. To document salt cedar control plans, two Environmental Analyses were developed, with Findings of No Significant Impact (FONSI) signed in 1988 and 1996.

Since that time, exotic plant treatments were continued in other areas, using a variety of methods and targeting several different species. In 2004, the Park developed an Exotic Plant Management Policy, which was signed by the Superintendent. This document gave more specific direction concerning IPM policies, including prevention practices, and appropriate methods of eradication for specific species and in specific environments.

The methods implemented under the direction of the Exotic Plant Management Policy have been treated in the NEPA pathway under the Categorical Exclusion (DO-12; Sec. 3.4E(3)): “Removal of individual members of a non-threatened/endangered species or populations of pests and exotic plants that pose an imminent danger to visitors or an immediate threat to Park resources.”

More recently, because of the variety of methods available to control exotic plants, the Park has determined that current exotic plant management practices falls into the category of Exceptions to Categorical Exclusions. According to the DO-12, an action may NOT be categorically excluded if it establishes a local policy, has material adverse effects on public health or safety, has highly controversial environmental effects, has adverse effects on wilderness areas, or has highly uncertain effects, or requires a permit from another agency (3.5). The current suite of available exotic plant management techniques includes, among other things, herbicide use, treatments within cultural areas, and the use of chainsaws in wilderness. Through the process of internal scoping, it was determined that the potential impacts of these activities warranted the determination of an Exception to the Categorical Exclusion.

In summary, exotic plant management can no longer be described as simple removal of individual members of populations, as described in the Categorical Exclusion above. Therefore, the Park has developed this EA to evaluate the effects of implementing a programmatic Exotic Plant Management Plan. The Environmental Screening Form used for this determination is included in Appendix C.

## 1.6 Regulations, Policies, Laws, and Legal Jurisdiction

### 1.6.1 Federal Regulations, Policies, Laws

There are many federal laws which pertain to exotic plant control:

- NPS Management Policies (2006); based on federal law, official NPS framework for decision making; the official NPS interpretation of what the agency mission and mandate is, with general priorities and parameters for achieving that mission and mandate. <http://data2.itc.nps.gov/npspolicy/index.cfm>
- NPS Director's Orders (various dates); similar to policy, only with more narrow focus (for example, environmental impact analysis). <http://data2.itc.nps.gov/npspolicy/index.cfm>
- Executive Order 13112 of 1999; Established the National Invasive Species Council, and requires Federal agencies to take actions to prevent the establishment of invasive species, and to actively control invasive species where they are present. Also provided definitions, assigned duties, and mandated the development of an Invasive Species Management Plan.
- California Desert Protection Act of 1994; created Death Valley National Park and provided framework and general objectives for the management of the Park, designated 95% of the Park as wilderness to be managed according to the standards set forward in the Wilderness Act.
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), requires Federal agencies to take steps to prevent the introduction of invasive species. This act emphasizes but is not limited to aquatic species.

- Federal Noxious Exotic plant Act of 1974, as amended (7 U.S.C. 2814), requires Federal agencies to assign responsibilities, develop plans, and provide funding for the control of undesirable plants on Federal lands administered by those agencies.
- Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), requires federal agencies to protect the habitat of endangered species, and to avoid direct harm to endangered species.
- General Authorities Act of 1970; clarifies the roles, responsibilities and mandates of the NPS.
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.); created the framework needed to document the process of determining the environmental effects of certain actions – in particular, all federally funded projects on federal land must go through the NEPA process. This also created the ‘Council on Environmental Quality’, an agency of the President’s office that has responsibility for the interpretation and implementation of NEPA.
- National Historic Preservation Act of 1966 as amended: Sections 106 and 110. Federal agencies must consider the effects of their proposals on historic properties, and provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions.
- Wilderness Act (1964, 16 U.S.C. 1131-1136). Established a national Wilderness Preservation System, with definitions and uses of wilderness, including what actions are or are not allowed in Wilderness, and general management objectives.
- Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947 as amended. Grants the US EPA authority to regulate pesticide use and to delegate that authority to the State governments.
- NPS Organic Act of 1916; created the National Park Service and provided the framework and general objectives for the Service and for the management of areas administered by the NPS.
- Lacey Act of 1900, as amended (18 U.S.C. 42); Under this law, it is unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law.
- Environmental Justice in Minority and Low-Income Populations (E.O. 12898); directs federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority and low income populations.
- Secretarial Order 3175 and Environmental Compliance Memoranda (ECM) 95-2 – These memoranda require bureaus to explicitly address environmental impacts of their preferred alternatives on Indian Trust Resources in any environmental document.

## 1.6.2 Legal Jurisdiction

Death Valley National Park practices “Proprietary Jurisdiction,” meaning that the State and County Law Enforcement have the authority to enforce State and County laws and regulations within the Park boundaries. In Death Valley, the National Park Service has the legal authority and rights of a property owner, plus the ability to make and enforce regulations in NPS areas (36 CFR Chapter 1 and 16 U.S.C. 1a-2[h], 1c and 3) (NPS Director’s Order #9, section 5.3.4).

State and County laws apply within the Park, except when preempted by specific federal laws. Executive Orders, Agency Policies, Directors Orders and Park Policies are developed as interpretations of Federal Law, and as such also preempt State and County laws.

### 1.6.3 State and County Regulations, Policies, Laws

The Federal laws and authorities mentioned above are broad ranging enough and specific enough to preempt most state laws and regulations related to land management within the Park. However, there are exceptions, one of which relates to this EPMP:

- Inyo and San Bernardino counties have regulatory control over pesticide use and reporting within the portion of the Park that is within California. This falls under Federal Law, as it is based on Federal authority that is granted to the US Environmental Protection Agency (EPA) by FIFRA. However, the EPA has delegated that authority to the state government, which in turn has delegated the authority to the County Agricultural Commissioners.

## 1.7 Decision to be Made

Based on the conclusions of this EA, the National Park Service decision maker may choose one of two Alternatives. Both Alternatives propose the use of Integrated Pest Management techniques to control exotic plants at all known sites in the Park. The Alternatives vary in the annual planning process, in interpretation of NPS policy, and in the measures taken to avoid damage to natural and cultural resources.

## 2.0 Alternatives

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### 2.1 Actions Common to Both Alternatives

#### 2.1.1 Integrated Pest Management

Both alternatives employ an Integrated Pest Management (IPM) system. IPM is a decision-making process that coordinates knowledge of pest biology, the environment, and available technology to prevent unacceptable levels of damage to resources by pests, using environmentally sound, cost-effective management strategies that pose the least possible risk to people, Park resources, and the environment. This process helps resource managers determine whether the treatment is necessary and appropriate, where treatment should be administered, when treatment should be applied, and what strategies should be used for immediate and long-term results. IPM decisions are made on a case-by-case basis, so that treatment strategies are tailored to local conditions.

IPM techniques that are used to control exotic plant populations include physical, chemical, and cultural control methods. ‘Control’ is defined here as containment, reduction, or elimination, as practical or appropriate.

Although both alternatives employ IPM, the alternatives differ in the planning process. Whereas Alternative 1 relies on the individual discretion of the Program Manager, Alternative 2 outlines specific decision-making tools with which to determine what treatment, if any, is warranted. Alternative 2 also outlines best management practices to guide specific treatments at specific locations.

#### 2.1.2 Oversight and Supervision

Under both alternatives, the Park Botanist, or other designated NPS employee, will act as Program Manager for the Exotic Plant Management Plan. Duties include the maintenance of proper permits for conducting exotic vegetation treatments, including pesticide applications. These permits include:

- Current Qualified Applicator Certificate (QAC) from the California Department of Pesticide Regulation, and Nevada Department of Agriculture, if applicable
- Pesticide application permit from County Agricultural Commissioners
- NPS pesticide permit, through the Pesticide Use Permitting System (PUPS)

The QAC holder will maintain responsibility to train any individuals in proper IPM techniques. Under that individual’s supervision, the work of exotic plant control may be performed by other Park staff, partner groups, contractors, or volunteers.

#### 2.1.3 Scope and prioritization

The species to be managed are the same for both alternatives, as outlined in Appendix B. Both alternatives also prioritize the management of these species under the same general guidance. In accordance with NPS policy, relative management priorities will be determined as follows (NPS 2001, page 37, Section 4.4.4.2):

“Higher priority will be given to managing exotic species that have, or potentially could have, a substantial impact on Park resources, and that can reasonably be expected to be successfully controlled. Lower priority will be given to exotic species that have almost no impact on Park resources or that probably cannot be successfully controlled.”

## 2.2 Alternative 1: No Action, No Change from Current Management

Under this Alternative, DVNP will continue operation under the Exotic Plant Management Policy. Individual plants and populations will be controlled under the compliance of the DO-12 Categorical Exclusion described in Chapter 1. Treatments will occur on a case-by-case basis, without the implementation of an annual plan that may be reviewed by Park staff. Minimum tool analyses may be developed on an individual basis for chainsaw use in wilderness (Appendix D).

Integrated Pest Management (IPM) techniques will continue to be used to control individual populations of exotic vegetation. Prioritization of treatments and appropriate techniques will be determined on a case-by-case basis, according to the discretion of the Program Manager. Herbicide will be used, at the discretion of the Program Manager and a Certified Applicator in the state of CA/NV. Exotic vegetation in cultural landscapes will not be controlled or maintained, except in cases where damage or threat of damage to historic features is obvious. No formal documentation will be available of the criteria used to determine whether a treatment should be made, or why a particular treatment was selected.

The affected environment and impacts to the environment would remain undefined, and DVNP would be in violation of federal compliance with NEPA.

## 2.3 Alternative 2: Exotic Plant Management Plan, Preferred Alternative

### 2.3.1 Introduction

A programmatic Exotic Plant Management Plan (EPMP) will be approved. Exotic vegetation establishment will be prevented and selected exotic vegetation will be controlled Park-wide, at all known sites, subject to limitations for cultural and natural resource protection, wilderness regulations, visitor experience, and human safety, as outlined in this document.

The EPMP will consist of a documented Integrated Pest Management (IPM) system. The suite of IPM techniques employed to prevent and control exotic plant establishment will include:

- Education
- Prevention
- Planning
- Treatment Methods
  - Cultural
  - Mechanical
  - Biological

- Chemical
- Monitoring and Record Keeping

Each of these techniques is discussed in the following sections.

### 2.3.2 Education

Existing visitor awareness or public education activities will continue in DVNP. These programs provide general information on specific exotic plant management issues and strategies for controlling individual exotic plants. An example of such an activity is the interpretive program at the Stovepipe Wells sand dunes, in which visitors help to pull non-native Russian thistle (*Salsola* sp.) plants. Another activity that would continue would be the inclusion of at least annual articles in the Park employee newsletter, the *Heatwave*, and the Natural History Association newsletter regarding exotic plant management.

The Park also has numerous opportunities for education through volunteer and school groups. The Sierra Club and University of Southern California Alternative Spring Break both have annual service trips in the Park. They have participated in pulling non-native Russian thistle and salt cedar seedlings. Future service trips will also include a component of instruction or activity related to exotic plant management.

In addition to these existing programs, the Park will develop interpretive displays and/or brochures to promote awareness of exotic plants. These products may include displays associated with existing entrance or interpretive signs, or brochures that may be shared with the public and displayed in visitor contact areas.

### 2.3.3 Prevention

The establishment of new exotic plant populations and species will be prevented through the following means:

- Weed Free Feed and Seed: All feed for stock used in the Park is required to be certified exotic plant free. Certification is a service provided by County Agricultural Commissioners. Park concessionaires will be notified of this requirement on an annual basis, and will provide documentation of certification to the Park. Park visitors will also be notified of this requirement when obtaining permits, and this requirement will be included in the Park Compendium. All seed, mulch, hay, or other products used for revegetation purposes following construction or maintenance will be certified weed free.
- Best management practices for construction and maintenance will be communicated to work crew members and supervisors of all construction and maintenance activities. These practices help prevent disturbance and reduce the potential for exotic plant invasion:
  1. Drive only on existing roadways or disturbed areas.
  2. Inform workers of boundaries of the work area and of appropriate turnarounds and Parking areas.
  3. Choose the minimum tool required to accomplish the task. When selecting machinery, choose the lightest, smallest vehicles reasonable under all circumstances.
  4. Minimize disturbance, including ground scraping, digging, and contouring.

5. Avoid damage to live and dead vegetation. Maintain native ground cover whenever possible on shoulders and berms to prevent openings for exotic plant species. When performing road work, clearing of vegetation will not extend beyond the shoulder of the road, or other existing, designated drainage features or pull-outs.
  6. Clean equipment regularly, and before and after arrival on a new work site. Cleaning should include the removal of plant materials from the cab and undercarriage of vehicles. Do not clean vehicles at the work site; perform cleaning only at the Cow Creek maintenance yard or another established cleaning facility at a developed site.
  7. All fill, including soil, sand, and gravel must be obtained from the immediate and disturbed work area, unless otherwise designated through the Park environmental compliance process. Other fill sources that may be used are included on the map of borrow pits and mixing tables in Appendix E. Fill sources that are outside the immediate work vicinity or that are not included on the map in Appendix E must be approved by the EPMP Program Manager prior to use, to ensure they are exotic plant-free.
- Landscaping: No individuals of new exotic species will be planted in the Park, including office areas, visitor centers, campgrounds, and residences. Exotic species that are a significant component of a historical landscape or feature may be replaced in-kind if they die. Exotic plants in historic and developed landscapes are addressed further in Section 2.3.9.

## 2.3.4 Planning

### Prioritizing Exotic Plant Management

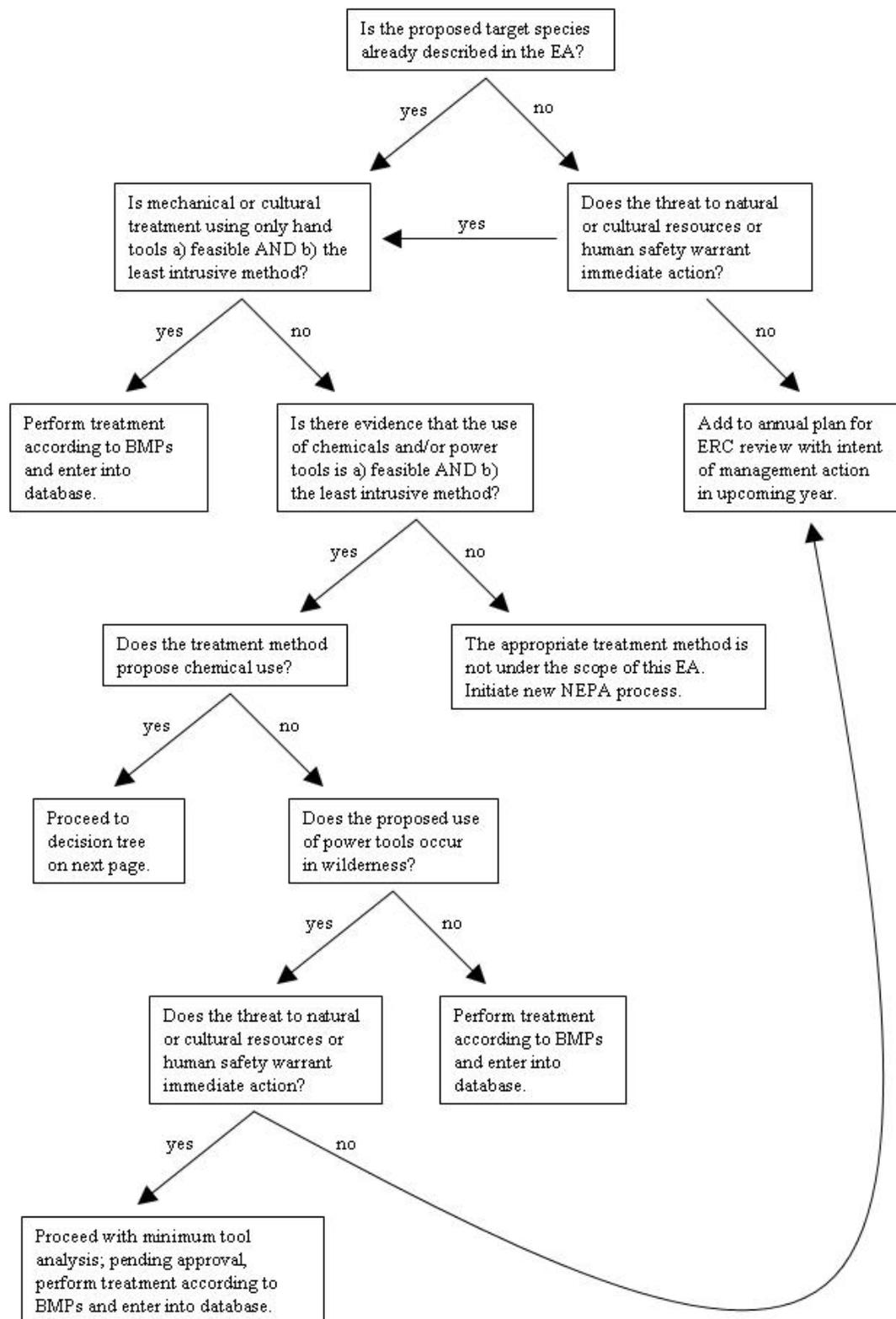
Under both alternatives, all plants that meet the NPS definition of an exotic species, as given above, will be managed under this EPMP. In addition, both alternatives prioritize management of these species according to the guidance outlined in Section 2.1.3.

### Optimum Method Analysis

An optimum method, in the context of this document, is an IPM technique determined to be necessary to accomplish an essential task, which makes use of the least intrusive treatment, agent, or application method that would achieve the management objective. The optimum method analysis process is based on the concept of Minimum Requirement Analyses that are used by the NPS to evaluate activities in wilderness areas. This method has been implemented in an Exotic Vegetation Management Plan by the Northern Great Plains National Park network (NPS, 2005). At the beginning of this decision tree in Figure 1, the resource manager identifies whether the target plant species is described in this EA. The manager then selects appropriate answers to a series of yes/no questions. The questions are designed to ensure that the least intrusive and safest method is selected, while allowing for feasible treatments to be made. The decision tree is designed such that chemical treatment and the use of power tools in wilderness are selected only when no other treatments are feasible.

If an appropriate treatment is identified in the decision tree, the resource manager is directed toward a set established techniques and Best Management Practices (BMPs) to accomplish that work. BMPs include mitigations to avoid damage to natural and cultural resources, to provide for the best visitor experience, and to ensure human health and safety. Additional steps are outlined in the decision tree to ensure that NEPA requirements, as identified in this EA, are met. All treatments are then documented in the Park Exotic Vegetation database.

There are a few key considerations to note in the decision tree. First, it is designed such that cultural and mechanical treatments of all species described within this EA, and at any locations, will not be subject to further environmental review procedures, with the exception of treatments that require minimum tool analyses (Appendix D). Thus, the BMPs are written with adequate site-specificity and detail to ensure that appropriate mitigations for natural and cultural resource protection, visitor experience, and human safety are met. Secondly, newly detected species that pose an immediate threat to resources or safety at all locations may be also be treated using cultural or mechanical methods, without further environmental review, but allowing for the restrictions and limitations included in the EPMP. Finally, actions that *will* be subject to further environmental review include: 1) the use of chemicals at locations not described in this EPMP, 2) new treatment methods not described in this EPMP, and 3) treatments that require the use of mechanized equipment in wilderness. In addition, the annual plan will include all anticipated treatments for each upcoming year that will be subject to environmental review, to allow for the evaluation of new resource information and safety considerations.



**Figure 1: Decision tree for use in Optimum Method Analysis**

Use this tree ONLY if directed to do so by the previous page.

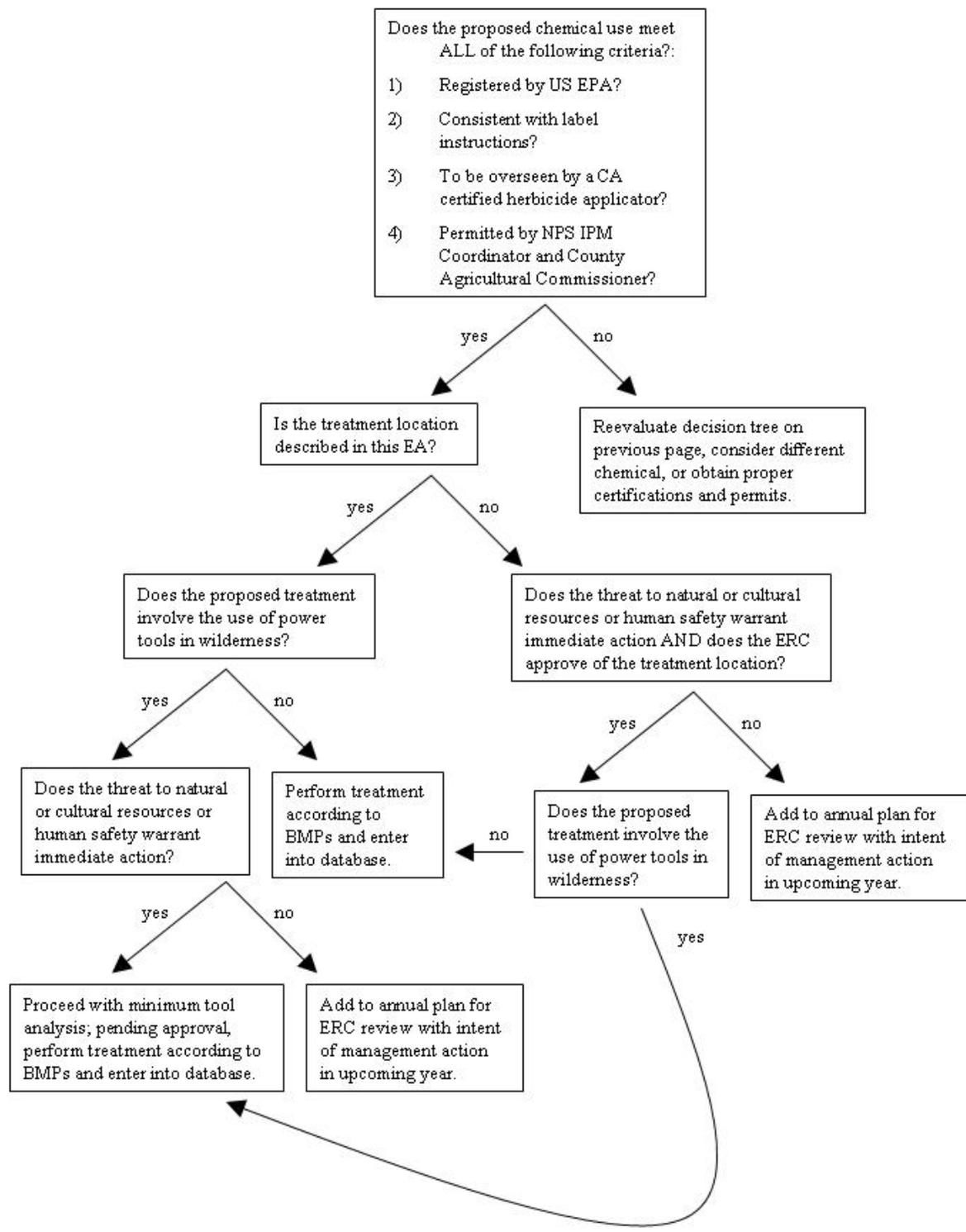


Figure 2: Continuation of decision tree for use in Optimum Method Analysis

### Annual Planning

An annual planning process is a key feature to a programmatic plan, such as the one documented in this EA. On one hand, it is critical to use the IPM method on a site-specific basis to allow for proper protections, and that is the case with already known species and locations described in the appendices. However, flexibility to treat populations that are not yet discovered must be accounted for. The Park believes that an annual planning process will succeed in providing adequate scrutiny of treatments to ensure proper protections, while ensuring that the threats caused by exotic vegetation are addressed.

Potential treatments of newly detected populations that were not treated in previous years because they were not believed to pose an immediate threat to resources or to human safety will be subject to annual review through the DVNP environmental review process. In addition, all new treatment areas, target species, and proposals for use of power tools in wilderness for the upcoming year will be documented in an annual plan, subject to environmental review. This will include treatments in any cultural landscapes not included below. Because most treatments occur between the Fall and Spring, the annual plan will be presented for review during August or September. The annual plan will consist of a list of proposed species, locations, and treatment methods for the upcoming year, and will be available in GIS format. In addition, treatments from the previous year will be presented to the review committee. Treatments of new populations may or may not be allowed, subject to the existing BMPs. Alternatively, new BMPs for the locations may be written, or alternative methods or no action whatsoever may be determined to be appropriate.

### 2.3.5 Integrated Pest Management Techniques

IPM treatment techniques include physical, chemical, and cultural control methods. An appropriate treatment is first selected by using the decision tree in the planning section above. Then, the techniques and best management practices (BMPs) for each method, as outlined below, will be followed.

Different methods are appropriate for different species and situations. To determine the appropriate treatment method, it is important to understand the traits that differentiate plants into contrasting functional types.

#### *A. Plant Functional Types*

Plant can be categorized into different functional groups based on their life history traits, morphology, and physiology. These characteristics will be used to determine what types of treatments are most effective to destroy or to reduce the growth of exotic plants.

- Woody dicots- Broad-leaved trees, shrubs, and woody vines. These types of plants often have extensive root systems that can regenerate even when above-ground portions of the plant are dead. Reproduction is by seed, or through vegetative means, or both, depending on the species and/or situation. Different treatment methods may be appropriate, depending on the size and reproductive stage of the plant.

- Palm Trees- Perennial monocots that grow into trees. Although they do not produce true wood, in the technical sense, they do produce woody tissue that presents similar difficulties to woody dicots in terms of removal. In addition, the fibers in the woody trunk are extremely difficult to break or cut. Young trees generally have little woody tissue, but relatively large leaves that occur in clusters. Reproduction is mainly through seeds produced by mature trees. Palm trees generally have single meristem at the top of the tree that produces new tissue. Removal of that meristem often causes the plant to die. However, many California fan palms (*Washingtonia filifera*), and all date palms, are able to regenerate meristematic tissue from other portions of the tree. For this reason, mechanical treatments alone are rarely sufficient to kill mature palm trees.
- Perennial forbs- Broad-leaved, herbaceous plants with a life span exceeding one year. Herbaceous plants do not develop secondary, woody tissue, although they may have extensive root systems, and reproduce through vegetative means, such as underground stems. Reproduction also occurs by seed. Because of their high root:shoot biomass ratio, these plants are often difficult to eliminate by either mechanical or chemical means.
- Annual forbs- Broad-leaved, herbaceous plants that grow from seed, reproduce, and die within the span of a single year, although some may act as biennials under certain environmental conditions. Reproduction is exclusively by seed, and root systems are less extensive than those of perennials. Seed production is often prolific, and these plants are generally tolerant of disturbance, often thriving in areas where soil movement occurs.
- Perennial Graminoids- Herbaceous monocots, such as grasses, sedges, and rushes with a life span that exceeds one year. Some grow in bunches, others form sod. Meristematic tissue is at or below ground level. Reproduction may occur vegetatively, or by seed. Extensive and tough root systems and runners often make these types of plants difficult to kill.
- Annual Graminoids- Herbaceous grasses, sedges, and rushes that regularly reach maturity, produce seed, and die in one year belong to this group. However, it is the annual grasses, such as cheatgrass, that are the primary concern in DVNP. These plants reproduce exclusively by seed, tend to be extremely disturbance-tolerant, and invade rapidly. They are highly adapted to germinate from seed following fires.

## *B. Treatment Methods*

### 1. Cultural

These methods include seeding native plants and vertical mulching to create habitat for native plants. Seeds may be collected by hand from areas immediately within or adjacent to exotic vegetation and spread within the perimeter of an exotic vegetation population to encourage native plants to grow. Seed collection will occur only by or under the direct supervision of the Park botanist. Seeds will be collected only from plants that are not Park Sensitives. This method will generally be used in conjunction with hand-pulling of exotics. Vertical mulching may also occur in conjunction with these methods, or alone. Using this technique, branches and other plant parts are scattered on the ground surface, or implanted in the soil to a depth of 5 cm to provide shade and microsites for plants to germinate. This method generally encourages native, rather than non-native plants to grow, because most non-native plants are adapted to grow in full

sun, without competition from other living or dead vegetation. Sometimes, rocks are used for this purpose, although these materials must be obtained from an existing disturbed berm or borrow pit.

## 2. Mechanical, without Power Tools

Plants may be pulled out of the ground, by hand, or by using a non-motorized tool, such as an exotic plant wrench. For most plants, this is considered the least intrusive and safest method of treatment. This method is effective for seedlings and small juveniles of woody dicots and palm trees. It is effective for most exotic perennial forbs currently present in DVNP. This method can also be used for small populations of annual forbs and graminoids. Hand-pulling is the most common technique, because it has the greatest chance of removing the root system and killing the entire plant.

Digging is another mechanical treatment that may be used for larger plants. However, because of the ground disturbance that it causes, and the fact that plants often regenerate from roots that were not removed, this method is rarely used. It will only be used in situations where other options are not effective or feasible, and where the ground disturbance is acceptable.

Finally, mechanical treatments may involve cutting. Cutting is usually not effective because woody plants and perennials may regenerate from roots, and even annual plants may have meristems so near the ground surface that this method will not kill them. Cutting can be effective for palm trees with a distinct trunk, and repeated cutting may be the method of choice in sensitive areas where other treatments are not safe or feasible. Hand saws, machetes, or loppers may be used to accomplish this work, and treatment would need to be repeated over several years to control the plants. Cutting is generally used in situations where exotic vegetation can only be temporarily controlled, to allow for resource protection or safety. Cutting may also be used to remove reproductive structures from exotic vegetation when other methods may not be feasible.

## 3. Mechanical, with Power Tools

The use of power tools alone to accomplish mechanical treatments is viable in few situations. Motorized equipment, such as winch and vehicle, may be used to pull some woody dicots or palm trees. This may be viable in areas where chemicals cannot be used, and where the ground disturbance resulting from the removal is acceptable. In some cases, chainsaws may be used to cut woody exotic plants. For the reasons described above, this method is usually not effective, but it may be the method of choice in non-wilderness situations, where other methods are not safe or cost-effective. This method may be used in wilderness settings, if a minimum tool analysis indicates that it is appropriate.

## 4. Chemicals Alone

This method may be effective for some annual and perennial forbs and graminoids, and for young woody plants that are too large to mechanically remove. Chemical methods are selected only when other methods are not safe or effective. For example, larger populations of yellow sweet clover cannot be mechanically controlled because of its extensive root systems. Very large populations of the annual halogeton have been controlled in DVNP using herbicides in Mud Canyon. Finally, large woody plants that cannot be pulled, but are not yet tree-sized, such

as juvenile palm trees, can be effectively treated through foliar spray applications. A basal bark application of herbicide may be selected for plants that cannot be removed through other means, and that have an exposed woody trunk of one inch in diameter or less. Three herbicides, manufactured under various trade names, are proposed for use under this EPMP: glyphosate, imazapyr, and triclopyr (Appendix F). As more information becomes available, additional herbicides may be proposed through the annual planning process described above.

### 5. Chemical and Mechanical

Many methods use a combination of mechanical and chemical means, because chemicals can often be applied in lesser amounts, and more effectively, when the application occurs directly to the plant's vascular system. Three herbicides, manufactured under various trade names, are proposed for use under this EPMP: glyphosate, imazapyr, and triclopyr (Appendix F). As more information becomes available, additional herbicides may be proposed through the annual planning process described in Chapter 2.

These combined methods can be divided into three general categories:

#### a. Cut Stump

Chain saws, hand saws, or loppers or machetes may be used to cut the plants down, followed by herbicide application to the cut stump surface. Immediate application ensures that the herbicide will penetrate to kill the roots. Larger trees have very large and deep root systems and usually require repeated regular treatments, over as many as five years, to completely kill the roots. This method is effective for both woody dicots and palm trees.

#### b. Hack and Squirt

Cuts are made into the cambium layer of the tree (girdling the tree, if possible), and herbicide is immediately sprayed into the cut. The herbicide then translocates throughout the tree, and the tree dies without being cut down. The cuts can be made with chain saws, hand saws or axes. This method is effective for woody dicots.

This method is less effective than the Cut Stump method. However, when it can be accomplished with hand tools, it is preferable in wilderness areas. It may also be the preferred method in areas where the trees provide wildlife habitat.

#### c. Drill and Injection

Chain saws, hand saws, loppers, or machetes are used to cut away the dead material surrounding the trunk of the tree. A shallow, wedge shaped cut is then made into the trunk of the tree, to ensure access to the inner core of the tree. Gasoline powered or "brace and bit" type drills are then used to drill large holes (17 by ¾ inch) into the trunks at a 45 degree downward angle – there are usually about six holes per tree. The holes are then filled with herbicide.

Without an appropriate cut, it is likely that some of the herbicide will dribble through the outer, dead material, without entering the living portion of the tree. This can result in environmental contamination, and may result in the survival of the tree.

This method has been used extensively and successfully in the Nevares and Cow Creek drainages, and at Travertine Springs. This kills the trees, but allows them to remain standing, so

they retain their usefulness to wildlife, while the native vegetation regenerates. This method is effective on all mature palms, and juvenile palms that have developed a distinct trunk.

### *C. Chemical Certifications and Permits*

In accordance with NPS-77 (NPS 1991), only those pesticides that are registered by the US EPA can be used. Pesticides must also be used in accordance with product labels, including any restrictions that prohibit their use under certain conditions. If these conditions are met, the Park must submit pesticide use requests to both County Agricultural Commissioners and to the NPS Regional IPM coordinator.

The Federal Government has delegated most aspects of pesticide regulation to the state government. Herbicide applications in DVNP are required to occur under the oversight of a Qualified Applicator Certificate (QAC) holder. This individual may train non-certified workers to perform herbicide related work, but the QAC holder must ensure that guidelines set by the state and within this EA are met. The state has delegated the process of herbicide permitting to County Agricultural Commissioners. Therefore, the QAC must annually contact appropriate commissioners to obtain approval for treatments in specific areas.

Requests are also submitted annually to the NPS Regional IPM coordinator through the Pesticide Use Proposal System (PUPS). Director's Order-77-7 (DO 77-7) requires pesticide use request approval by a National IPM Coordinator for aerial application of pesticides. DO 77-7 also requires approval by a National IPM Coordinator for application of 400 contiguous acres. The Regional IPM Coordinator may approve other pesticide use requests that do not fall into these categories.

Once county and NPS proposals have been approved, Park staff may purchase pesticides. Pesticides must be used within one year from the date of purchase (NPS, 2001).

### *D. Best Management Practices*

- All workers will be provided with the safety training as outlined in Appendix F, including pesticide safety, if applicable. Non-NPS workers will also be provided with instructions related to general Park regulations.
- To avoid damaging soil crusts and/or cultural resources, crews will access sites by following established routes or by remaining on stable, non-frangible soils, whenever possible. Creation of new routes will be minimized through supervisory instruction and/or flagging.
- To protect nesting birds and potential nesting habitat and rearing habitat, removal of mature, standing woody vegetation will only occur from late summer (September 15) to mid-spring (March 15).
- To protect fish and amphibians, only herbicide approved for aquatic uses will be used in situations where herbicide will be used within 50 ft. of surface water, or further if directed by the pesticide label. Aquatic-approved herbicides will also be used whenever the applicator has reason to believe that run-off may cause herbicide to reach surface water. No herbicide of any type will be deliberately applied to water.

- In the vicinity of Valley Springs and Darwin Falls, herbicide will be applied only by direct application to stumps or bark, using a brush or sponge. No sprayers will be used in these areas. This method will ensure protection of sensitive animals and potable water in these areas. See below for more information.
- To avoid damage to historic and cultural resources, a more specific set of guidelines has been developed (see Section 2.3.9 Management of Exotic Plants in Cultural Landscapes). Any individual conducting exotic vegetation work must consult with the Park Archeologist to determine if the proposed treatment area is within one of the historic/cultural areas described below, and follow the appropriate guidelines for each. On some occasions, new exotic plants may be detected in areas where historic or cultural features are evident, but not yet described in this EPMP. In the latter case, the treatment will be subject to the annual planning process; approval through the Park's environmental compliance process must be obtained prior to treatment.
- The Timbisha Shoshone or other Native American groups with cultural affiliations to the park may also have opinions regarding the use of chemicals in certain areas, or could have alternative suggestions regarding vegetation management without use of chemicals. Any individual conducting exotic vegetation work must consult with the Park Archeologist or Park Timbisha liaison to determine if the proposed treatment area is not suitable for use of chemicals.
- Any restoration techniques that accompany exotic plant control, such as sweeping, raking, or vertical mulching must first be reviewed by the Park archeologist and Timbisha Shoshone Tribe liaison.
- Rock, soil, and other fill material used for road and facility maintenance and construction will be obtained from the borrow pits and mixing tables identified in Appendix E. These areas will be visited at least every other year by the Park botanist or designated staff to inventory for exotic vegetation. Areas with exotic vegetation will have high priority for prevention and treatment measures. If rock, soil, or fill must be obtained from other areas, those sites will be approved by the Park botanist or designated staff to ensure that exotic vegetation is not spread.

### 2.3.6 Monitoring and Record Keeping

Park staff will perform routine surveys to detect the presence of exotic plants. The areas surveyed, and any exotic plant species found will be entered into the Park exotic plant electronic database. Newly disturbed areas have the highest priority, and new construction sites will be surveyed annually for at least three years following construction. Roadsides and trails have the next priority, and will be surveyed on at least a biennial basis. Rare plant and animal habitat, especially springs, will also be prioritized.

In addition, areas where exotic vegetation has been treated will be monitored to determine whether management objectives were met. Findings will be documented in the Park Exotic Plant database. If management objectives were met, the resource manager will document the results of monitoring. The resource manager should, however, consider other treatment options as they become available to identify other alternatives that might have lower impacts. If management objectives are not met, the selected treatment may be modified, or alternative treatments may be considered through adaptive management. The NPS must use adaptive management to fully comply with 40 CFR, which requires a monitoring and enforcement

program to be adopted, where applicable, for any mitigation activity. Adaptive management [516 Departmental Manual (DM) 4.16] is a system of management practices based on clearly identified outcomes; monitoring to determine if management actions are meeting outcomes; and if not, facilitating management changes that will best ensure that outcomes are met or by reevaluating outcomes. Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain and is the preferred method of management in these cases.

### 2.3.7 Wilderness Considerations

The Wilderness Act strongly restricts but does not completely ban the use of motorized equipment in designated wilderness. If the administrative action (exotic plant removal) is necessary to preserve or restore wilderness characteristics, then the agency is required to carry out that action in a way that has the least impact on the wilderness characteristics of the area in question. One general definition is that “the ‘minimum tool’ should have the least discernable impact on the land” (Beach et. al 2004).

The use of power tools in wilderness for the purpose of exotic vegetation control will only be considered when other means are not feasible or cost-effective. If a resource manager believes that the use of power tools in wilderness is justified, a minimum tool analysis will be submitted for ERC review. This analysis will normally be submitted on an annual basis through the planning process described above. However, a minimum tool analysis may be developed and submitted for review prior to annual planning, in cases where the exotic vegetation causes an imminent threat to resources or safety (see Optimum Tool Analysis Section).

Minimum tool analyses may include the use of gasoline powered chainsaws and drills. Chainsaws are used to perform either the cut-stump, or hack and squirt methods described above. Drills may be used for the drill and injection technique. The use of chainsaws is considered cost-effective for woody dicot trunks 3 in. – 5 in. in diameter, when the total number of stems that must be cut is at least 50. Smaller diameter stems may be cost-effectively cut with hand tools. Chainsaws are considered the most cost-effective technique for larger trunks, when the number of total stems is greater than 5. In addition, chainsaws are considered the most cost-effective and safe tool for any trunks larger than 10 in.

For palms, chainsaws or power drills are required to treat plants with a large trunk (>12 inch diameter). Hand saws will not cut into date palms because the palms are flexible and fibrous; even large chain saws have great difficulty. It is also very difficult to drill a trunk, even with a power tool, and not practical to do so by hand.

### 2.3.8 Potable Water Collection Areas

No herbicide will be used within ½ mile upstream, or within 50 feet from potable water intake structures. Some herbicides may have even stricter label guidelines; in those cases, the label requirements will be met. Within the potable water areas shown in an Appendix, exotic plants will be treated only by mechanical and cultural methods.

The single exception occurs in the vicinity of Darwin Falls, where water is collected for use at Panamint Springs Resort. Approximately 15 large *Tamarix* sp. have been previously cut and

treated with herbicide in the area. They have resprouted, and are impacting the sensitive habitat, described in Chapter 3. DVNP has chosen to exercise extreme caution with potable water collection areas, and exclude use of herbicides in most areas. However, in this location, no other method can be used to control the exotics. Some herbicides are approved for use in these conditions, under county, state, and federal regulations, and would not cause a disruption of service to the users of potable water. Nonetheless, the Park believes that extra caution is warranted, and following practice will be used:

Any herbicide application between upper Darwin Falls and 1/2 mile below lower Darwin Falls will occur through direct hand application, and not through the use of hand-held or backpack sprayers. Application will occur by brushing appropriate herbicides directly onto cut stumps, or onto bark, using a brush or sponge. This method will avoid the possibility of any drift from a sprayer reaching standing water. The small number of plants in the vicinity makes this a reasonable and cost-effective method to use for the 10 year span of this EPMP.

### 2.3.9 Management of Exotic Plants in Cultural Landscapes

A cultural landscape is a geographic area, including both cultural and natural resources that are associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Cultural landscapes may contain both native and exotic vegetation. In the context of a cultural landscape, exotic vegetation itself may be a resource. However, in some situations, exotic vegetation may overgrow other features of the cultural landscape, damage historic structures, or spread onto adjacent lands. For these reasons, exotic vegetation control is appropriate in some cultural landscapes. Exotic vegetation that is part of a cultural landscape will be maintained. Exotics that are growing in, but that are not a part of cultural landscapes will be controlled, subject to documentation and management planning by the Park Archeologist or a Cultural Resource Specialist, and approval by the State Historic Preservation Office (SHPO).

In all cultural landscapes in the Park, exotic vegetation will be controlled according to the following best management practices:

- Exotic plants that are a planned component of a cultural landscape may be replaced if necessary. However, no new exotic species will be intentionally added to the Park, and the use of non-native plants in landscaping will not exceed current levels.
- Exotic plant species that are present in cultural landscapes, and do not show any indication of invasiveness will not be removed or treated. Examples include the apple trees at Hungry Bill's Ranch and the cactus at Scotty's Castle.
- Exotic vegetation control will be carried out on a case-by-case basis in cultural landscapes. This is because the plant species to be maintained or controlled differ at each site. Furthermore, inventory of all cultural landscapes in the Park has not been completed. This EPMP proposes the exotic vegetation control at the specific sites listed below. Control at other locations must be approved through the annual planning process, as described above. Through that process, additional historic areas may be added, along with management plans similar to those below. These new sites will be included in an

addendum to this EPMP. All control efforts implemented in these areas will be documented with 1 m precision for spatial accuracy, and included in the Park Exotic Plant GIS database.

- Scotty's Castle. The cultural landscape of the Death Valley Scotty Historic District has been described in the draft document, NPS (2008). This document, when completed, will include recommendations for vegetation maintenance, and, in some cases, removal or planting at both the Castle and Lower Vine Ranch. The plan designates Management Zones, each with different vegetation and resources to be protected. This EPMP will adopt the management guidelines of the cultural landscape plan. However, because of the dynamic nature of the vegetation at the Castle, any control actions will be carried out on a case-by-case basis, and in coordination with Park Curatorial and Archeological staff.
- Cow Creek Administrative Site and Residence Area. Exotic plants in the Mission 66 area include a variety of exotics that will be maintained at current levels (NPS, 2004). Exotic plants elsewhere in the residence area do not carry historic, cultural value, but may be maintained for aesthetic reasons and shade purposes for residents. Athels, salt cedar, palms, and oleanders will not be replaced in-kind upon death or removal, but may be replaced with other non-invasive species. Other exotic species may be replaced in kind, but exotic plants will not be planted where they do not already exist (in 2008), and no new exotic species will be planted. In the Administrative area, athels and palm trees greater than 15 ft. height will be maintained.
- Hungry Bill's Ranch (Swiss Ranch). The apple orchard at Hungry Bill's Ranch will be maintained, and plants may be replaced in kind upon death (NPS 2002c). Other exotic vegetation, including salt cedar and tree-of-heaven (*Ailanthus altissima*) will be removed and/or controlled.
- Barker Ranch: Pomegranate, olive, Siberian elm, cottonwood, and miscellaneous fruit trees will be maintained. Dead fruit trees will not be removed until a suitable replacement is found. Cottonwood that is threatening structures (e.g. chicken coop) will be removed. Treatment of eucalyptus and additional cottonwood will be managed dependant on Resource Management division decisions. Tree-of-heaven will be removed from the ranch site and Cave Spring.
- Wildrose: Planted vegetation at Wildrose CCC Camp (comprising Wildrose Administrative Area and campground) is from the 1950s to the 1970s and is not historic (NPS 2002b). However, since the work would be conducted in a historic district, additional cultural compliance may be necessary.

Additionally, exotic vegetation management will occur at areas that have not been formally subject to Cultural Landscape studies, but are part of a historic area of the park. These areas include:

- Texas Spring Campground. Limbs of large trees have been removed or cut for safety purposes in the campground, and some very young salt cedars have been hand-pulled in the area over the last 20+ years. Exotic plants, including salt cedar, athels, and palms in the vicinity are not part of the historic landscape, and

will be removed and/or controlled (Bonstead, 2008). The large athels will be left for shade in the tent area (lower loop).

- Warm Springs Talc Camp. Young oleanders, salt cedar, and athels have been removed or treated with chemicals on a case-by-case basis in the Park, over the last 20+ years. Components of the landscape that will be maintained include the single large oleander and shade athels near the upper building, and the small grove of edible fig (*Ficus carica*) trees between the camp and spring. Other exotic vegetation may be controlled or removed, with a focus on control of young, invasive oleander and salt cedars. Upon death of the maintained exotic plants, they will not be replaced in kind, but may be replaced with native plants.
- Eagle Borax. Salt cedar is not part of the planned landscape, and has been controlled in the past by the Park, through the use of herbicides and of fire. Treatments will continue as needed (with consultation by the Park Archeologist and Timbisha Shoshone) to eliminate the species, but treatments will not include fire.
- Hungry Bill's Ranch. The apple orchard at Hungry Bill's Ranch will be maintained (i.e. not controlled or removed), and plants may be replaced in kind upon death. Other exotic vegetation, including salt cedar and tree-of-heaven (*Ailanthus altissima*) will be removed and/or controlled.

### 2.3.10 Slash Disposal

The physical treatment of woody vegetation and large populations of herbs can generate significant amounts of slash, or dead plant materials, such as trunks, limbs, and leaves. In some areas, slash may simply be unsightly. In other cases, the slash may block water courses, or cause a fire hazard that threatens human safety or natural or cultural resources.

Slash produced from exotic vegetation removal can produce some benefits. If scattered appropriately, it can create a microclimate that aids the germination and growth of native vegetation. In addition, the slash contains nutrients, such as nitrogen, potassium, and phosphorus that are essential to the functioning of the ecosystem from which they were removed. Although the process of decomposition is extremely slow in arid environments, continued removal of slash from a site can reduce the potential for productivity of native vegetation. For these reasons, maintaining slash on site may be desirable.

The slash from salt cedar, athel, tree of heaven, and many other perennial species can sprout long after the plant has been cut down. The slash of both woody and herbaceous species may contain seeds and fruits that may germinate or spread. Consequently, slash may be disposed of through a variety of means. In all areas, slash will be immediately moved out of moist areas and drainage bottoms to prevent resprouting or the alteration of water courses. Herbaceous species will be removed from site and contained to prevent the spreading of seeds.

Where slash piles may create a fire hazard, or create an unsightly feature in a cultural landscape, slash will be physically removed. Larger pieces may be made available for use as firewood, or chipped. Wood may be chipped up and used as landscaping material, for dust abatement, for erosion control, or sent to a landfill. The area to which the slash is moved will be determined

according to proximity, cost, safety considerations, and protection of cultural and natural resources.

Burning of slash piles may occur in accordance with all federal, state, and county rules, and in accordance with any Fire Management Plan (FMP) which may be developed by DVNP, and in accordance with Air Quality restrictions.

## 2.4 Alternatives Considered but Rejected

### 2.4.1 Chemical Treatment Only

Chemical treatment alone may be sufficient for some perennial forbs, graminoids, and juvenile woody plants. However, this method would require a large amount of chemical to be applied to the environment than other methods (Tu et al., 2001). This method alone is also not sufficient to destroy mature woody dicots and palm trees.

### 2.4.2 Physical Treatment Only

Exotic vegetation would be cut down, pulled up, or dug up, without the use of herbicides. This method can be effective with small patches of herbaceous exotic plants, seedlings of perennial plants, and mature California fan palm trees, but will result in a loss of wildlife habitat. It is very labor intensive.

Most importantly, however is the fact that this method would be ineffective at treating most of the exotic plants, including large woody dicots; grasses, cane and reeds, many California fan palms, and all of the date palms. Furthermore, plants that require repeated cutting will generate large amounts of slash, and disposal will become problematic.

### 2.4.3 Burning

Burning of live exotic plants has proven to be ineffective at killing most woody species of exotic plants, because most of those species will resprout from the base. Palm trees will resprout from the apical meristem, which can be as much as 3/4 of the way up the tree. Wildland Fire Use fires may have some value in controlling annual species of exotics.

A Fire Management Plan (FMP) and associated Environmental Analysis (EA) are currently under development/review, and until they are approved, fire is not a viable alternative, except very small, non-wildland fires for training purposes.

This EA does not preclude the potential use of fire to burn slash piles. If this method is determined to be feasible under the FMP, the technique may be used, with appropriate consideration for safety, and protection of natural and cultural resources, including air quality.

### 2.4.4 Complete Physical Removal of Woody Exotics

Proposals have been made to excavate and sell exotic vegetation on the open market. However, this would involve excavating the palms and their root systems with heavy equipment. Such ground disturbance and equipment would potentially damage natural and cultural resources,

possibly lead to further invasion by exotic plants, and could damage the soil through ground compaction or erosion.

#### 2.4.5 Biological Control

Biological control, or biocontrol, is the use of living organisms, such as insects or other herbivores, to control exotic vegetation. Initial research into biological control has brought mixed results. Two species of insects have been released in North America with the objective of controlling salt cedar. The results of these studies have been mixed, with effective control only in some situations. This may be a useful alternative in Death Valley, but much more research is needed first, because this method has some risk of unexpected problems, and strong problems with public perception.

#### 2.4.6 Blanket Approval for Chainsaw Use on Woody Exotics

During the course of internal scoping, the possibility of completing a single minimum tool analysis for NEPA review and Park approval was suggested. However, the considerations of the minimum tool analysis include cost, timing, the extent of the exotics population, and ongoing natural and cultural resource surveys, all of which change on an annual basis. For this reason, the Park does not feel it is appropriate to approve these treatments for a large number of areas over the course of more than one year. Rather, areas that are proposed for the use of mechanized equipment in wilderness will be summarized in an annual plan, which will be subject to environmental review through the NPS Minimum Tool Analysis procedure (See Appendix).

### 2.5 Environmentally Preferred Alternative

NPS policy (NPS, 2001) requires that an EA identify the environmentally preferred alternative. The environmentally preferred alternative is the alternative that would promote the national environmental policy expressed in NEPA (Sec. 101 (b)). This includes alternatives that:

- 1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- 2) Ensure for all Americans safe, healthful, productive, and aesthetically 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 of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- 5) Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.
- 6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources. (DO-12 Handbook, 2.7D; NPS 2001a).

Based on the impact analysis, Alternative 2 – Exotic Plant Management Plan is the preferred alternative. Alternative 1 has more potential adverse impacts on resources due to the lack of resource-specific BMPs. Alternative 1 would also have fewer overall beneficial effects because

the overall effectiveness of current exotic plant management programs is limited. Lack of a standardized approach to assist in decision-making creates difficulty selecting the most appropriate treatment option.

Regarding long-term impacts, Alternative 1 realizes a lower number of positive impacts because it provides less effective control of exotic plants and requires more retreatment of exotics. Alternative 2 realizes greater positive impacts over the long-term because it provides for more rapid and long-lasting control of exotic plants, resulting in greater benefits to the environment. Therefore, Alternative 2 is the environmentally preferred alternative.

## 3.0 Affected Environment

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### 3.1 Project Area

Death Valley National Park (DVNP), is located in the Mojave Desert of California (Inyo and San Bernardino counties) and Nevada (Nye and Esmeralda counties). At 3.4 million acres, it is the largest National Park outside of Alaska. Ninety-seven percent of the Park is designated wilderness.

This EA addresses all exotic vegetation occurrences in the Park. Known exotic plant populations have been mapped at approximately 200 localities, covering more than 8568 acres in the Park (Appendix G). Widespread exotics, such as cheatgrass, red brome and Russian thistle cover hundreds of thousands of acres in the Park, but are mapped at only a few locations. Nonetheless, this EA provides for an annual planning process to treat newly detected populations of exotic vegetation.

Exotic plant populations range from -270 to 9700 ft. in elevation, and occur in wetlands, xeric shrublands, and forests, and in both developed areas and wilderness. Generally speaking, the exotic plants are most common on roadsides and in riparian areas. Large and small populations are found in both wilderness and non-wilderness. Woody exotic plant species are more common at low elevation, whereas herbaceous exotics occur at all elevations, but mainly in disturbed areas.

Most information included in this chapter was derived from the 2002 DVNP General Management Plan (NPS, 2002a).

### 3.2 Physical Resources

#### 3.2.1 Air Quality and Visibility

Death Valley National Park is designated a 'Class II' area in the Prevention of Significant Deterioration Program, according to the Clean Air Act. This allows for 'moderate' increases in certain pollutants. DVNP is occasionally in non-attainment status for State and Federal ozone standards during summer months, when ozone levels are highest. DVNP is in non-attainment status for particulate matter less than 10 microns in diameter (PM<sub>10</sub>). There is an air quality monitoring station at Cow Creek (NPS, 2002a).

Visibility within the Park is influenced by pollution from as far away as the San Joaquin Valley and Los Angeles in California, and Las Vegas in Nevada. Closer (but smaller) pollution sources include the chemical extraction operations in Searles Valley (Trona), gold mining operations at the Briggs Mine in Panamint Valley, China Lake Naval Air Weapons Station, U.S. Army National Training Center at Ft. Irwin, and other areas. During the summer, visibility in Death Valley can be greatly reduced by smoke from forest fires in the Sierra Nevada (NPS, 2002a).

Visibility is further influenced by windblown dust from Owens Valley and Mono Basin (NPS, 2002a). In strong winds, dust rises from Death Valley itself, although much of it is heavy sand particles that settle down again when the wind abates.

### 3.2.2 Noise

The Park is generally a very quiet place. Common natural sounds include wind, birds, and insects. Less common natural sounds include ‘booming’ sand dunes, rockslides, running water, and thunder. A baseline sound inventory is currently being conducted.

Common artificial sources of noise in the Park include vehicles and aircraft. Vehicle noise in the Park is generally not an issue. Low speed limits in developed areas reduce vehicle noise where most visitors congregate, and due to the Park’s size, most other areas are well away from traffic and noise (NPS, 2002a). Noise is further reduced through limits on the use of generators in campgrounds.

Aircraft, on the other hand, are a significant source of noise in the Park. Death Valley is in relatively close proximity to China Lake Naval Air Weapons Station, Edwards Air Force Base, Ft. Irwin National Training Center (Army), Nellis Air Force Base, and the Nevada Test Site (Air Force and Department of Energy). As a result, there is a large amount of military air traffic over the Park. In areas that were part of Death Valley National Monument, military air traffic is restricted to altitudes greater than 3000 feet above the land surface. In most areas added to the Park in 1994, the restriction is 200 feet above the land surface. This airspace is used daily, and produces large amounts of noise (NPS, 2002a).

The U.S. Navy documents that an F-18 jet airplane (the most commonly seen military aircraft in the Park) generates from 108 to 113 decibels (depending on the specific model of F-18) when flying at 1000 feet (carrier landing approach, measured 1000 feet from airplane). This compares to a Stihl 044/440 model chainsaw (standard used for exotic vegetation treatment) at 90 to 106, depending on RPM (measured at ear level of chainsaw operator).

### 3.2.3 Soils

Soils in Death Valley are generally sandy or silty, with low organic content. Clay soils, which have a very fine particle size, are present in some areas of the Park, including much of the Furnace Creek Formation, just southeast of Furnace Creek. Clay soils are also present on some playas and the floors of some of the valleys, as is caliche (a very hard soil type).

Soil crusts, also called cryptogamic or cryptobiotic soils, are layers on the upper surface of some soils that may be comprised of certain minerals, or of living organisms, such as lichens, moss, bacteria, and/or algae. They are easily damaged by foot and vehicle traffic, and are present Park-wide, but are most noticeable on the lower edges of the bajada (inter-connected alluvial fans), the edges of the salt flats, and those portions of valley floors that are not in active washes or salt pans. Large areas of the Park consist of salt flats with mineral formations. Desert pavements, unique smooth surfaces formed by gravel and cobble, are also common, mainly on the bajadas. There are five major sand dune complexes, as well as many minor areas of windblown sand and fixed dunes. On the higher mountains, soil is scarce, with large areas of scree, talus, and exposed bedrock.

Most wetlands have hydric soils, although some small springs are swept by floods too often to develop hydric soils.

Rain events can cause significant erosion, especially the localized, intense storms that occur during the summers. These are normal, natural events and are not a concern to Park staff. The Furnace Creek formation has proven to be very susceptible to erosion induced by human manipulation of water flows.

### 3.2.4 Water

Known water sources in Death Valley include seeps, wells, springs, and ponds. The small springs and seeps in the Park offer isolated and limited water for plants, wildlife, domestic or commercial purposes. Some springs produce potable water, but overall, water quality is poor because of high dissolved mineral concentrations. There are about 700 water sources of varying dependability in the Park. These sources vary from small seeps to large springs producing greater than 200 gallons per minute.

Many of these water sources are impacted by the presence of exotic plant species, including several in which exotic plants have eliminated all surface expression.

#### Potable Water Collection

There are ten potable water collection and distribution systems in Death Valley. Each of the eight NPS operated water collection systems in DVNP draw water from either buried infiltration galleries or wells.

In 2008, the Park installed a new Furnace Creek Water System, following the development of an EIS. This system will satisfy long term needs for delivery of safe and reliable drinking water to the Furnace Creek area, with as small of an environmental impact as can be managed. The new system replaced the water collection systems at Travertine Springs and Furnace Wash with wells, drilled at different locations. There are additional buried infiltration galleries at Texas Spring and Furnace Creek Wash. The Texas Spring gallery is off-line.

The Park Service housing and utility areas at Cow Creek and Grapevine are supplied by infiltration galleries in Nevares Spring and Surprise Spring, respectively. Scotty's Castle is supplied by the infiltration gallery at Staninger Spring; Stovepipe Wells Village is supplied by wells; Wildrose Campground and Ranger Station are supplied by an infiltration gallery at Upper Wildrose Spring; Emigrant Campground and Ranger Station is supplied by an infiltration gallery at Emigrant Spring; Mesquite Springs Campground is supplied by an infiltration gallery in Mesquite Spring. Maps of these areas are shown in Appendix H.

There is a surface water collection system at Darwin Falls for Panamint Springs Resort, and a small buried system at Navel Spring for the old mining camp of Ryan.

All ten water collection systems feed into storage tanks prior to distribution. Treatment occurs through chlorination or reverse osmosis.

## 3.3 Biological Resources

### 3.3.1 Vegetation

Death Valley supports vegetation typical of four biotic life zones: the Mojave, lower Sonoran, Canadian, and Artic/Alpine. Seven plant communities can be categorized within these life zones, each characterized by dominant vegetation and representative of three vegetation types: scrub, desert woodland, and coniferous forest. Microhabitats further subdivide some communities into zones, especially on the valley floor.

Desert shrubland is the most extensive vegetation type in Death Valley, covering the lower elevations. It dominates about three-fourths of the Park landscape and includes the alkali sink, and shrublands dominated by creosote bush (*Larrea tridentata*), saltbush (*Atriplex* sp.), or other species. At higher elevations, sagebrush (*Artemisia* sp.) is dominant. Bitterbrush (*Purshia* sp.), blackbrush (*Coleogyne ramosissima*), and greenfire (*Menodora spinescens*) are also common.

Of these four shrub communities, the alkali sink is most heavily impacted by exotics. The alkali sink is dominated by mesquite (*Prosopis* sp.), arrow-weed (*Pluchea sericea*), and other heat tolerant phreatophytes, as well as salt tolerant species like salt grass (*Distichlis spicata*), and alkali sacaton (*Sporobolus airoides*). Exotics present in this community include salt cedar, palms, oleander, Bermuda grass (*Cynodon* sp.), rabbit's foot grass (*Polypogon monspeliensis*), and others.

Higher elevation, wooded communities include pinyon-juniper woodland (*Pinus monophylla* and *Juniperus osteosperma*), and smaller patches of bristlecone pine (*Pinus longaeva*) and limber pine (*Pinus flexilis*) communities.

Death Valley has a very diverse floral composition, with 1255 distinct native species, subspecies, and varieties of vascular plants. Of those, 145 are listed as Threatened, Endangered, or Sensitive (TES) species, which includes plants that are listed federally, or as California or Nevada Rare or Endangered, or as special status plants by the California Native Plant Society or Nevada Natural Heritage Program.

#### A. Threatened, Endangered, and Sensitive Plants

There are two species listed as Federally Endangered in the Park – Eureka Dunes evening primrose (*Oenothera californica* ssp. *eurekensis*), and Eureka Valley Dune grass (*Swallenia alexandrae*). Russian thistle is present in the habitat for these species.

California (but not federally listed or proposed) listed plants include July gold (*Dedeckera eurekensis*), rock lady (*Maurandya petrophila*), and Sodaville milkvetch (*Astragalus lentiginosus* var. *sesquimetralis*). July gold is impacted by annual grasses, and salt cedar has invaded the habitat for Sodaville milkvetch.

Of the remaining rare plants (140 species), all of which are considered Park Sensitive, only a few are present in areas where there are high concentrations of exotic plants. The rare hot-springs fimbriatylis (*Fimbristylis thermalis*), Death Valley blue-eyed grass (*Sisyrinchium funereum*), knotted rush (*Juncus nodosus*), Cooper's rush (*Juncus cooperi*), and black sedge (*Schoenus*

*nigricans*) are present at several springs in which palm trees and other exotics are present, including Nevares, Travertine, and others. A list of the Park's rare plants is given in Appendix I.

Spring-loving centuary (*Centaureum namophilum* var. *namophilum*) is a federally threatened plant that is not currently known to be present in Death Valley, although it is present at nearby Ash Meadows.

### 3.3.2 Wildlife

#### A. Birds

More than 346 species of birds can be found in DVNP. Common birds include common raven, verdin, Say's phoebe, greater roadrunner, mourning dove, rock wren, house finch, Gambel's quail, black-chinned sparrow, mountain chickadee, red-shafted flicker, dark-eyed junco, and Clark's nutcracker.

California listed species include California (or western) yellow billed cuckoo (*Coccyzus americanus occidentalis*), Swainson's hawk (*Buteo swainsoni*) and elf owl (*Micrathene whitneyi*). Also state listed is the willow flycatcher (*Empidonax traillii*), which is dependent on riparian areas for nesting habitat (NPS, 2002a).

Federally listed species include southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*Vireo bellii pusillus*). Neither species currently nests within the Park, although suitable habitat is present. Southwestern willow flycatchers have been seen at eleven different locations within the Park, least Bell's vireos have been seen at seven different locations within the Park. There is no designated 'Critical Habitat' within the Park for either species.

#### B. Mammals

There are 61 species of native mammals in Death Valley, and two known species of exotic mammals.

Desert bighorn sheep (*Ovis canadensis nelsoni*) occur in the mountains of the Park. The populations are thought to be small and sensitive to disturbance, but stable. They are dependent on small, isolated springs for water (NPS, 2002a).

Bats, including Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), are found in DVNP, roosting in abandoned mines. Coyotes, foxes, jack-rabbits, kangaroo rats, and desert cottontail rabbits are also commonly seen.

Exotic mammals are present, including burros and wild horses. These have impacted the bighorn sheep population through competition and have damaged riparian vegetation. The Park has a non-lethal horse and burro removal program, and the population is thought to now be less than 500.

Cattle grazing is allowed in the Park by federal legislation. It is limited to the pre-existing grazing allotment in the Lee Flat and Hunter Mountain area and controlled by an annual Special Use Permit from the Park.

There are no federally threatened or endangered mammals in Death Valley. The Mojave ground squirrel (*Spermophilus mojavensis*) is the only state listed mammal species in the Park. There is only one verified sighting of a Mojave ground squirrel in the Park, in Panamint Valley. The sighting was in an area with dry, sandy soil, dominated by creosote bush, and this area is not heavily impacted by exotics.

#### *C. Reptiles and Amphibians*

There are 41 species of reptiles and 6 species of amphibians in the Park. The reptiles are more active and visible during the hot season. Commonly seen species include collared lizards, zebra-tail lizards, and chuckwallas.

The western toad (*Bufo boreas*) has one naturally occurring population in the Park, at Darwin Falls Wash. This species has a wide geographic range, but is in decline and warrants special consideration when using pesticides. Exotic bullfrogs are present in the Furnace Creek area.

Rare or endangered reptiles include the desert tortoise (*Gopherus agassizii*, both federally and California threatened) and the Panamint alligator lizard (*Elagaria panamintina*, federal special concern species). The desert tortoise occurs primarily in shrubby areas of the bajadas or valleys. Tortoises do not need surface water to survive, and prefer sand to sandy gravel soils, although they will occasionally occur in areas of other soil types. The Panamint alligator lizard is found in the Panamint Mountains, and prefers damp areas with some undergrowth, beneath rocks and among rock slides. It is mainly found from 2500 to 5100 ft. elevations, near willow-lined water courses, including Surprise Canyon.

#### *D. Fish*

Desert fish are one of the most unique and fascinating resources in Death Valley. There are species of pupfish within the Park that warrant special consideration, even if they are not legally considered to be Threatened and Endangered. These species include the Amargosa pupfish (*Cyprinodon nevadensis amargosa*), found in the Amargosa River and in Valley Springs, both of which are northwest of Saratoga Springs; the Saratoga pupfish (*Cyprinodon nevadensis nevadensis*), found at Saratoga Springs at the south end of Death Valley; and the Salt Creek pupfish (*Cyprinodon salinus salinus*), found in Salt Creek in the central part of Death Valley.

The Devils Hole pupfish (*Cyprinidon diabolis*) is Federally Endangered, and the Cottonball Marsh pupfish (*Cyprinidon salinus milleri*) is California Threatened.

The Devils Hole pupfish occurs only in Devils Hole, which is geographically separated from the rest of the National Park. The Devils Hole unit of the National Park is 40 acres and is surrounded by BLM land and Ash Meadows National Wildlife Refuge, in Nye County, Nevada. There are no significant populations of exotic plants within the 40 acres managed by the Park Service.

The Cottonball Marsh pupfish only occurs at Cottonball Marsh, on the west side of Death Valley, 5 miles south of Salt Creek. The population appears to be stable. There are no exotic plants near Cottonball Marsh; the area receives very little visitation and is difficult to access.

### *E. Invertebrates*

There is relatively little information about the diversity of invertebrates in DVNP, and the Park Service has only recently begun to understand how unique and imperiled these species are.

Seven species of invertebrates are known to be endemic to the Nevares/Texas/Travertine spring complex. Three of those are NPS Sensitive Species – the Furnace Creek riffle beetle (*Microcylleopus formicoideus*), the Nevares Spring naurocorid bug (*Ambrysus funebris*), and the robust tryonia snail (*Ipnobius robustus*). The others include the Texas Springs amphipod (*Hyaella muerta*), the Travertine Springs amphipod (*Hyaella Sandra*; Threlhoff, 1999), and two scorpions (*Stahnkeus deserticola* and *Serradigitus gramenestris*); the latter two are also found at Grapevine Springs. In addition, there are at least three recently discovered species of subterranean ostracodes present in the area that are thought to be endemic.

Also present in the Nevares/Texas/Travertine spring complex is the Badwater snail (*Assimineea infima*), which is only known to occur in two other sites in the world, and the western riffle beetle (*Microcylleopus similis*). Both of these are also NPS Sensitive Species.

The Oasis Valley Springsnail (*Pyrgulopsis micrococcus*), an NPS species of special concern is present in the Saline Valley Salt Marsh and Darwin Falls wash. Grapevine Springs has both the Grapevine Springs elongate tryonia (*Tryonia margae*) and the Grapevine Springs squat tryonia (*Tryonia rowlandsi*), both of which are also NPS species of special concern as is the Amargosa tryonia (*Tryonia variegata*), present in the Amargosa River.

The Amargosa tryonia (*Tryonia variegata*) is an NPS species of special concern, and is known to be present in the Amargosa River, and is probably also present in Valley springs. Several species of *Tryonia* are endemic to Park springs. There is also a new species of eyeless amphipod endemic to Devils Hole #2 cave.

## 3.4 Cultural Resources

### 3.4.1 Historic and Prehistoric Resources

Approximately 3,000 archeological sites have been documented in DVNP, including prehistoric, historic, and ethnohistoric (historic period Native American) sites. Less than 5% of the Park has been surveyed, meaning there are tens of thousands of unrecorded sites in the Park, including in areas with exotic plant populations. Archeological sites are found at all elevations and environments in the Park.

Prehistoric sites date from as early as 10,000 B.C., and represent a variety of cultural groups (NPS, 2000). Examples of prehistoric sites include artifact scatters comprised of chipped stone flakes, projectile points, pottery, and other tools, quarries, middens, hunting blinds, rock art (petroglyphs and pictographs), rock alignments, rock cairns, roasting pits, and many other equally significant features. Many of these sites were used up into the ethnohistoric period, and some mesquite and pinion nut gathering areas are still used by Timbisha Shoshone today.

Historic archeological sites are representative of human activity and are greater than fifty years of age. Some of the earliest historic sites are rock engravings from the "49ers," who were the

first euro-american visitors to spend a length of time in DVNP in 1849. A majority of historic sites in the Park are related to mining, dating from the late 1800s to the 1950s. Examples of mining resources include features such as borax “haystacks” on the playa, mill sites, claim markers, aerial tramways, mine shafts, and even town sites (NPS, 2000). During the Great Depression years, the Civilian Conservation Corps (CCC) constructed roads, trails, campgrounds, and structures, many of which are treated as historic archeological sites or landscapes today. Other types of historic sites present in the park from a variety of eras include aircraft wreckage, abandoned roads, cabins (some still in use), rock walls, fences, gravesites, graffiti, survey markers, bearing trees, and many other things.

The National Park Service does not normally divulge the location of prehistoric or historic resources. This is done both to reduce the likelihood of looting, and also to address the concerns and wishes of American Indians.

#### National Register of Historic Places

Death Valley contains five sites recognized and listed in the National Register of Historic Places:

- Eagle Borax
- Scotty’s Castle
- Harmony Borax
- Leadfield
- Skidoo

Fifteen sites around the park are in the process of being nominated for the National Register of Historic Places. The nomination is currently being reviewed by the California State Historic Preservation Office. These sites are being nominated as one Multiple Property Listing, the "Historic Mining Properties in Death Valley National Park." The properties include:

- Chloride Cliff Historic District
- Corduroy Road
- Echo Canyon Historic District
- Furnace Creek Wash Historic District
- Garibaldi Mine
- Greenwater Historic District
- Harrisburg Historic District
- Hungary Bill's Ranch Historic District
- Journigan's Mill
- Keane Wonder Mine Historic District
- Panamint Treasure Mine Historic District
- Panamint City
- Queen of Sheba Mine Historic District
- Ubehebe Historic Mining District
- Warm Spring Canyon Gold and Talc Mining Historic District
- Wildrose Charcoal Kilns

Other sites have been determined eligible for the Register, including Cow Creek Historic District. Most of the Saline Valley Salt Tram is on the Register, but not the portion that is in Death Valley National Park.

Invasive exotic vegetation is present at Eagle Borax and Scotty's Castle. At the Castle, it is present both as a planned part of the site, and as unplanned invaders. Salt cedar is present at Eagle Borax, and is not part of the planned landscape. Russian thistle and red brome are present at both Leadfield and Skidoo, but are dispersed and are not considered to be manageable at those locations.

### 3.4.2 Cultural Landscapes

A cultural landscape is a geographic area, including both cultural and natural resources that are associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general kinds of cultural landscapes, not mutually exclusive:

- Historic Designed Landscapes
- Historic Vernacular Landscapes
- Historic Sites
- Ethnographic Landscapes.

Exotic plants are present in many cultural landscapes, either as a part of the landscape, or as invaders. Invasive species that may be present as part of cultural landscapes, but also may become established as invaders in wildlands, include palm trees, athels, oleander, and Bermuda grass.

Cultural Landscape Studies have taken place at Cow Creek Historic District, Scotty's Castle, Lower Vine Ranch, Barker Ranch, Hungry Bill's Ranch (Swiss Ranch) Historic District, and CCC Camp Wildrose Historic District.

The Park's Maintenance Division in consultation with Resource Management Division usually manages vegetation in those areas that have current, permanent human occupancy or use, although residents of NPS housing are expected to manage the vegetation around the housing themselves (except for larger trees that require equipment). Areas with current, permanent residences include Furnace Creek, Cow Creek, Scotty's Castle, Grapevine, Saline Valley Warm Springs, and Stovepipe Wells Village. The Park does not currently have a vegetation management plan specific to any of those areas. Cow Creek and Grapevine are Mission 66 era planned landscapes, and a landscape maintenance plan will be developed for these areas in the near future.

The Resource Management Division manages vegetation in areas that do not have current, permanent human use, but that do have non-native vegetation dating from historic periods of activity. Such vegetation is currently managed only to prevent the vegetation from damaging historic structures, although NPS policy states that they should be managed to preserve the existing integrity and character of the cultural landscape.

Invasive exotics that are growing in or around cultural landscapes are managed in consultation with Cultural Resource staff. Examples of these areas that have invasive plants growing in

cultural areas include Hungry Bill's Ranch, Barker Ranch, Warm Springs Camp (Panamint mountains), Scotty's Castle, Cow Creek and others.

Some non-native plants growing in cultural landscapes are not invasive and are not spreading. This plan does not propose removing them. It is Park policy that those plants which are an intended part of a historic landscape will be maintained and may even be replaced if they die or are diseased or structurally unsound enough to pose a hazard. Examples of areas that have non-native vegetation that is not targeted for removal include Scotty's Castle, Cow Creek, Furnace Creek Campground and Visitor Center, Strozz Ranch, Barker Ranch, Russell Camp, and others.

### 3.5 Wilderness

The California Desert Protection Act designated 97% of the Park as wilderness to be managed according to the standards set forward in the Wilderness Act. The wilderness boundaries were determined through the California Desert Protection Act, and Death Valley National Park is currently in the process of digitizing those wilderness boundaries.

The Wilderness act sets standards for what acts are permitted in designated Wilderness. Among other things, mechanical transportation and motorized equipment cannot be used. Exceptions can be made, but only if these exceptions are the 'minimum tool' needed to manage the area as wilderness.

## 4.0 Environmental Consequences

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The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the preferred alternative be implemented. This chapter identifies the impacts to the physical, biological, and human aspects of the environment that could be affected by the alternatives.

### 4.1 Impact Topics Addressed

Impact topics that had been included in previous exotic plant NEPA documentation in the Park were determined to be relevant, and were selected to be addressed in this document. In addition, informal internal scoping, beginning in 2001, indicated that other topics should be included, such as slash disposal, and the role of herbicides in water collection areas.

### 4.2 General Methodology

This section describes the methodology used to predict impacts to the environment and resources that were outlined in Chapter 3. The definition of an environmental impact is a change in condition of the resource or environment under examination that results from the proposed action. A list of potential impacts to resources was developed during the process of internal scoping. The magnitude and nature of each impact was then identified according to the following factors:

- Type (beneficial or adverse, direct or indirect)
- Context (site-specific, local, regional)
- Duration and timing (short or long-term)
- Intensity (negligible, minor, moderate, or major)

For each resource, the type, context, duration, and intensity for the impacts of each alternative are given in a conclusion statement. These categories are defined in the following section. Definitions of intensity, which vary by resources, are given in the tables in Section 4.3.1. In addition, a statement of cumulative impacts and impairment to each resource is given.

### 4.3 Definitions of Terms

- Direct impact - an effect that is caused by an action and occurs in the same place. No intermediate outcomes occur between the cause and effect. For example, installment of a well may destroy a small plant population during the course of construction.
- Indirect impact - an effect that is caused by an action, and occurs in the same place, or in a different place. Intermediate outcomes may occur between cause and effect. For example, installment of a well may cause a change in water level, which results in riparian vegetation loss. Consequently, bird nesting habitat may be reduced.
- Beneficial impact - a positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

- Adverse impact - in the context of most resources, an adverse impact refers to a change that moves the resource away from a desired condition or detracts from its appearance or condition.
- Short-term impact - an effect that results in a resource being returned to its pre-disturbance condition or appearance within five years.
- Long-term impact - an effect that does not result in a resource returning to pre-disturbance condition or appearance, within approximately five years, and is therefore considered permanent.
- Site-specific impact - effects that occur within a Park unit boundary only.
- Local impact - effects within a Park unit boundary and adjacent lands (sharing a boundary) to a Park unit.
- Regional impact - effects that occur within the Park, as well as on adjacent lands, and in the surrounding communities.

#### 4.3.1 Resource Impact Intensity

Because definitions of intensity (negligible, minor, moderate, or major) vary by resource, intensity definitions are provided separately for each (Tables 1-8). Unless otherwise noted, impact definitions apply to the intensity of the impact, which could be either adverse or beneficial.

**Table 1: Intensity Definition, Air Quality**

Impact Intensity	Intensity Definition
Negligible	Impacts (chemical, physical, or biological) would not be detectable, would be well within air quality standards or criteria, and would be within historical or desired air quality conditions.
Minor	Impacts (chemical, physical, or biological effects) would be detectable, but would be within air quality standards or criteria and within historical or desired air quality conditions.
Moderate	Impacts (chemical, physical, or biological effects) would be detectable, but would be at or within air quality standards or criteria; however, historical baseline or air quality standards would be periodically, but not continuously, exceeded by less than 20% of the standard or historical value.
Major	Impacts (chemical, physical, or biological effects) would be detectable, and would be frequently altered from the historical baseline or desired air quality conditions; and/or air quality standards or criteria would be continuously exceeded, or exceeded by more than 20% of the standard or historical value.

**Table 2: Intensity Definition, Noise/Soundscape**

Impact Intensity	Intensity Definition
Negligible	Impacts noticeable only with close observation in a localized area. Hearing protection not required for workers on site. Impact is temporary and of short duration (daytime hours only, one day or less).
Minor	Impacts noticeable, but confined to localized area. Noise not noticeable or easily distinguishable from background noise from more than 500 meters away in developed areas or two kilometers in backcountry. Impact is temporary and of short duration, daytime hours only – if lasting more than one day, then timed or spaced to avoid significant visitor contact.  Hearing protection may be required as mitigation for workers on site.

Impact Intensity	Intensity Definition
Moderate	<p>Impacts readily noticeable for a moderate duration (more than one week to one month) over a localized area, or for a short duration over a large area (clearly audible and distinguishable from background noise from more than one kilometer away in developed areas or five kilometers in backcountry).</p> <p>Hearing protection required as mitigation for workers on site. Visitor access to immediate area may need to be temporarily denied due to risk of hearing loss. Impact may occur for short duration at night or early morning.</p>
Major	<p>Impacts readily noticeable for a long duration (one month to permanent) in localized or wider area (clearly audible from more than one kilometer away in developed areas or five kilometers in backcountry).</p> <p>Hearing protection required as mitigation for workers on site. Visitor access to localized area may need to be denied due to risk of hearing loss. Impact may occur at night or early morning.</p>

**Table 3: Intensity Definition, Soils**

Impact Intensity	Intensity Definition
Negligible	Soils would not be affected or the effects to soils would be below or at the lower levels of detection.
Minor	The effect to soils would be detectable. Effects to soil area, including soil disturbance and erosion would be small and localized. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely to be successful.
Moderate	The effect on soils would be readily apparent and result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely to be successful
Major	The effect on soils would be readily apparent and substantially change the character of the soils over a large area. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

**Table 4: Intensity Definition, Water Quality and Potability**

Impact Intensity	Intensity Definition
Negligible	No detectible or probable lowering of water quality or volume at any point in the system, from collection to the tap. May be slight effect on operation of the system in the form of short-term increase in water testing or monitoring of work activities. No service interruptions occur, and water quality at the source and tap stays within legal limits.
Minor	Very slight detectible or probable lowering of water quality at the collection point, but no detectible change at the tap (changes eliminated through dilution, filtration, reverse osmosis, or other pre-existing system). No decrease in volume of water entering the system or available to end users. No service interruptions occur, and water quality at the source and tap stays within legal limits
Moderate	<p>Moderate impact to the operation of water system. May include short-term (less than one day), planned reduction in volume of water entering the storage tanks (by turning off some collection points to prevent contamination). May include short-term lowering of quality of water entering the system, and slight lowering of water quality at the tap, providing that water quality at the tap still stays within legal limits.</p> <p>May include pre-planned short-term request for end users to decrease consumption (24 hours or less). May include pre-planned very short-term service interruptions (less than eight hours) to limited number of facilities or residences, but timed to occur during periods of low water use. No full or unplanned service interruptions, water quality at the tap stays within legal limits.</p>

Impact Intensity	Intensity Definition
Major	Service interruptions occur that are unplanned, or widespread, or continue longer than eight hours, or occur during periods of high use; or special mitigations must be issued to protect human health and safety. Water at the tap may exceed or be at high risk of exceeding legal limits. Threats to public safety may occur.

**Table 5: Intensity Definition, Vegetation and Wildlife (non-Threatened, Endangered, or Sensitive; non-TES)**

Impact Intensity	Intensity Definition
Negligible	There would be no observable or measurable impacts to native, non-TES species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable, but they would not be expected to be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Individuals of native, non-TES species may be affected, or reproductive success may change; mortality or interference with activities necessary for survival can be expected on an occasional basis, and sizable portion of a population may be affected, but the impact is not expected to threaten the continued existence of the species in the Park unit. Impacts to native species, their habitats, or the natural processes sustaining them would be detectable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts to native non-TES species, their habitats, or the natural processes sustaining them would be detectable. Loss of habitat or mortality might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

**Table 6: Intensity Definition, Vegetation and Wildlife (Threatened, Endangered, and Sensitive; TES)**

Impact Intensity	Intensity Definition
Negligible	The action could result in a change to a population or individuals of a TES species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to U.S. Fish and Wildlife Service “may affect, not likely to adversely affect” or “No Effect” determinations.
Minor	The action could result in a change to a population or individuals of a TES species or designated critical habitat. The change would be measurable, but small and localized and of little consequence. Mitigation measures, if needed to offset the adverse effects, would be simple and successful. This impact intensity equates to a U.S. Fish and Wildlife Service “may affect, not likely to adversely affect” determination.
Moderate	Impacts to TES species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Mitigation measures, if needed to offset adverse effects, would be extensive and likely to be successful. This impact intensity equates to the U.S. Fish and Wildlife Service determination, “may affect, likely to adversely affect.”
Major	<p>The action would result in a noticeable effect to the viability of a population or individuals of a species or resource or designated critical habitat. Impacts to a TES species, critical habitat, or the natural processes sustaining them would be detectable both in and out of the Park.</p> <p>Loss of habitat or mortality might affect the viability of at least some TES species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.</p> <p>This impact intensity equates to the U.S. Fish and Wildlife Service determination, “may affect, likely to jeopardize the continued existence of a species or adversely modify the critical habitat for a species.”</p>

**Table 7: Intensity Definition, Cultural Resources**

Impact Intensity	Impact Type	Intensity Definition
Negligible	Adverse or Beneficial	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for section 106 would be “no adverse effect”.
Minor	Adverse	Disturbance of a site results in little, if any loss of integrity. The determination of effect for section 106 would be “no adverse affect”.
	Beneficial	Maintenance and preservation of a site. The determination of effect for section 106 would be “no adverse effect”.
Moderate	Adverse	Disturbance of a site results in loss of integrity. The determination of effect for section 106 would be “adverse effect”. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b).  Measures identified in the memorandum of agreement to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.
	Beneficial	Stabilization of a site. The determination of effect for section 106 would be “no adverse affect”.
Major	Adverse	Disturbance of a site results in loss of integrity. The determination of effect for section 106 would be “adverse effect”. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or advisory council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).
	Beneficial	Active intervention to preserve a site. The determination of effect for section 106 would be “no adverse effect”.

**Table 8: Intensity Definition, Wilderness and Backcountry Aesthetics**

Impact Intensity	Intensity Definition
Negligible	The impact would be so small that it would not be of any measurable or perceptible consequence. Impacts would not be detectable to the visitor.
Minor	Minor impacts would be slightly detectable, though not expected to have an overall effect on the visitor experience. Impact is slight but would be small and localized and of little consequence.
Moderate	Moderate impacts would be clearly detectable and could have an appreciable effect on the visitor experience. The impact is readily apparent, would be measurable and consequential, but more localized.
Major	Major impacts would have a substantial, highly noticeable influence on the wilderness experience, such as the permanent closure of a campground. The impact is severely adverse or exceptionally beneficial. The change would be measurable and the consequences could be permanent.

### 4.3.2 Cumulative Impacts

The Council on Environmental Quality, which implements NEPA, requires assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact to the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time.

Both additive and interactive cumulative impacts are assessed. Additive impacts accumulate by adding more of the same impact to a resource. For example, one impact-causing occurrence, such as the construction of a road, may be of little significance. However, one hundred roads constructed in the same area may cause significant impacts to a resource. Interactive impacts accrue as a result of one impact being either emphasized or de-emphasized by another. For example, the construction of a road in the same area to which a water diversion is directed may result in disproportionately greater soil erosion than would occur if the two projects occurred in different vicinities.

Cumulative Impacts of two or more actions in the same location are not necessarily all adverse or all beneficial. One impact may have the opposite effect from another. For example, the construction of a road may cause an increase in soil erosion, and the installation of a culvert may reduce soil erosion. In such cases, one impact may act to diminish or reverse the impact of another.

Cumulative Impacts are considered for all alternatives and are presented for each resource. The analysis includes all environmental compliance reports which describe programmatic plans or projects that may result in interactive impacts to resources, as a result of the alternatives. The temporal scope is the same for all resources and was defined as impacts that have taken place in the last ten years, or may take place within the next ten years. A period of ten years was selected because that is also the proposed duration of this plan.

Under the Cumulative Impacts analysis, actions are assessed primarily by whether they cause impacts to a resource to change the rating definition, such as from negligible to minor, or minor to major.

### 4.3.3 Impairment

The NPS Management Policies (NPS, 2006) require analysis of potential effects to determine whether or not actions would impair Park resources. The fundamental purpose of the National Park Service, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve Park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting Park resources and values. Therefore, non-impairment is a required objective of this project. An alternative that leads to impairment would be rejected as an alternative. The project and its mitigation measures must be designed to prevent major adverse impacts.

Park management has the discretion to allow impacts to Park resources and values when necessary and appropriate to fulfill the purposes of a Park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within Park, that discretion is limited by the statutory requirement that the NPS must leave Park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of Park resources or values. An impact to any Park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Park;
- Key to the natural or cultural integrity of the Park; or
- Identified as a goal in the Park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the Park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the Park. Impairment determinations are not required for resource topics that are not considered to be Park resources or values.

## 4.4 Impact of Alternative 1 (No Action)

### 4.4.1 Physical Resources

#### *A. Air Quality*

There are two possible sources of air pollution in this alternative – smoke from chainsaws and dust. Smoke will be limited by ensuring that chainsaws are properly maintained, and by using low-smoke non-petroleum two-cycle oil. Dust will be created by foot traffic in and out of work sites, and through the break-up of soil crusts and desert pavement. Additional dust will be created by work crews driving on dirt roads to access sites. This dust is expected to be larger sized particles, greater than PM10. Over time, the soil crust will regenerate and regain the ability to hold soil in place.

Initially, this alternative will create less dust and smoke than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent dust and smoke pollution than Alternative 2.

Cumulative Impact: Pollution sources near the Park include the chemical extraction operations in Searles Valley (Trona), gold mining operations at the Briggs Mine in Panamint Valley, China Lake Naval Air Base, U.S. Army National Training Center at Ft. Irwin, and other areas. Fires in the Park and throughout the region can affect air quality. The Park is developing a Fire Management Plan that includes plans for prescribed fire in the northwest section of the Park.

Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on air quality and visibility in the Park, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, local, short-term and long-term, negligible impact to air quality and visibility in the Park.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to

opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *B. Noise/Soundscape*

This alternative will create noise from chainsaws. The Park will be required to complete a Minimum Tool Analysis for chainsaw use in wilderness, which may preclude noise at certain locations or times of year. Initially, this alternative will create less noise than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent noise than Alternative 2.

### Cumulative Impact

Common artificial sources of noise in the Park include vehicles and aircraft. Low speed limits in developed areas reduce vehicle noise where most visitors congregate, and due to the Park's size, most other areas are well away from traffic and noise. Noise is further reduced through limits on the use of generators in campgrounds.

Aircraft are a significant source of noise in the Park. Death Valley is in relatively close proximity to China Lake Naval Air Weapons Station, Edwards Air Force Base, Ft. Irwin National Training Center (Army), Nellis Air Force Base, and the Nevada Test Site (Air Force and Department of Energy). In areas that were part of Death Valley National Monument, military air traffic is restricted to altitudes greater than 3000 feet above ground level. In most areas added to the Park in 1994, the restriction is 200 feet above ground level. This airspace is used daily, and produces large amounts of noise.

The U.S. Navy documents that an F-18 jet airplane (the most commonly seen military aircraft in the Park) generates from 108 to 113 decibels (depending on the specific model of F-18) when flying at 1000 feet (carrier landing approach, measured 1000 feet from airplane). This compares to a Stihl 044/440 model chainsaw (standard used by the LAME EPMT) at 90 to 106 decibels, depending on RPM (measured at ear level of chainsaw operator).

Alternative 1 would result in an additive, adverse, minor change to these past, present, and future effects on the Park soundscape, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, local, short-term, minor impact to the Park soundscape.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *C. Soils*

There will be very little ground disturbance caused by the death of exotic vegetation because most treatments are above ground. Plants with relatively limited root systems may be pulled, causing some soils disturbance. There will be loss of soil crusts and desert pavement, caused by foot traffic to and from work sites. There will also be some minor soil compaction as a result of the foot traffic in the treatment areas. Over time, the natural soil processes will allow regeneration.

Initially, this alternative will create less soil disturbance than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent soil disturbance than Alternative 2.

Cumulative Impact: Human manipulation of water flows has caused soil erosion in the Furnace Creek area. Road and facility construction and maintenance has also caused erosion and soil disturbance in many areas of the Park. Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on Park soils, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, minor impact to Park soils. Long-term impact to soils would be direct, adverse, site-specific, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *D. Water Quality and Potable Water Collection Systems*

Many native and non-native plants, including salt cedar exude large amounts of salt from leaf surfaces. This can impact water quality by causing an increase in soil and water salinity.

Death Valley National Park consists mainly of closed watersheds. There are few areas where impacts to water quality in the Park may result in impacts to water quality outside the Park. These include state lands in Saline Valley and the Timbisha Shoshone homeland at Furnace Creek. Research is currently underway to determine the relationship between ground water in Death Valley and the carbonate aquifer of western Nevada.

There will be a temporary increase in turbidity at some locations from crew members walking through mud and water to access and treat plants that are growing in or near water. Initially, this alternative will have less of an adverse effect on non-potable water quality than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse effects to water quality than Alternative 2.

Potable water supplies would not be affected by herbicide, because no herbicide would be used in potable water collection areas (see Appendix H for potable water collection areas excluded from herbicide use), with the exception of Darwin Falls. Large salt cedars have been previously treated (during 1990-2005) using the cut-stump and herbicide application method in the vicinity of the water collection area. Under Alternative 1 (No Action), that practice would be continued. Although exotic vegetation is present at a number of potable water collection sites, the salt cedar at Darwin Falls poses a threat to Sensitive animals, including western toad and Oasis Valley springsnail. The potable water collection area below Darwin Falls supplies water for the Panamint Springs Resort in Panamint Valley. Only those herbicides approved by the US EPA, NPS, state of California, and Inyo County, for use near potable water will be permitted. Precautions to avoid drift of herbicides into standing water would be assumed, but not mitigated clearly in a compliance document.

Exotic vegetation can reduce the quality of potable water supplies, because the rapid growth of exotics produces large amounts of detritus, including palm fronds, which degrade very slowly, and large, woody limbs. The presence of this detritus may reduce drinking water quality by creating excessive vegetative matter that can attract animals, and result in water contamination.

Cumulative Impact: Road and facility construction and maintenance can create soil disturbance and erosion that may increase turbidity of water. The Park concessionaire, Xanterra, uses pesticides to control exotic plants and animal pests at the Furnace Creek Ranch and Inn.

Alternative 1 would result in an additive, adverse, short-term, negligible change to these past, present, and future effects on non-potable water quality in the Park. In the long-term, those effects may be at least partially reversed by the removal of exotic vegetation near non-potable water sources. This would result in overall adverse, minor impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, local, short-term, negligible impact to potable and non-potable water quality in the Park. There would be an indirect, adverse, local, long-term, minor impact to water quality.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### 4.4.2 Biological Resources

##### A. Vegetation

Russian thistle is known to occur in the habitat of the Federally Endangered species, Eureka Valley dunegrass (*Swallenia alexandrae*) and Eureka Valley evening-primrose (*Oenothera californica* ssp. *eurekensis*). Many Park Sensitive plants are adversely impacted by the presence of exotics (Appendix I).

There would be a positive impact to native vegetation under Alternative 1 because the removal of exotics would allow native vegetation, including Threatened, Endangered, and Sensitive (TES) species to recover. This would occur as a result of native plants having greater access to water and nutrients, which are required for growth and reproduction.

Careful application of herbicide would only eliminate exotic plants, would remain non-mobile in the environment, and would break down quickly (30 to 120 days, depending on the herbicide).

Inadvertent trampling of native plants will occur. Native vegetation would recover from the trampling in 3-5 years. However, any exotic vegetation work in or near TES plant habitat will be directly overseen by a botanist or other designated personnel, to ensure that these plants are not adversely impacted. As a result, TES species would benefit immediately from the increased availability of water and other resources that would result from exotic vegetation control.

This alternative will have less of a beneficial impact to native plants than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. In addition, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse short-term impacts than Alternative 2.

Cumulative Impact: Road and facility maintenance and construction can destroy individuals of native and rare plants in the Park. These activities can also alter water courses, which, in turn, can have a negative impact to vegetation. The Park is developing a programmatic plan, and environmental review document, for roads and utilities maintenance. Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on vegetation in the Park, but would counteract adverse impacts by long-term benefits to native vegetation. This would result in a change in the overall impacts from adverse to neutral or beneficial.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, negligible impact to vegetation. The long-term impact would be direct, beneficial, local, and minor.

Activities associated with Alternative 1 would have a direct, beneficial, site-specific, short-term, negligible impact to Park TES plants. The long-term impact would be direct, beneficial, local, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

## *B. Birds*

There will be a gradual improvement in bird habitat in some areas as exotic plants are replaced by native plants. Timing the work so that it is done in the fall, winter, and early spring will ensure that birds are not disturbed during nesting season. There would be a short-term, inadvertent harassment of any birds present during work periods, but no mortality or injury. There will be a long-term improvement in habitat resulting from the regeneration of native habitat, but it will occur on a relatively small scale.

Initially, this alternative will cause less bird harassment than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent bird harassment, and less native habitat regeneration than Alternative 2.

Cumulative Impact: Loss of riparian nesting habitat has been severe, especially in the Furnace Creek, Texas/Travertine and Scotty's Castle/Grapevine areas. This loss has been caused by competition with exotic plants, physical destruction of habitat to create roads and to maintain water collection systems, through die-off of vegetation caused by removal of water from these systems, and through the presence of campgrounds and other developments.

Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on birds in the Park, but would counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in no change to the overall negligible impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, negligible impact to birds in the Park. Long-term impact would be indirect, beneficial, local, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *C. Mammals*

Desert bighorn sheep will benefit from the removal of exotic plants from the smaller, isolated oases, because such plant removal will provide increased water supplies and improved forage, resulting from the revegetation of native species.

USGS and Scrapper springs both support large date palm trees, which may account for their lack of surface water. Lack of water, in turn, may have eliminated a critical link connecting bighorn sheep habitat around Indian Pass canyon with habitat in the Nevares/Texas/Travertine area, and caused the sheep to lose access to the area around USGS and Scrapper springs.

Exotic plant removal will have very little impact to the Mojave ground squirrel because the Mojave ground squirrel habitat (Panamint Valley and Lee Flat) is affected mainly by annual grasses, which are not targeted for treatment over those large areas under this EPMP. The same is true for bats.

Some harassment of native mammals, including desert bighorn sheep, will occur under this alternative, as a result of the presence of people in the work sites. Initially, this alternative will cause less mammal harassment than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent mammal harassment, and less native habitat regeneration than Alternative 2.

Cumulative Impact: The Park has been pursuing an exotic animal removal program for horses and burros. These animals have impacted bighorn sheep through competition and have damaged riparian vegetation more severely than bighorn or other native animals. Road and facility maintenance and construction can affect vegetation in bighorn sheep habitat, or create noise that harasses the animals. The Park is developing a programmatic plan for roads and utilities maintenance.

Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on mammals in the Park, but would counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in no change to the overall negligible impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, minor impact to mammals, including desert bighorn sheep, in the Park. Long-term impact would be indirect, beneficial, local, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *D. Reptiles and Amphibians*

Exotic annual grasses and forbs are found in tortoise habitat in DVNP, including cheatgrass, red brome, halogeton, Arabian schismus (*Schismus arabicus*), and Sahara mustard (*Brassica tournefortii*). There is salt cedar in Surprise Canyon, which may affect Panamint Alligator lizard habitat. Salt cedar is found in many riparian areas that may provide suitable habitat for toads, frogs, and salamanders. In comparison to native plants, exotic plants are generally less nutritious for reptiles and amphibians, may be poisonous (e.g. halogeton), and can alter the fire regime of tortoise habitat (e.g. cheatgrass and red brome). Consequently, exotic vegetation has direct and indirect effects on reptiles and amphibians.

Appropriate use of herbicides by trained applicators will ensure that no amphibians are harmed. In situations where there is a possibility of herbicide contacting water or amphibians, only aquatic herbicides will be used. This includes, but is not limited to, applications that occur within 50 ft. of surface water. Access to treatment sites will require some trampling of amphibian habitat. In the long-term, reptiles and amphibians will benefit from improved habitat with the native vegetation. This benefit would be less pronounced under this alternative as compared to Alternative 2.

Initially, this alternative will have less of an adverse impact to reptiles and amphibians than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse impacts to reptiles and amphibians than Alternative 2.

Cumulative Impact: Road and facility maintenance and development can result in the loss of habitat. There is occasional illegal lizard poaching in the Park, to supply the exotic pet trade.

Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on reptiles and amphibians in the Park, but would counteract adverse impacts by reducing long-term loss of habitat and food sources caused by exotic plant invasion. This would result in no change to the overall negligible impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, local, short-term, negligible impact to non-TES and TES reptiles and amphibians in the Park. Long-term impacts would be direct and indirect, beneficial, local, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *E. Fish*

Salt cedar has impacted the habitat of pupfish that reside in the southern end of the Park, in the Amargosa River, Valley springs, Salt Creek, and Saratoga Springs. The presence of salt cedar may have reduced water availability in these habitats and/or changed the salinity. Palm trees are also present at Salt Creek.

There would be a short-term increase in turbidity at some work sites while work crews access areas with surface water. This would clear within a few hours of crews leaving the site, and would not be expected to cause any mortality. Initially, this alternative will have less of an adverse impact to turbidity than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse impacts to turbidity than Alternative 2.

Appropriate use of herbicides by trained applicators will ensure that no fish are harmed. In situations where there is a possibility of herbicide contacting water, only aquatic herbicides will be used. This includes, but is not limited to, applications that occur within 50 ft. of surface water. Access to treatment sites will require some trampling of riparian habitat. In the long-term, fish will benefit from improved habitat with the native vegetation. This benefit would be less pronounced under this alternative as compared to Alternative 2.

Under this alternative, herbicide may be applied to exotics using a hand-sprayer in the vicinities of Salt Creek and Valley Springs. Neither Devil's Hole pupfish nor Cottonball Marsh pupfish will be affected by exotic plant removal, because there are no exotic plants near either species' habitat.

Cumulative Impact: Salt cedar has been controlled in the southern end of the Park during several years between 2000 and 2008. These efforts have eliminated approximately 90% of the infestations. Retreatments will be required to control resprouting trees and seedlings from the existing seed bank. Visitor use, in the form of foot traffic and illegal off-road driving has resulted in compaction and damage to riparian areas. In order to restore damage caused by illegal off-road driving in the Amargosa River area, the Park has used vertical mulching and sweeping and raking techniques to reduce visual impacts, encourage vegetation growth, and reduce the likelihood of repeated trespassing.

Past, present, and future actions have had both adverse and beneficial impacts to fish. Alternative 1 would result in further adverse, negligible changes to these past, present, and future effects on fish in the Park, but would also counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in no change to the overall minor to moderate impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, negligible impact to fish in the Park. Long-term impact would be indirect, beneficial, site-specific, and negligible.

Activities associated with Alternative 1 would have no impact to the Devils Hole pupfish.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *F. Invertebrates*

The entire Nevares/Texas/Travertine springs area is heavily impacted by exotic plants, including palm trees, salt cedar, athel, oleander, Bermuda grass, rabbit's foot grass and others. These exotics probably consume more water than native plants, especially in Furnace Creek wash.

Invertebrates in general will not be impacted by this alternative, because only aquatic herbicides will be used in those situations where herbicide might accidentally come in contact with water. There might be negligible injury or mortality cause by crews moving through the site. Initially, this alternative will have less of an adverse impact to invertebrates than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse impacts to invertebrates than Alternative 2.

#### Cumulative Impact

Construction and maintenance of the potable water collection and distribution systems at Furnace Creek and Nevares springs are thought to have reduced the habitat for invertebrates by as much as 80% in the last 70 years. California State Highway 190 passes through this area, altering stream-flow patterns and dividing the habitat.

Sometime in the 1940's, a large notch was artificially opened in the ridgeline of the Black Mountains at Zabriskie Point. This notch diverts water from the periodic flash floods, sending the water down Gower Gulch, instead of its previous, natural course down Furnace Creek Wash. The effect of this diversion on water levels and invertebrate populations in Furnace Creek Wash is unknown.

Alternative 1 would result in additive, adverse, negligible changes to these past, present, and future effects on invertebrates in the Park, but would also counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in no change to the overall minor to moderate impacts.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, site-specific, short-term, negligible impact to invertebrates of the Nevares/Texas/Travertine spring complex. The long-term impact would be indirect, beneficial, local, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### 4.4.3 Cultural Resources

#### *A. Historic and Prehistoric Resources*

Historic and prehistoric resources will not be directly damaged under this alternative, except for very minor damage through inadvertent trampling. Initially, this alternative will have less of an adverse impact to cultural resources than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse impacts to cultural resources than Alternative 2. In addition, this alternative

may result in more trampling compared to Alternative 2, because it does not allow for annual planning of treatment sites that will be subject to archeological review.

Exotic vegetation can create a greater wildfire risk, as compared to native vegetation. This results from its more rapid and dense growth, which produces greater amounts of dead biomass and continuous fuels along the ground surface and near historic structures. Alternative 1 will reduce the risk of wildfire damage to cultural resources in some areas.

Exotic vegetation can also damage cultural resources through growth that occurs near structures, or by falling limbs from trees. Under Alternative 1, exotic vegetation will not be treated near many important cultural sites, such as Scotty's Castle, Cow Creek residential and administrative site, and Warm Springs Camp. This will result in damage to some historic structures, and a deterioration of the historic landscapes surrounding them.

#### Cumulative Impact

Common sources of cultural resource damage include ground disturbance (associated with construction, illegal off-road driving, and other activities), vandalism, theft, and wildfire. The Park is developing a Wildland Fire Management Plan. Alternative 1 would result in additive, adverse, negligible changes to these past, present, and future effects on historic and prehistoric resources in the Park. This would result in negligible change to the overall minor to moderate impacts, or may cause a change in the overall rating from minor to moderate.

Conclusion: Activities associated with Alternative 1 would have both short- and long-term direct, adverse, site-specific, minor impacts to historic and prehistoric resources in the Park.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *B. Cultural Landscapes*

Exotic vegetation is a component of many historic landscapes in the Park, including Scotty's Castle, Lower Vine Ranch, Cow Creek, Warm Springs Camp, and Hungry Bill's Ranch, among others. In some cases, the exotics themselves are cultural resources. In other cases, the invasion of exotics throughout the sites may cause damage to historic structures, create a fire hazard, or alter historic trails, waterways, and open spaces.

Under Alternative 1, no exotic vegetation treatments would occur in historic areas, except for minor tree and shrub trimming in the vicinity of structures.

Cumulative Impact: Cultural landscapes are some of the most frequently visited areas in the Park. Vegetation may be altered by visitors, areas may be trampled, and vandalism may occur.

Alternative 1 would counteract these past, present, and future adverse effects on historic and prehistoric resources in the Park, by reducing damage caused by exotic vegetation. The effect would be negligible.

Conclusion: Activities associated with Alternative 1 would have a direct, beneficial, site-specific, short-term, negligible impact to cultural landscapes in the Park. Long-term impacts would be indirect, adverse, site-specific, and moderate.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### 4.4.4 Wilderness and Backcountry Aesthetic Qualities

Some slash piles would be created, and cut stumps would be visible. Social trails might be created.

Populations of exotic plants will be controlled in some areas. To those who consider exotic plants to be an indication of human influence on the environment, this would be viewed as an improvement. There will be increased populations of native plants and animals, both of which enhance aesthetic and wilderness experiences.

Initially, this alternative will have less of an adverse impact to wilderness and backcountry aesthetic qualities than Alternative 2, because this alternative only targets individuals and small populations of exotic plants. However, because the treatments will occur on a small scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse impacts to wilderness and backcountry aesthetic qualities than Alternative 2. Furthermore, the absence of annual planning under Alternative 1 will preclude long-term, sustainable success of exotic vegetation control across the large-scale wilderness area of the Park.

#### Cumulative Impact

Indications of past human activity are common, in the form of cultural resources, both historic and prehistoric. Evidence of previous mining activity is common and visible, as are abandoned/closed roads.

Indications of recent human activity in the wilderness and non-wilderness backcountry areas of the Park are limited. There are only approximately 20 miles of maintained hiking trail, and a few other 'routes' that are popular.

The Park occasionally uses helicopters or other low flying aircraft in wilderness for Search and Rescue, Emergency Medical Service, and Wildland Firefighting operations. There are no proposals or programs involving the use of chain saws or other mechanized tools (other than Search and Rescue, EMS or Wildland Firefighting operations) in wilderness in Death Valley National Park.

Alternative 1 would result in an additive, adverse, negligible change to these past, present, and future effects on wilderness and backcountry aesthetics, but would counteract adverse impacts by reducing exotic vegetation, which degrades the character of wilderness.

Conclusion: Activities associated with Alternative 1 would have a direct, adverse, local, short-term, negligible impact to the Park's Wilderness and Backcountry aesthetics. Long-term impacts would be direct, beneficial, local, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

## 4.5 Impact of Alternative 2 (Proposed Action)

### 4.5.1 Physical Resources

#### *A. Air Quality*

There are two possible sources of air pollution in this alternative – smoke from chainsaws and dust. Smoke will be limited by ensuring that chain saws are properly maintained, and by using low-smoke non-petroleum two-cycle oil. Dust will be created by foot traffic in and out of work sites, and through the break-up of soil crusts and desert pavement. Additional dust will be created by work crews driving on dirt roads to access sites. This dust is expected to be larger sized particles, greater than PM10. Over time, the soil crust will regenerate and regain the ability to hold soil in place.

Initially, this alternative will create more dust and smoke than Alternative 1, because this alternative targets a greater number of populations and individuals. However, because treatments under this alternative are less likely to require retreatment, this alternative will create less frequent dust and smoke pollution than Alternative 1.

Cumulative Impact: Pollution sources near the Park include the chemical extraction operations in Searles Valley (Trona), gold mining operations at the Briggs Mine in Panamint Valley, China Lake Naval Air Base, U.S. Army National Training Center at Ft. Irwin, and other areas. Fires in the Park and throughout the region can affect air quality. The Park is developing a Fire Management Plan that includes plans for prescribed fire in the northwest section of the Park.

Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on air quality and visibility in the Park, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, local, short-term and long-term, negligible impact to air quality and visibility in the Park.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *B. Noise/Soundscape*

This alternative will create noise from chainsaws. The Park will be required to complete a Minimum Tool Analysis for chainsaw use in wilderness that may preclude noise at certain locations or times of year. Initially, this alternative will create more noise than Alternative 1, because this alternative targets a greater number of populations and individuals. However, because treatments under this alternative are less likely to require retreatment, this alternative will create less frequent noise than Alternative 1.

### Cumulative Impact

Common artificial sources of noise in the Park include vehicles and aircraft. Low speed limits in developed areas reduce vehicle noise where most visitors congregate, and due to the Park's size, most other areas are well away from traffic and noise. Noise is further reduced through limits on the use of generators in campgrounds.

Aircraft are a significant source of noise in the Park. Death Valley is in relatively close proximity to China Lake Naval Air Weapons Station, Edwards Air Force Base, Ft. Irwin National Training Center (Army), Nellis Air Force Base, and the Nevada Test Site (Air Force and Department of Energy). As a result there is a large amount of military air traffic over the Park. In areas that were part of Death Valley National Monument, military air traffic is restricted to altitudes greater than 3000 feet. In most areas added to the Park in 1994, the restriction is 200 feet. This airspace is used daily, and produces large amounts of noise.

The U.S. Navy documents that an F-18 jet airplane (the most commonly seen military aircraft in the Park) generates from 108 to 113 decibels (depending on the specific model of F-18) when flying at 1000 feet (carrier landing approach, measured 1000 feet from airplane). This compares to a Stihl 044/440 model chainsaw (standard used by the LAME EPMT) at 90 to 106, depending on RPM (measured at ear level of chainsaw operator).

Alternative 2 would result in an additive, adverse, minor change to these past, present, and future effects on the Park soundscape, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, local, short-term, minor impact to the Park soundscape.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in

the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *C. Soils*

There will be little ground disturbance caused by the death of exotic vegetation because most treatments are above ground. Plants with relatively limited root systems may be pulled, causing some soils disturbance. There will be loss of soil crusts and desert pavement, caused by foot traffic to and from work sites. There will also be some minor soil compaction as a result of the foot traffic in the treatment areas. Over time, the natural soil processes will allow regeneration.

Impacts to soils will be greatest near potable water collection areas (see Appendix H). Herbicide use would not be permitted in these areas, necessitating the use of mechanical methods of treatment, including pulling trees down with winch and vehicle, and/or digging.

Initially, this alternative will create more soil disturbance than Alternative 1, because this alternative targets a greater number of populations and individuals. However, because treatments under this alternative are less likely to require retreatment, this alternative will create less frequent soil disturbance than Alternative 1.

Cumulative Impact: Human manipulation of water flows has caused soil erosion in the Furnace Creek area. Road and facility construction and maintenance has also caused erosion and soil disturbance in many areas of the Park. Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on Park soils, causing no change to the overall moderate impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, site-specific, short-term, minor impact to Park soils. Long-term impact to soils would be direct, adverse, site-specific, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *D. Water Quality and Potable Water Collection Systems*

Many native and non-native plants, including salt cedar exude large amounts of salt from leaf surfaces. This can impact water quality by causing an increase in soil and water salinity.

There will be a temporary increase in turbidity at some locations from crew members walking through mud and water to access and treat plants that are growing in or near water. Initially, this alternative will have a greater adverse effect on water quality than Alternative 1, because this alternative targets a greater number of populations and individuals. However, because

treatments under this alternative are less likely to require retreatment, this alternative will create less frequent adverse effects to water quality than Alternative 1.

Death Valley National Park consists mainly of closed watersheds. There are few areas where impacts to water quality in the Park may result in impacts to water quality outside the Park. These include state lands in Saline Valley and the Timbisha Shoshone homeland at Furnace Creek. Research is currently underway to determine the relationship between ground water in Death Valley and the carbonate aquifer of western Nevada.

There will be a temporary increase in turbidity at some locations from crew members walking through mud and water to access and treat plants that are growing in or near water. Initially, this alternative will have a greater adverse effect on non-potable water quality than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a large scale and, thus, are more likely to require retreatment, this alternative will create more frequent adverse effects to water quality than Alternative 1.

Potable water supplies would not be affected by herbicide, because no herbicide would be used in potable water collection areas (see Appendix H for potable water collection areas excluded from herbicide use), with the exception of Darwin Falls. However, all potable water supplies will be affected by soil disturbance necessary to mechanically treat exotic vegetation. Adult palms will be felled by pulling the tree with a winch and vehicle. The limited extent of the root system results in relatively little soil erosion. Smaller salt cedar or athels may be pulled with a similar method, but most plants will require some digging to remove roots. Plants will resprout and repeated treatment will be required to kill the plants.

The potable water collection area below Darwin Falls supplies water for the Panamint Springs Resort in Panamint Valley. Although exotic vegetation is present at a number of potable water collection sites, the salt cedar at Darwin Falls poses a threat to Sensitive animals, including western toad and Oasis Valley springsnail. Large salt cedars have been previously treated (during 1990-2005) using the cut-stump and herbicide application method in the vicinity of the water collection area. Under Alternative 1 (No Action), that practice would be continued. Only those herbicides approved by the US EPA, NPS, state of California, and Inyo County, for use near potable water will be permitted. As an extra precaution, to eliminate the potential for any herbicide drift in this very sensitive area, hand application will occur only through use of a brush or sponge. The difficulty of mitigating the use of even hand-held sprayers to eliminate all drift warrants the use of the most cautious method in this particular vicinity. The salt cedar population is also relatively small, and annual visits to the site will be adequate to control the population in a cost-effective manner. The use of herbicide in this situation meets all federal, state, and county regulations, and would require no interruption of service to the Panamint Springs Resort. The herbicides used would be selected according to Label instructions as non-toxic to aquatic organisms, and extra precautions would be taken during the application, as described above.

Exotic vegetation can reduce the quality of potable water supplies, because the rapid growth of exotics produces large amounts of detritus, including palm fronds, which degrade very slowly,

and large, woody limbs. The presence of this detritus may reduce drinking water quality by creating excessive vegetative matter that can attract animals, and result in water contamination.

Cumulative Impact: Road and facility construction and maintenance can create soil disturbance and erosion that may increase turbidity of water. The Park concessionaire, Xanterra, uses pesticides to control exotic plants and animal pests at the Furnace Creek Ranch and Inn. Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on water quality in the Park, but would counteract adverse impacts by reducing long-term contamination caused by vegetation overgrowth, and by reducing the need to retreat sites. This would result in no change to the overall negligible impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, local, short-term, minor impact to potable and non-potable water quality in the Park. There would be an indirect, beneficial, local, long-term, minor impact.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

## 4.5.2 Biological Resources

### A. Vegetation

Russian thistle is known to occur in the habitat of the Federally Endangered species, Eureka Valley dunegrass (*Swallenia alexandrae*) and Eureka Valley evening-primrose (*Oenothera californica* ssp. *eurekensis*). Many Park Sensitive plants are adversely impacted by the presence of exotics, through competition for water, sunlight, or nutrients, increased fire danger, or alteration of soil chemistry. Park Sensitive plants are listed in Appendix I.

There would be a strongly positive impact to native vegetation under Alternative 2 because the removal of exotics would allow native vegetation, including Threatened, Endangered, and Sensitive (TES) species to recover. This would occur as a result of native plants having greater access to water and nutrients, which are required for growth and reproduction. Fire danger to native plants would also be lessened, and the negative impacts of exotic vegetation to soil chemistry (e.g. increased salinity) would be reduced.

Careful application of herbicide would only eliminate exotic plants, would remain non-mobile in the environment, and would break down quickly (30 to 120 days, depending on the herbicide).

Inadvertent trampling of native plants will occur. Native vegetation would recover from the trampling in 3-5 years. Any exotic vegetation work in or near rare plant habitat will be directly overseen by the Park botanist or other designated personnel, to ensure that these plants are not negatively impacted. As a result, TES species would benefit immediately from the increased availability of water and other resources, which would result from exotic vegetation control.

This alternative will have a greater beneficial impact to native vegetation than Alternative 1, because this alternative targets a greater number of populations and individuals of exotic plants. In addition, because treatments under this alternative are less likely to require retreatment, this alternative will create less frequent adverse impacts to native vegetation than Alternative 1.

Cumulative Impact: Road and facility maintenance and construction can destroy individuals of native and rare plants in the Park. These activities can also alter water courses, which, in turn, can have a negative impact to vegetation. The Park is developing a programmatic plan, and environmental review document, for roads and utilities maintenance. Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on vegetation in the Park, but would counteract adverse impacts by long-term benefits to native vegetation. This would result in a change in the overall impacts from adverse to beneficial.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, site-specific, short-term, negligible impact to vegetation. The long-term impact would be direct, beneficial, local, and major.

Activities associated with Alternative 2 would have a direct, beneficial, site-specific, short-term, negligible impact to Park T&E or Sensitive plants. The long-term impact would be direct, beneficial, local, and major.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *B. Birds*

There will be a gradual improvement in bird habitat as exotic plants are replaced by native plants. Timing the work so that it is done in the fall, winter, and early spring will ensure that birds are not disturbed during nesting season. There would be a short-term, inadvertent harassment of any birds present during work periods, but no mortality or injury. There will be a long-term improvement in habitat resulting from the regeneration of native habitat. As a result, there may be an improvement in the habitat of large-scale migration routes, by providing key habitat in the context of the greater Mojave Desert.

Initially, this alternative will cause more bird harassment than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a larger scale and, thus, are less likely to require retreatment, this alternative will create less frequent bird harassment, and more native habitat regeneration than Alternative 1.

Cumulative Impact: Loss of riparian nesting habitat has been severe, especially in the Furnace Creek, Texas/Travertine and Scotty's Castle/Grapevine areas. This loss has been caused by

competition with exotic plants, physical destruction of habitat to create roads and to maintain water collection systems, through die-off of vegetation caused by removal of water from these systems, and through the presence of campgrounds and other developments.

Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on birds in the Park, but would strongly counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in an overall cumulative impact that is beneficial.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, site-specific, short-term, negligible impact to birds in the Park. Long-term impact would be indirect, beneficial, regional, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *C. Mammals*

Desert bighorn sheep will benefit from the removal of exotic plants from the smaller, isolated oases, because such plant removal will provide increased water supplies and improved forage, resulting from revegetation of native species.

USGS and Scrapper springs both support large date palm trees, which may account for their lack of surface water. Lack of water, in turn, may have eliminated a critical link connecting bighorn sheep habitat around Indian Pass canyon with habitat in the Nevares/Texas/Travertine area, and caused the sheep to lose access to the area around USGS and Scrapper springs.

Exotic plant removal will have very little impact to the Mojave ground squirrel because the Mojave ground squirrel habitat (Panamint Valley and Lee Flat) is affected mainly by annual grasses, which are not targeted for treatment over those large areas under this EPMP. The same is true for bats.

Some harassment of native mammals, including desert bighorn sheep, will occur under this alternative, as a result of the presence of people in the work sites. Initially, this alternative will cause more mammal harassment than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a larger scale and, thus, are less likely to require retreatment, this alternative will create less frequent mammal harassment, and more native habitat regeneration than Alternative 1.

Cumulative Impact: The Park has been pursuing an exotic animal removal program for horses and burros. These animals have impacted bighorn sheep through competition and have damaged riparian vegetation more severely than bighorn or other native animals. Road and facility maintenance and construction can affect vegetation in bighorn sheep habitat, or create noise that

harasses the animals. The Park is developing a programmatic plan for roads and utilities maintenance.

Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on mammals in the Park, but would counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in no change to the overall negligible impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, site-specific, short-term, minor impact to mammals, including desert bighorn sheep, in the Park. Long-term impact would be indirect, beneficial, local, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *D. Reptiles and Amphibians*

Exotic annual grasses and forbs are found in tortoise habitat in DVNP, including cheatgrass, red brome, halogeton, Arabian schismus (*Schismus arabicus*), and Sahara mustard (*Brassica tournefortii*). There is salt cedar in Surprise Canyon, which may affect Panamint Alligator lizard habitat. Salt cedar is found in many riparian areas that may provide suitable habitat for toads, frogs, and salamanders. In comparison to native plants, exotic plants are generally less nutritious for reptiles and amphibians, may be poisonous (e.g. halogeton), and can alter the fire regime of tortoise habitat (e.g. cheatgrass and red brome). Consequently, exotic vegetation has direct and indirect effects on reptiles and amphibians.

Appropriate use of herbicides by trained applicators will ensure that no amphibians are harmed. In situations where there is a possibility of herbicide contacting water or amphibians, only aquatic herbicides will be used. This includes, but is not limited to, applications that occur within 50 ft. of surface water. Access to treatment sites will require some trampling of amphibian habitat. In the long-term, reptiles and amphibians will benefit from improved habitat with the native vegetation. This benefit would be more pronounced under this alternative as compared to Alternative 1.

Initially, this alternative will have a greater adverse impact to reptiles and amphibians than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a larger scale and, thus, are less likely to require retreatment, this alternative will create less frequent adverse impacts to reptiles and amphibians, and more native habitat regeneration than Alternative 1.

Cumulative Impact: Road and facility maintenance and development can result in the loss of habitat. There is occasional illegal lizard poaching in the Park, to supply the exotic pet trade.

Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on reptiles and amphibians in the Park, but would counteract adverse impacts by reducing long-term loss of habitat and food sources caused by exotic plant invasion. This would result in no change to the overall negligible impacts, or may result in a reversal to overall beneficial impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, local, short-term, negligible impact to non-TES and TES reptiles and amphibians in the Park. Long-term impacts would be direct and indirect, beneficial, local, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *E. Fish*

Salt cedar has impacted the habitat of pupfish that reside in the southern end of the Park, in the Amargosa River, Valley springs, Salt Creek, and Saratoga Springs. The presence of salt cedar may have reduced water availability in these habitats and/or changed the salinity. Palm trees are also present at Salt Creek.

There would be a short-term increase in turbidity at some work sites while work crews access areas with surface water. This would clear within a few hours of crews leaving the site, and would not be expected to cause any mortality. Initially, this alternative will have a greater adverse impact to turbidity than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a large scale and, thus, are less likely to require retreatment, this alternative will create less frequent adverse impacts to turbidity than Alternative 1.

Appropriate use of herbicides by trained applicators will ensure that no fish are harmed. In situations where there is a possibility of herbicide contacting water, only aquatic herbicides will be used. This includes, but is not limited to, applications that occur within 50 ft. of surface water. Access to treatment sites will require some trampling of riparian habitat. In the long-term, fish will benefit from improved habitat with the native vegetation. This benefit would be more pronounced under this alternative as compared to Alternative 1.

Under this alternative, herbicide may be painted directly on cut stems of exotics using a hand-applicator in the vicinities of Salt Creek and Valley Springs. No spraying devices will be used in these areas. Neither Devil's Hole pupfish nor Cottonball Marsh pupfish will be affected by exotic plant removal, because there are no exotic plants near either species' habitat.

Cumulative Impact: Salt cedar has been controlled in the southern end of the Park during several years between 2000 and 2008. These efforts have eliminated approximately 90% of the infestations. Retreatments will be required to control resprouting trees and seedlings from the

existing seed bank. Visitor use, in the form of foot traffic and illegal off-road driving has resulted in compaction and damage to riparian areas. In order to restore damage caused by illegal off-road driving in the Amargosa River area, the Park has used vertical mulching and sweeping and raking techniques to reduce visual impacts, encourage vegetation growth, and reduce the likelihood of repeated trespassing.

Past, present, and future actions have had both adverse and beneficial impacts to fish. Alternative 2 would result in further adverse, negligible changes to these past, present, and future effects on fish in the Park, but would also counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in either no change to the overall minor to moderate impacts, or else an overall improvement to negligible or minor impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, site-specific, short-term, negligible impact to fish in the Park. Long-term impact would be indirect, beneficial, site-specific, and minor.

Activities associated with Alternative 2 would have no impact to the Devils Hole pupfish.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### *F. Invertebrates*

The entire Nevares/Texas/Travertine springs area is heavily impacted by exotic plants, including palm trees, salt cedar, athel, oleander, Bermuda grass, rabbit's foot grass and others. These exotics probably consume more water than native plants, especially in Furnace Creek wash.

Invertebrates in general will not be impacted by this alternative, because only aquatic herbicides will be used in those situations where herbicide might accidentally come in contact with water. There might be negligible injury or mortality cause by crews moving through the site. Initially, this alternative will have a greater adverse impact to invertebrates than Alternative 1, because this alternative only targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a large scale and, thus, are more likely to require retreatment, this alternative will create less frequent adverse impacts to invertebrates than Alternative 1.

#### Cumulative Impact

Construction and maintenance of the potable water collection and distribution systems at Furnace Creek and Nevares springs are thought to have reduced the habitat for these species by as much as 80% in the last 70 years. California State Highway 190 passes through this area, altering stream-flow patterns and dividing the habitat.

Sometime in the 1940's, a large notch was artificially opened in the ridgeline of the Black Mountains at Zabriskie Point. This notch diverts water from the periodic flash floods, sending the water down Gower Gulch, instead of its previous, natural course down Furnace Creek Wash. The effect of this diversion on water levels and invertebrate populations in Furnace Creek Wash is unknown.

Alternative 2 would result in additive, adverse, negligible changes to these past, present, and future effects on invertebrates in the Park, but would also counteract adverse impacts by reducing long-term loss of habitat caused by exotic plant invasion. This would result in either no change to the overall minor to moderate impacts, or else an overall improvement to minor or negligible impacts.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, short-term site-specific, negligible impact to invertebrates. The long-term impact would be indirect, beneficial, local, and minor.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### 4.5.3 Cultural Resources

#### *A. Historic and Prehistoric Resources*

Historic and prehistoric resources will not be damaged under this alternative, except for very minor damage through inadvertent trampling. Initially, this alternative will have a greater adverse impact to cultural resources than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a large scale and, thus, are more less to require retreatment, this alternative will create less frequent adverse impacts to cultural resources than Alternative 1. In addition, this alternative may result in less trampling compared to Alternative 1, because it allows for annual planning of treatment sites that will be subject to archeological review.

Exotic vegetation can create a greater wildfire risk, as compared to native vegetation. This results from its more rapid and dense growth, which produces greater amounts of dead biomass and continuous fuels along the ground surface and near historic structures. Alternative 2 will reduce the risk of wildfire damage to cultural resources in some areas.

Exotic vegetation can also damage cultural resources though growth that occurs near structures, or by falling limbs from trees. Under Alternative 2, exotic vegetation will be treated near many important cultural sites, such as Scotty's Castle, Cow Creek residential and administrative site, and Warm Springs Camp. This will prevent damage to some historic structures, and preserve the historic landscapes surrounding them.

### Cumulative Impact

Common sources of cultural resource damage include ground disturbance (associated with construction, illegal off-road driving, and other activities), vandalism, theft, and wildfire. The Park is developing a Wildland Fire Management Plan. Alternative 2 would result in additive, adverse, negligible changes to these past, present, and future effects on historic and prehistoric resources in the Park. However, this would result in negligible change to the overall minor to moderate impacts, because the reduction of structural and/or wildland fire risk would counteract those effects and benefit these resources.

Conclusion: Activities associated with Alternative 2 would have short-term direct, adverse, site-specific, negligible impacts to historic and prehistoric resources in the Park. Long-term impacts would be direct, beneficial, site-specific, and negligible.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

### *B. Cultural Landscapes*

Exotic vegetation is a component of many historic landscapes in the Park, including Scotty's Castle, Lower Vine Ranch, Cow Creek, Warm Springs Camp, and Hungry Bill's Ranch, among others. In some cases, the exotics themselves are cultural resources. In other cases, the invasion of exotics throughout the sites may cause damage to historic structures, create a fire hazard, or alter historic trails, waterways, and open spaces.

Under Alternative 2, exotic vegetation treatments would occur in historic areas, with the purpose of maintaining the historic landscapes, as described in Chapter 2. Some trampling in the sites would occur as a result of the workers' presence. Some plants that were part of the original cultural landscape may be destroyed, resulting in an immediate adverse impact. However, because the plants have limited longevity, and this alternative would allow for replanting of some non-native and native plants in specific locations, the cultural landscape may be better maintained in the long-term. In addition, this alternative would reduce damage to historic structures, trails, and other features, by reducing limb and root density in the vicinity, and through the reduction of fire hazards.

Cumulative Impact: Cultural landscapes are some of the most frequently visited areas in the Park. Vegetation may be altered by visitors, areas may be trampled, and vandalism may occur.

Alternative 2 would have an immediate, additive effect to these past, present, and future adverse actions on cultural resources in the Park, but would counteract those effects in the long-term. This would occur as a result of the sustainable cultural landscapes that would be maintained. The overall result would be a change in the category rating from adverse to beneficial.

Conclusion: Activities associated with Alternative 2 would have direct, adverse, site-specific, short-term, negligible impacts to cultural landscapes in the Park. Long-term impacts would be direct and indirect, beneficial, site-specific, and moderate.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

#### 4.5.4 Wilderness and Backcountry Aesthetic Qualities

Some slash piles would be created, and cut stumps would be visible. Social trails might be created.

Populations of exotic plants will be controlled in some areas. To those who consider exotic plants to be an indication of human influence on the environment, this would be viewed as an improvement. There will be increased populations of native plants and animals, both of which enhance aesthetic and wilderness experiences.

Initially, this alternative will have a greater adverse impact to wilderness and backcountry aesthetic qualities than Alternative 1, because this alternative targets more individuals and larger populations of exotic plants. However, because the treatments will occur on a large scale and, thus, are less likely to require retreatment, this alternative will create less frequent adverse impacts to wilderness and backcountry aesthetic qualities than Alternative 1. Furthermore, the annual planning proposed under Alternative 1 will allow for long-term, sustainable success of exotic vegetation control across the large-scale wilderness area of the Park.

#### Cumulative Impact

Indications of past human activity are common, in the form of cultural resources, both historic and prehistoric. Evidence of previous mining activity is common and visible, as are abandoned/closed roads.

Indications of recent human activity in the wilderness and non-wilderness backcountry areas of the Park are limited. There are only 20 miles or so of maintained hiking trail, and a few other 'routes' that are popular.

The Park occasionally uses helicopters or other low flying aircraft in wilderness for Search and Rescue, Emergency Medical Service, and Wildland Firefighting operations. There are no proposals or programs involving the use of chain saws or other mechanized tools (other than Search and Rescue, EMS or Wildland Firefighting operations) in wilderness in Death Valley National Park.

Alternative 2 would result in an additive, adverse, negligible change to these past, present, and future effects on wilderness and backcountry aesthetics, but would counteract adverse impacts by reducing exotic vegetation, which degrades the character of wilderness.

Conclusion: Activities associated with Alternative 2 would have a direct, adverse, local, short-term, negligible impact to the Park's wilderness and backcountry aesthetics. Long-term impacts would be direct, beneficial, local, and moderate.

Impairment of Park Resources and Values: Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

## 4.6 Other Factors Considered

### 4.6.1 Cost Effectiveness, Practicality, and Sustainability

Realistically, it is unlikely that the Park will ever be able to obtain enough funding to completely eliminate all exotic plant species in such a large area, regardless of what methods are used. Therefore, the most cost effective proposal will be the one that controls the greatest numbers of exotic plants at the lowest cost, over the ten year lifespan of the EPMP.

In the context of this project, sustainability refers to the long-term ability to achieve project objectives, with an emphasis on the prevention of re-invasion of exotic plants after the initial removal. This prevention of re-invasion by exotic plants can be achieved by regularly visiting and treating all the different work sites.

#### Alternative 1

This alternative is less cost-effective and sustainable than Alternative 2. First, the absence of an annual plan results in less efficient work, because target treatment areas are not determined in advance. In addition, the treatment of fewer individuals and smaller populations results in rapid regrowth or spread of these plants. Consequently, a larger number of sites must be visited more frequently, reducing the cost-effectiveness of the alternative. Because many sites cannot be visited or treated, it is unlikely that this alternative will provide for long-term, successful control of exotic vegetation.

#### Alternative 2

This alternative is more cost-effective and sustainable than Alternative 1. First, annual planning allows for more efficient work, because target treatment areas are determined in advance. This provides more opportunities to work with volunteers and labor groups, to seek funding sources, and to perform surveys and treatments in conjunction with other work duties. In addition, the treatment of more individuals and larger populations results in less regrowth or spread of these plants. Consequently, sites can be visited less frequently, increasing the cost-effectiveness of the alternative.

## 4.7 Issues Dismissed from Consideration

### 4.7.1 Socioeconomic

None of the alternatives within this project would favor one social, economic, or cultural group more than any other alternative.

### 4.7.2 Environmental Justice

None of these proposals would produce any significant amount of pollutants. As a result of this project, no social, economic or cultural group would be exposed to increased levels of environmental contamination.

### 4.7.3 Public Health and Safety

This is addressed under Potable Water Collection sections, and under Safety precautions, in Appendix F.

### 4.7.4 Floodplains

This project does not call for any construction in floodplains

### 4.7.5 Geography and Topography

This project does not call for any blasting or earth-moving activities, would not impact geologic processes, and would cause no alteration of topography.

### 4.7.6 Prime and Unique Farmlands

This project would not impact any farmlands.

### 4.7.7 Information Technology and Management

Many of the things that make this project sustainable do not require NEPA analysis, including database management, use of Geographic Information Systems (GIS), and other methods of accurate record keeping and planning. However, it is worth noting that the National Park has made great strides in this area, and now has a database with associated GIS files that has proven extremely useful in planning out day to day, month to month, or even year to year exotic plant control activities. Most of the information presented in the appendices is summarized from the database.

### 4.7.8 Funding

The National Park Service encourages project managers to document NEPA clearance before requesting funding. This is not strongly enforced, in part because most funding is requested at least three years in advance, and changes during that time can cause previously existing NEPA documentation to become outdated. For the purposes of this project, it is sufficient to state that until proper NEPA documentation is approved, the scope of work described in Alternative 1 'No Action' will not be exceeded, regardless of what funding may be available.

## 4.8 Summary

This section summarizes the overall impacts of each alternative, major findings, cumulative impacts, and impairment. Potential impacts of Alternative 1 and Alternative 2 are summarized in Table 1.

Table 1: A comparison of potential impacts for Alternatives 1 and 2, in the short- and long-term. Differences between Alternatives are shown in bold.

	Alternative 1 Short-term	Alternative 1 Long-term	Alternative 2 Short-term	Alternative 2 Long-term
Air Quality and Visibility	Direct Adverse Local Negligible	Same	Direct Adverse Local Negligible	Same
Soundscape	Direct Adverse Local Minor	None	Direct Adverse Local Minor	None
Soil	Direct Adverse Site-specific Minor	Direct Adverse Site-specific Minor	Direct Adverse Site-specific Minor	Direct Adverse Site-specific Minor
Water Quality and Potable Water Collection Systems	Direct Adverse Local <b>Negligible</b>	Indirect <b>Adverse</b> Local Minor	Direct Adverse Local <b>Minor</b>	Indirect <b>Beneficial</b> Local Minor
Vegetation	Direct Adverse *Beneficial to TES Site-specific Negligible	Direct Beneficial Local <b>Minor</b>	Direct Adverse *Beneficial to TES Site-specific Negligible	Direct Beneficial Local <b>Major</b>
Birds	Direct Adverse Site-specific Negligible	Indirect Beneficial <b>Local</b> <b>Negligible</b>	Direct Adverse Site-specific Negligible	Indirect Beneficial <b>Regional</b> <b>Minor</b>
Mammals	Direct Adverse Site-specific Minor	Indirect Beneficial Local <b>Negligible</b>	Direct Adverse Site-specific Minor	Indirect Beneficial Local <b>Minor</b>
Reptiles and Amphibians, General	Direct Adverse Local Negligible	Direct and Indirect Beneficial Local <b>Negligible</b>	Direct Adverse Local Negligible	Direct and Indirect Beneficial Local <b>Minor</b>
Fish	Direct Adverse Site-specific Negligible	Indirect Beneficial Site-specific <b>Negligible</b>	Direct Adverse Site-specific Negligible	Indirect Beneficial Site-specific <b>Minor</b>
Invertebrates	Direct Adverse Site-specific Negligible	Indirect Beneficial Local <b>Negligible</b>	Direct Adverse Site-specific Negligible	Indirect Beneficial Local <b>Minor</b>
Historic and Pre-historic resources	Direct Adverse Site-specific	Direct <b>Adverse</b> Site-specific	Direct Adverse Site-specific	Direct <b>Beneficial</b> Site-specific

	Minor	<b>Minor</b>	Negligible	<b>Negligible</b>
Cultural Landscapes	Direct <b>Beneficial</b> Site-specific Negligible	<b>Indirect</b> <b>Adverse</b> Site-specific Moderate	Direct <b>Adverse</b> Site-specific Negligible	<b>Direct and indirect</b> <b>Beneficial</b> Site-specific Moderate
Wilderness and Aesthetic Qualities	Direct Adverse Local Negligible	Direct Beneficial Local <b>Minor</b>	Direct Adverse Local Negligible	Direct Beneficial Local <b>Moderate</b>

## **Major findings:**

### **Short-term impacts:**

Alternatives 1 and 2 are very similar in regard to short-term impacts. Both alternatives have some degree of adverse impacts to nearly all resources considered, as a result of trampling that occurs while accessing sites.

One difference between alternatives is in the impact to water quality, including potable water collection sites. Under Alternative 1, exotic vegetation would not be controlled near potable water collection sites. This may lead to water contamination, through the build-up of detritus, and by creating habitat for wildlife. Under Alternative 2, exotic vegetation would be treated mechanically in most potable water collection areas. Whereas large palms can be pulled down without extensive damage to soils, salt cedars have extensive root systems that would necessitate digging with heavy equipment. While these methods would have adverse, short-term impacts to water quality, the long-term impact would be beneficial.

Another difference between alternatives is in the type of impact to cultural landscapes. The small amount of tree and shrub trimming proposed under Alternative 1 would have an immediate beneficial impact to the landscapes. Alternative 2, which proposes larger scale changes to trees and shrubs, with the purpose of long-term maintenance, would have an immediate, adverse impact to the landscapes.

### **Long-term impacts:**

Alternatives 1 and 2 differ strongly in regard to long-term impacts. Soils are the only resource which would be adversely impacted by both alternatives in the long-term.

Both alternatives would have long-term benefits to a variety of resources. However, the beneficial impacts would generally be stronger under Alternative 2 (i.e. minor instead of negligible, or moderate instead of minor), because more individuals and larger populations of exotic plants would be treated. Alternative 2 also allows for annual planning, which would result in more efficient and less costly treatments, and better prevention measures. Consequently, native plant populations would recover, and provide important habitat and food for other organisms. For example, birds, mammals, reptiles, amphibians, and fish would benefit more from Alternative 2 than Alternative 1. Native plants themselves would undergo a major benefit as the result of exotic vegetation control proposed under Alternative 2. Wilderness and backcountry qualities would also be more strongly enhanced under this alternative, as a result of preservation of native ecosystems in the Park.

Finally, whereas the long-term impacts to cultural landscapes under Alternative 1 would be adverse, impacts under Alternative 2 would be beneficial. Neglect of cultural landscapes will result in eventual death of cultural plants, which have a limited life-span. Under Alternative 1, overgrown plants may also damage cultural features and create fire hazards. Alternative 2 would allow for long-term maintenance of cultural landscapes that may include both native and non-native plant species. Alternative 2 proposes active management of cultural landscapes with the purpose of protection and preservation of these resources.

### **Cumulative Impacts:**

It was determined that both alternatives would generally cause negligible changes to impacts caused by other past, present, and future actions. One exception was the Cumulative Impact to vegetation, for which past, present, and future actions have an adverse, minor to moderate impact. Both alternatives would counteract these adverse impacts, but Alternative 2 would have a stronger beneficial effect, and could change overall Cumulative Impacts to vegetation to beneficial, and moderate to major.

This improvement in the condition of vegetation would also counteract adverse effects to birds, reptiles and amphibians, fish, and invertebrates. Because Alternative 2 proposes to control more individuals and larger populations of exotic vegetation, these counteractive, beneficial effects may change overall adverse impacts to these resources to neutral, or beneficial, or at least reduce the cumulative adverse impacts.

Finally, both alternatives would reverse some of the cumulative adverse impacts to cultural landscapes, by reducing damage to historic structures that exotic vegetation can cause. However, only Alternative 2 would actively manage and maintain cultural landscapes, resulting in a change in the overall Cumulative Impact to this resource from adverse to beneficial.

**Impairment:**

Implementation of either alternative would not constitute or cause impairment. Death Valley National Park is mandated by the NPS Organic Act and the Desert Protection Act to preserve natural and cultural resources. This project is necessary to fulfill that mandate, and does not exceed it in any way.

It is possible that the ineffectiveness of either alternative could allow exotic plant populations in the Park to spread faster than they can be contained. There is a slight, unquantifiable risk that this could eventually result in irreversible harm (including possible, eventual extinction) to the unique biological resources.

However, because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the Park's establishing legislation, (2) key to the natural or cultural integrity of the Park or to opportunities for the enjoyment of the Park, or (3) identified as a goal in the Park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of Park resources and values.

## 5.0 Consultation and Coordination

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### 5.1 Summary of Public Involvement

On **DATE**, a press release announced the initiation of a plan to control exotic plants at Death Valley National Park, and was sent to **X** individuals and organizations. Interested parties were encouraged to submit comments on this project via mail, email, fax, or attendance at a public meeting. Additional opportunities for comment were afforded to the general public, agencies, and organizations during the public review period in **DATE**, and via the PEPC (post the link here and on the frontispiece).

#### To be completed:

This draft EPMP/EA was sent to **X** individuals, including members of the public and tribal, organizational, or agency representatives who provided comments, or specifically asked to receive a copy of the EPMP/EA. The release of the public review document was announced widely through Death Valley National Park press release procedures. The document underwent a 30-day public review period and all substantive comments will be addressed.

### 5.2 Contact and Consultation with Other Agencies

The following organizations and local, state, and federal agencies were consulted during the preparation of this document (**Coming**).

#### 5.2.1 Tribal Consultation

The Exotic Plant Management Plan and Environmental Assessment will be submitted to the Timbisha Shoshone Tribe for review and comment during the public review period.

#### 5.2.2 Forest Service and Bureau of Land Management

The public scoping letter of **X** was sent to the Inyo National Forest and Humboldt Toiyabe National Forest. The letter was also sent to the Bishop and Ridgecrest Field Offices of the Bureau of Land Management. **Responses were received from X.** Additional opportunities for comment will be afforded to the National Forest Service and Bureau of Land Management during the public review period.

#### 5.2.3 U.S. Fish and Wildlife Service

Before any proposed federal action that may affect a federally listed Threatened or Endangered (T&E) species can be implemented, the agency that wishes to implement the action must first enter into 'Section 7' consultation with the U.S. Fish and Wildlife Service. Section 7 consultation is only required when the proposed action may affect listed species.

If the agency believes the action will not affect listed species, then the agency is not required to initiate consultation. If outside groups or individuals believe the proposed action may affect listed species, they may request US FWS to initiate consultation, or US FWS may initiate consultation on its own, even if the agency promoting the action believes that the action will not affect listed species.

This refers to 'Section 7' of the Endangered Species Act. Consultation includes multiple steps:

- The proposed action is described.
- Listed species that may be present in the project area are identified.
- The agency identifies protective measures incorporated into the plan that will prevent harm to listed species.
- Current status of the listed species is described for the species entire range and population.
- Current status and habitat condition of the listed species within the project area are described.
- Potential effects of the proposed action on the listed species are described.
- Cumulative effects within the project area are described, including any future proposed projects that may affect the species.
- Conclusion regarding likeliness of the actions to jeopardize the continued existence of the species.
- Incidental take statement, listing special exemptions for the 'take' (harassment, injury or mortality; significant habitat alteration or degradation; modification of behavior) of listed species.
- Reasonable and prudent measures the Agency must take to minimize take of listed species.
- Terms and conditions the agency must follow to be exempt from prohibitions listed in 'Section 9' of the ESA.
- Reporting requirements regarding any dead or injured individuals of listed species that may be found.
- Disposition of dead or injured animals.
- Conservation recommendations.
- Re-initiation notice – criteria for which Section 7 consultation would need to be reinitiated.

The documentation of Section 7 consultation is a 'Biological Opinion' including the above-mentioned sections. This document is issued by the US FWS.

Death Valley National Park and the US FWS did Section 7 consultation for the General Management Plan and associated EIS. The Biological Opinion for the GMP was issued by the Ventura, California office of the US FWS on July 24, 2001.

Exotic Plant removal was described in the GMP and analyzed both in the EIS for the GMP and in the Biological Opinion. The Biological Opinion included specific parameters that the exotic

vegetation management program will follow. These parameters will ensure that no harm comes to any listed species:

- Control of salt cedar and other woody species will only occur between September 15 and March 15, to avoid the nesting season.
- During exotic plant control activities, native vegetation will not be removed.
- Trees (of any species) containing nests of southwestern willow flycatcher or least Bell's vireo will not be cut down at all – regardless of what time of year, or for what reason.
- Vegetation within 50 yards of any tree containing nests of southwestern willow flycatcher or least Bell's vireo will not be cut down at all – regardless of what time of year, or for what reason.

The Biological Opinion includes parameters to which all Park operations must conform to ensure that no harm comes to any listed species. Of those parameters, many do not apply to exotic plant removal, but the following do:

- Threatened and Endangered species in general and desert tortoise specifically, will not be handled by anyone except qualified individuals, and only when needed to remove the individuals from harms way.
- Hiking through desert tortoise habitat in order to carry out normal Park operations is acceptable.
- Any injury, mortality, or loss of habitat of any T&E species will be reported to US FWS immediately.
- Any actions that cause injury, mortality, or loss of habitat of any T&E species will be reported to US FWS immediately, the action will stop immediately, and consultation will be reinitiated.
- Any proposed actions that may affect T&E species require a re-initiation of consultation.

The driving force behind development of this document (Environmental Analysis and Management Plan for Exotic Plant Control) was the use of chain saws in wilderness, and the use of herbicides in potable water collection areas – not the presence of T&E species.

Threatened and Endangered species related issues are examined in the EA, but the presence of T&E species alone would not require an EA to be developed, because all reasonable alternatives described in the EA conform to the parameters described and approved in the Biological Opinion for the General Management Plan.

#### No Impact

Death Valley National Park believes that the Section 7 consultation that was done for the EIS/GMP is sufficient. The Biological Opinion is still current; it was detailed and specific. The Park will conform to the parameters described in the Biological Opinion for the EIS/GMP, and there will be no impact to any Threatened or Endangered Species. At any time, if the NPS, or

others believe that actions proposed during the annual planning process may affect listed species, they may request US FWS to initiate consultation.

#### 5.2.4 State Historic Preservation Offices

The actions described in this document are also subject to Section 106 of the NHPA, under the terms of the 1995 Servicewide Programmatic Agreement among the NPS, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. The Park will complete all consultations required under Section 106 of the NHPA.

The completed Exotic Plant Management Plan will be submitted to the State Historic Preservation Officers in California and Nevada for review and comment during the public review period.

#### 5.2.6 County Agencies

The following county agencies in California and Nevada received the public scoping letter sent on **DATE**: Inyo (CA), Nye (NV), and San Bernardino (NV). Additional opportunities for comment will be afforded to county agencies during public review.

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## Appendix A. 2004 DVNP Exotic Plant Policy

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This policy is approved by the Park superintendent and is intended to establish general guidance for the eradication and prevention of exotic plants. This policy will be revised as needed to reflect changes in law, regulations, or policies.

It is Park policy to reduce or eliminate exotic pest (e.g., invasive, high-water consuming or physically destructive) plants throughout the Park, including those found in developed (e.g., Cow Creek employee housing area) and cultural resource areas (e.g., Hungry Bills Ranch), unless there is documentation that individual plant specimens have cultural resource significance, and the plants were part of the original intent and fabric of the site. Management of exotic plants will be undertaken whenever they threaten Park resources or public health, and wherever control is prudent and feasible.

### Eradication (Parkwide)

The Park is currently targeting several exotic plants for eradication throughout the entire Park. The following species cannot be part of any cultural landscape, even if their presence predates the implementation of this policy (no “grandfather clause”). Where they already exist, they will be removed or treated. These species spread quickly, and cause ecological damage. Experience has shown that it is not practical to maintain them in cultural settings because of the potential likelihood of escaping into adjacent natural habitats.

<i>Alianthus altissima</i>	tree of heaven
<i>Apium graveolens</i>	celery
<i>Arundo donax</i>	giant reedgrass
<i>Asparagus officinalis</i> ssp. <i>officinalis</i>	asparagus
<i>Bassia hyssopifolia</i>	hyssopleaf bassia
<i>Centaurea melitensis</i>	toçalote
<i>Centaurea solstitialis</i>	yellow star-thistle
<i>Chenopodium botrys</i>	Jerusalem oak
<i>Chorispóra tenella</i>	chorispóra
<i>Conyza canadensis</i>	horseweed
<i>Cortaderia jubata</i>	jubata grass, Andean pampas grass
<i>Cortaderia selloana</i>	pampas grass
<i>Grindelia squarrosa</i>	curly cup gumweed
<i>Halogeton glomeratus</i>	halogeton
<i>Hedera helix</i>	English ivy
<i>Hirschfeldia incana</i>	mustard
<i>Kochia scoparia</i>	summer cypress
<i>Lactuca serriola</i>	prickly lettuce
<i>Lepidium perfoliatum</i>	shield cress
<i>Malva parviflora</i>	cheeseweed
<i>Marrubium vulgare</i>	horehound
<i>Mentha spicata</i> var. <i>spicata</i>	spearmint
<i>Nicotiana glauca</i>	tree tobacco

<i>Parthenocissus vitacea</i>	woodbine, Virginia creeper
<i>Pennisetum setaceum</i>	fountain grass
<i>Phalaris canariensis</i>	canary grass
<i>Plantago major</i>	common plantain
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rumex crispus</i>	curly dock
<i>Sisymbrium altissimum</i>	tumble mustard
<i>Sisymbrium irio</i>	London rocket
<i>Sisymbrium orientale</i>	Oriental mustard
<i>Sonchus asper</i> ssp. <i>asper</i>	prickly sow thistle
<i>Sonchus oleraceus</i>	common sow thistle
<i>Sorghum halepense</i>	Johnsongrass
<i>Tamarix ramosissima</i>	saltcedar
<i>Tamarix chinensis</i>	deciduous tamarisk
<i>Tribulus terrestris</i>	puncture vine
<i>Xanthium strumarium</i>	cocklebur

#### Eradication (non-cultural sites)

The Park is currently targeting the following exotic plants for eradication or control except at locations where the Superintendent approves the retention of these plants as components of a documented significant cultural site:

<i>Cercidium floridum</i>	blue palo verde
<i>Chilopsis linearis</i> ssp. <i>arcuata</i>	desert willow
<i>Cynodon dactylon</i>	Bermuda grass
<i>Ficus carica</i>	edible fig
<i>Melilotus</i> sp.	sweet clover
<i>Nerium</i> sp.	oleander
<i>Parkinsonia auceleata</i>	Mexican palo verde
<i>Phoenix dactylifera</i>	date palm
<i>Robinia pseudoacacia</i>	black locust
<i>Sonchus asper</i>	prickly sow thistle
<i>Tamarix aphylla</i>	athel, evergreen tamarisk
<i>Vinca major</i>	periwinkle
<i>Washingtonia filifera</i>	California fan palm
<i>Washingtonia mexicana</i>	Mexican fan palm

These species lists will be expanded as necessary. High priority will be given to the management of exotic species that have a substantial impact on Park resources and/or public health and that can reasonably be expected to be successfully controlled.

#### Guidelines

The following guidelines were developed to prevent further exotic plant invasions, and to protect the Park's native vegetation, natural habitats, and significant cultural sites:

- Consistent with National Park Service (NPS) Policy, the Park will use native plants from genetically and ecologically related Park populations for restoration and landscaping.

Exceptions to this policy include the use of sterile exotic plants for temporary erosion control or when there are no other choices and there is a benefit to providing a vegetated cover in a developed area. Developed areas, as used here, include previously or currently human-disturbed areas associated with roads, trails, dwellings, etc.

- Ecological restoration projects, and the plant material used, will be recommended by a Division Chief, reviewed by the Park Management Team, the Environmental Review Committee, and approved by the Superintendent. Only native plant species, as defined in the above guideline, will be used in restoration projects.
- Any use of exotic plants must be approved by the Superintendent. Plant species must not be listed as noxious weeds by the U.S. Dept. of Agriculture (USDA), NPS, California Invasive Plant Council (CAL-IPC), California Department of Food and Agriculture, or be considered locally invasive by the Park Botanist.
- Plant material used for landscaping in NPS administered developed areas will be approved prior to use by the chiefs of Maintenance and Resources. Superintendent approval is required for landscape changes that would increase water usage and/or the use of exotic plants.
- Landscaping with plants purchased from a commercial nursery is discouraged because of the high probability of introducing pests (e.g., red imported fire ant) and/or pathogens into the Park. Using NPS operated nurseries to grow project-specific native plants, such as those operated by Joshua Tree and Grand Canyon, is encouraged.
- Proposals to alter or eradicate biotic (exotic or native plants) cultural resources associated with significant cultural sites will be recommended by a Division Chief, reviewed by the Park Management Team and the Environmental Review Committee, and approved by the Chief of Resources and the Superintendent. All treatments to cultural landscapes will preserve significant physical attributes, biotic systems, and uses contributing to the historical significance.
- The Park only allows the following animals to carry supplies and/or people: horses, mules, burros, oxen, llamas, and camels. In accordance with California Food and Agriculture Code Section 5101 & 5205 for the Certification of Weed Free Forage, Hay, Straw and Mulch, the Park requires that any hay or straw brought into the Park be certified weed free. This rule also applies to non-stock uses of straw. This program is locally administered by the County Agricultural Commissioners.

Approved:       /s/ James T. Reynolds (original on file)  
                  James T. Reynolds, Superintendent

Effective Date: 03/01/2004

## Appendix B. Invasive, Exotic Plants in DVNP

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Exotic plants that are targeted for treatment under this EPMP are listed in the table below. There are other non-native species in the Park, including some ornamentals and historically cultivated crops. The EPMP outlines specific measures to reduce or control the latter plants in cultural areas, as described above. Otherwise, these and other species are not targeted for treatment under the EPMP, but may be added through the annual planning process, if the plants demonstrate invasion potential.

### **California Invasive Plant Council (Cal -IPC) Categories for the list of Exotic Pest Plants of Greatest Concern in California (Cal-IPC, 2006):**

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

### **State of California Department of Food and Agriculture Division of Plant Health and Pest Prevention Services (CA Dept. Food and Agriculture, 2008):**

- **"A"** – Eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.
- **"B"** – Eradication, containment, control or other holding action at the discretion of the commissioner.
- **"C"** – State endorsed holding action and eradication only when found in a nursery; action to retard spread outside of nurseries at the discretion of the commissioner; reject only when found in a crop seed for planting or at the discretion of the commissioner.

- "Q" – Temporary "A" action outside of nurseries at the state-county level pending determination of a permanent rating. Species on List 2, "Federal Noxious Weed Regulation" are given an automatic "Q" rating when evaluated in California

### Nevada Department of Agriculture

- Category "A" – Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations.
- Category "B" – Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.
- Category "C" – Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer

### Federal Noxious Weed List (USDA, 2006)

The Federal Noxious Weed list is defined by the Federal Noxious Weed Act of 1974, and by later congressionally approved amendments to the list. This list is divided into Aquatic, Parasitic, or Terrestrial Weeds, but has no other classification scheme – plants are either on the list, or they are not. No federally listed noxious weeds are currently known in the Park.

Scientific Name	Common Name	Growth Form	Pest Rating <sup>1</sup>	Proposed primary treatment method <sup>2</sup>
<i>Ailanthus altissima</i>	tree of heaven	tree		herbicide
<i>Bromus</i> sp.	red brome;	annual grass	CalIPC- High	mechanical
<i>Bassia hyssopifolia</i>	cheatgrass	annual forb	CalIPC-Limited	mechanical
<i>Brassica tournefortii</i>	hyssopleaf bassia	annual forb	NV-B; CalIPC- High	mechanical or chemical
<i>Centaurea solstitialis</i>	Sahara mustard	annual forb	CA-C	mechanical or chemical
<i>Cynodon</i> sp.	yellow star-thistle	annual forb	CA-C; Cal-IPC- Moderate	mechanical or chemical
<i>Descurainia</i> sp.	bermudagrass	perennial grass	CalIPC-Limited	mechanical
<i>Erodium cicutarium</i>	tansy mustard	annual forb	CalIPC-Limited	mechanical
<i>Halogeton glomeratus</i>	filaree	annual forb	Cal-IPC- Moderate	mechanical or chemical
<i>Hordeum</i> sp.	halogeton	annual forb	Cal-IPC- Moderate	mechanical
<i>Malcomia africana</i>	barley	annual grass	Cal-IPC- Moderate	mechanical
<i>Marrubium vulgare</i>	African mustard	annual forb		mechanical or
	horehound	perennial forb		mechanical or

				chemical
<i>Melilotus</i> sp.	sweet clover	biennial or perennial forb		chemical
<i>Nerium oleander</i>	oleander	shrub		chemical
<i>Pennisetum setaceum</i>	purple fountain grass	perennial grass	NV-A; Cal-IPC-Moderate	mechanical or chemical
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	annual grass	CalIPC-Limited	mechanical
<i>Phoenix dactylifera</i>	date palm	palm		chemical mechanical or chemical
<i>Saccharum ravennae</i>	ravenna grass	perennial grass		chemical
<i>Salsola</i> sp.	Russian thistle	annual forb	CA-C	mechanical
<i>Schismus arabicus</i>	Arabian schismus	annual grass	CalIPC-Limited Cal-IPC-Moderate	mechanical
<i>Sisymbrium</i> sp.	tansy mustard	annual forb		mechanical mechanical or chemical
<i>Sonchus</i> sp.	sow thistle	annual forb		chemical
<i>Tamarix aphylla</i>	athel	tree	NV-C; CalIPC-Limited NV-C; Cal-IPC-High	chemical
<i>Tamarix ramosissima</i>	salt cedar	tree or shrub		chemical
<i>Taraxacum officinale</i>	dandelion	perennial forb		mechanical
<i>Tribulus terrestris</i>	puncture vine	annual forb	NV-C	mechanical
<i>Washingtonia filifera</i>	California fan palm	palm		chemical

<sup>1</sup>See descriptions above.

<sup>2</sup>The EPMP proposes at least some hand-pulling of all species, when plants are young enough, and in small populations.

Many ornamental species are also known in the Park, but most are in cultural landscapes, have not spread beyond plantings, and do not require control measures. However, these plants are included in the Park exotic vegetation database, and treatment may be warranted if plants invade new habitats or spread within cultural landscapes.

Scientific Name	Common Name
<i>Acacia greggii</i>	catclaw acacia
<i>Cercidium floridum</i>	blue palo verde
<i>Chilopsis linearis ssp. arcuata</i>	desert willow
<i>Cortaderia selloana</i>	pampas grass
<i>Cotoneaster</i> sp.	cotoeaster
<i>Ficus carica</i>	edible fig
<i>Parkinsonia aculeata</i>	Mexican palo verde
<i>Ricinus communis</i>	castorbean
<i>Robinia pseudoacacia</i>	black locust
<i>Schinus terebinthifolius</i>	Brazilian peppertree

# Appendix C. Environmental Screening Form

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USDI, National Park Service  
 Death Valley National Park

## A. PROJECT INFORMATION

Project name: Exotic Plant Control Program

Tracking number: DEVA-NEPA-02-006

Funding source/ fiscal year funded/ PMIS number: OPM Base, Special Projects

Location: Park Wide

DEVA project leader: Tim Croissant

Date ESF initiated: 4-18-02

Desired project start date: ASAP

Administrative record location: NEPA project case files, Environmental Specialist's office, Resource Management Building (adobe), Cow Creek, Death Valley National Park.

## B. PROJECT DESCRIPTION

*(Attach a Project Proposal Form, maps, photos, site visit notes, agency consultation, data, reports, or other relevant materials.)*

Is a Project Proposal Form attached?  Yes  No

Are preliminary drawings attached?  Yes  No

Is background information attached?  Yes  No

## C. DEVA RESOURCE EFFECTS TO CONSIDER

Are measurable impacts possible in the following categories?	Yes	No	Data needed to determine	Notes
1. Geological resources – soils, bedrock, streambeds, etc.		x		
2. From geohazards, earthquake hazard		x		
3. Air quality, smoke, dust		x		
4. Night sky visibility, night lighting		x		

Are measurable impacts possible in the following categories?	Yes	No	Data needed to determine	Notes
5. Soundscapes, noise, natural quiet	x			Loud noises produced by chain saws – is located areas with low visitation
6. Water quality		x		Use only Rodeo herbicide in or near water.
7. Water quantity		x		
8. Groundwater, aquifer,		x		
9. Surface water, springs, seeps		x		
10. Instream flow, drainage patterns		x		
11. Wetlands		x		Long term positive impact
12. Floodplains, 100/500 year, including alluvial fans and debris flows		x		
13. Land use, land status, including changes in occupancy, value, ownership, type of use, private rights, etc.		x		
14. Inholding of a non-NPS interest in land		x		
15. Access to a non-NPS interest		x		
16. Right-of-way, easement, Special Use Permit, etc.		x		
17. Mineral materials extraction, mine operations, reclamation, patented, unpatented, or abandoned mine claims		x		
18. Grazing allotment, operations		x		
19. Rare or unusual vegetation or habitat -- riparian, endemic, range limit, unique, important, etc., including non-vascular		x		Long term habitat improvement for all native species
20. Species of special concern (plant or animal) or their habitat		x		Long term habitat improvement for all native species
21. Unique or important plant or animal population, community, landscape, or ecosystem		x		Long term habitat improvement for all native species
22. Rare or unusual animals or habitat -- endemic, range limit, unique, important, migration, etc., including invertebrates		x		Long term habitat improvement for all native species
23. Animal health, welfare, disease, reproduction, overabundance, etc.		x		
24. Animal hazard to people or human interests, e.g., agriculture, disease		x		
25. Introduce or promote non-native species (plant or animal), including from imported construction fill material		x		Project will remove exotics that have been inadvertently introduced by other

Are measurable impacts possible in the following categories?	Yes	No	Data needed to determine	Notes
				projects
26. Biosphere Reserve, National Natural Landmark, Research Natural Area, or other special land use designation		x		
27. Wilderness resources or values, including opportunity for solitude, unconfined recreation, etc.	x			Use of chainsaws in wilderness, work crews in wilderness
28. Wilderness use prohibitions, including motorized access/equipment, structures	x			Use of mechanized equipment in wilderness; no use of motorized vehicles in wilderness
29. Recreation resources, including supply, demand, visitation, activities, etc.		x		
30. Visitor enjoyment or experience	x	x		This project will meet with mixed visitor response.
31. Aesthetic resources, visual intrusion, viewshed	x	x		This project will meet with mixed visitor response. Cut stumps and slash piles will be visible
32. Natural landscape		x		
33. Increase the footprint of development		x		
34. Traffic congestion or circulation		x		
35. Handicapped accessibility		x		
36. Cultural resources, including historic, pre-historic, and ethnographic		x		No work will be done in any historic district without clearance from RM Division Chief. No ground disturbance without clearance from RM Division Chief, or Park Archeologist
37. Historic structure, building, site, scene, district, or landscape		x		See #36
38. Native American interest, sacred site, co-management area, etc.		x		May work with Timbisha Shoshone for removal of exotics on tribal land and in cooperatively managed areas
39. Archeological resources, including any surface disturbance ( <i>driving over bare ground or off-road</i> ) or excavation ( <i>shovel, post hole, etc.</i> )		x		See #36
40. Fossil resources		x		
41. Collections management		x		

Are measurable impacts possible in the following categories?	Yes	No	Data needed to determine	Notes
42. Socioeconomics, including changes in employment, occupation, income, tax base, infrastructure, gateway communities, etc.		x		
43. Energy resources, conservation, energy sustainability, alternative energy sources		x		
44. Sustainability, including use of recycled materials, building deconstruction, and long-term changes in water use, garbage, sewer, or hazardous materials		x		Woody debris will be chipped up and used for dust control
45. Hazardous materials use, exposure or storage, including fuels, pesticides, asbestos, explosives, etc.	x			Use of pesticides, following all California and NPS IPM use, handling, storage, safety, and training requirement
46. Non-NPS agency or tribal land use plans or policies.		x		Some cooperative projects with Timbisha
47. Code of Federal Regulations, 36 CFR		x		
48. NPS Management Policies		x		
49. Director's Orders and Reference Manuals		x		
50. Conformance with existing MOU, MOA, permit, etc.		x		
51. Other important resources,		x		

D. MANDATORY CRITERIA

Mandatory Criteria: If implemented, would the proposal:	Yes	No	Data needed to determine	Notes
A. Have material adverse effects on public health or safety?		x		
B. Have adverse effects on such unique characteristics as historic or cultural resources; Park, recreation, or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands; floodplains; or ecologically significant or critical areas, including those listed on the National Register of Natural Landmarks?		x		
C. Have highly controversial environmental effects?	x	x	Public scoping and comment period needed to determine public	

Mandatory Criteria: If implemented, would the proposal:	Yes	No	Data needed to determine	Notes
			feelings about pesticide use near potable water sources	
D. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?		X		
E. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?		X		
F. Be directly related to other actions with individually insignificant, but cumulatively significant environmental effects?		X		
G. Have adverse effects on properties listed or eligible for listing on the National Register of Historic Places?		X		
H. Have adverse effects on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species?		X		
I. Require compliance with Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands) or the Fish and Wildlife Coordination Act?		X		
J. Threaten to violate a federal, state, local or tribal law or requirement imposed for the protection of the environment?		X		
K. Involve unresolved conflicts concerning alternative uses of available resources (NEPA sec. 102 (2) (E)).		X		
L. Have a disproportionate, significant adverse effect on low income or minority populations (EO 12898).		X		
M. Restrict access to and ceremonial use of Indian sacred sites by Indian religious practitioners or adversely affect the physical integrity of such sacred sites (EO 130007)		X		
N. Contribute to the introduction, continued existence, or spread of federally listed noxious weeds (Federal Noxious Weed Control Act).		X		This project will remove exotic plants inadvertently introduced by other NPS projects
O. Contribute to the introduction, continued		X		This project will remove

Mandatory Criteria: If implemented, would the proposal:	Yes	No	Data needed to determine	Notes
existence, or spread of non-native invasive species or actions that may promote the introduction, growth or expansion of the range of non-native invasive species (EO 13112).				exotic plants inadvertently introduced by other NPS projects
P. Require a permit from a federal, state, or local agency to proceed, unless the agency from which the permit is required agrees that a CE is appropriate?	x			Permits are current, and are renewed yearly – Inyo County Pesticide Applicators Permit. Also NPS Integrated Pest Management Program
Q. Have the potential for significant impact as indicated by a federal, state or local agency or Indian Tribe?		x		
R. Have the potential to be controversial because of disagreement over possible environmental effects?	x			There has been internal disagreement between Resource Management Division and Maintenance Division concerning effects of herbicide use near potable water sources.
S. Have the potential to violate the NPS Organic Act by impairing Park resources or values?		x		

E. OTHER INFORMATION

Are personnel preparing this form familiar with the site?  Yes  No  
*(If no, conduct a site visit)*

Did personnel conduct a site visit?  Yes  No  Pending  
*(If yes, note the dates, who attended, etc.) Many site visits over three year period*

Is the project consistent with the NPS Management Policies?  Yes  No  
*(If yes, list the relevant section numbers)*

Is the project consistent with the approved General Management Plan?  
 Yes  No Natural Resources, Biological Environment, Introduced Species  
*(If yes, list the relevant GMP section)*

Are there any interested or affected agencies or parties?  Yes  No  
*(If yes, make a diligent effort to contact them.)*

If yes, have they been contacted?  Yes  Pending

Frequent, informal contact with Timbisha Shoshone, Sierra Club, and many other supportive groups. None of them expressed any reservations about this plan.

(If yes, give details of the contacts, including names, dates, and summary of comments from the interested public.)

*Public scoping and Comment period will address this issue further*

Has consultation with all affected agencies or tribes been completed?

Yes  No (*not needed*)  Pending

(If yes, give details of the consultation, including the names, dates, and summary of comments from other agency or tribal contacts.)

If *pending*, what consultation, approval or permitting is needed?

Timbisha Shoshone Tribal consultation:

Archeological Clearance:

WACC:

SHPO:

ESA Section 7, FWS:

n/a 404 Permit, Corps of Engineers:

n/a Air Pollution Control District:

n/a Lahontan Regional Water Quality Control Board:

Other:

Are there possible impacts on wilderness resources or character (*e.g., motorized equipment, vehicular access, aerial delivery, structure, or installation in wilderness*)?  Yes  No

(Not in this proposal)

Use of chain saws in wilderness

If yes, has a Minimum Requirements Analysis been completed?

Yes  No  Not needed

(If yes, attach the *Minimum Requirements Analysis*)

Are there any connected, cumulative, or similar actions as part of the proposed action?

Yes  No

(If yes, consideration has been given to doing an EA or EIS. Attach additional information detailing the other actions.)

Were alternatives, including “no action,” considered?  Yes  No

(If yes, list the alternatives that were considered.)

See attached proposal

Were possible mitigation measures identified that would reduce or eliminate impacts?

Yes  No

(If yes, list details of the mitigation measures)

Use of herbicides appropriate to situation, minimal ground disturbance. Others listed in proposal

## F. INSTRUCTIONS FOR DETERMINING APPROPRIATE NEPA PATHWAY

Complete site visit or ensure that staff is familiar with the site’s specifics.

Consult with affected agencies, tribes, and interested public.

Complete this ESF.

If (a) the action is not described in DO-12 Section 3.4 (*CEs for which a record is needed*) or (b) you checked *yes* or identified *data needed to determine* impacts in any block in Section D above (*mandatory criteria*), then you must prepare an EA or EIS.

If (a) you checked *no* in all blocks in Section C (*resource effects to consider*) and (b) you checked *no* in all blocks in Section D (*mandatory criteria*) and (c) the action is described in DO-12 Section 3.4 (*CEs for which a record is needed*), then you may proceed with a CE Form.

#### G. INTERDISCIPLINARY TEAM

(*The DEVA Environmental Review Committee (ERC) is the NEPA review interdisciplinary team.*)

Did the ERC meet and conducted scoping and environmental review of this proposal?   x   Yes  
       No

(*If yes, list details of the dates, participants, and summary of comments.*) Met with ERC – Richard Anderson, Marian O’Dea, Terry Baldino, ED Forner

Environmental issues identified by the ERC: Slash disposal needed to be addressed better (proposal was revised), need to consider selling palm trees (impact would be greater).

Recommendation from the ERC to the Superintendent for the level of environmental compliance:

Factors favoring a CE:

Factors favoring an EA: Use of mechanized equipment in wilderness

#### H. SIGNATORY

Submitted by:

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Richard Anderson, Environmental Specialist

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Date

Superintendent's direction for continued project development:

- a.  Project not necessary at this time (*stop project planning*)
- b.  Prefer to explore other alternatives (*revise the project proposal and resubmit it to the ERC*)
- c.  Support the project concept (*proceed with NEPA analysis and documentation*)

If *c*, and based on the environmental impact information contained in this ESF, the level of NEPA analysis and documentation is set as:

- CE with Superintendent approval (*see CE Form, attached*)
- EA with FONSI approval (*proceed with EA development*)
- EIS with ROD approval (*proceed with NOI publication*)

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James T. Reynolds, Superintendent

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Date

Note: This signature is not approval to implement the project. NEPA documentation and approval is still required.

*Distribution after signature: project leader, Environmental Specialist, and SMT*

# Appendix D. Minimum Requirement Decision Guide

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ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER



## MINIMUM REQUIREMENT DECISION GUIDE

*“ . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act.”*

– Wilderness Act, 1964

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### Introduction

More than 100 million acres of Federal land are managed as wilderness, a Congressional mandate that began with the passage of the Wilderness Act in 1964. In partnership with the public, wilderness managers have a responsibility to preserve and protect wilderness values.

Simply designating a wilderness does not assure its preservation. Careful management is needed to minimize the impacts from human activities in wilderness, including grazing, access to private lands, mining, management of fish and wildlife, fire and recreation. These activities have the potential to negatively impact the values that we are charged with protecting.

This guide is provided to assist managers in making appropriate decisions about their administrative actions in wilderness. The guidance comes from the Wilderness Act, agency policies, and the experience of 35 years of wilderness management. The wilderness resource is fragile and can be lost through the erosion from seemingly inconsequential decisions.

### From Legislative Mandate to Agency Policy

A clear understanding and appreciation of the purposes and definitions contained in the 1964 Wilderness Act are necessary before considering appropriate management actions in wilderness.

The purpose of the Act is stated in Section 2 (a), “to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.”

Section 4 (c) of the Act prohibits certain activities in wilderness by the public and, at the same time, allows the agencies to engage in those activities in some situations. Section 4 (c) states:

“except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.”

In the above language, Congress acknowledged that even though certain activities are prohibited, there are times when exceptions to these prohibitions will need to be made for administration of the area. However, from the regulations, special orders, and internal agency policy contained in Appendix A of this guide, it is clear that the

wilderness management agencies should not view the language in Section 4 (c) as blanket approval to conduct projects or allow activities without an analysis of (1) whether the project or activity is necessary to meet the minimum requirements for the administration of the area, and (2) which tool or method should be used to complete the project that results in the least impact to the physical resource or wilderness values.

Agency employees entrusted with management of wilderness should set the highest standard possible when reviewing management practices in wilderness. Wilderness is intended to be managed differently from other public lands and this difference needs to be demonstrated to the public.

## **A Word About Traditional/Primitive Tools and Mechanical Transport**

There isn't an all encompassing definition of traditional or primitive tools, but generally defined they include a variety of non-motorized devices such as hand saws, axes, shovels, and certain tools that give a mechanical advantage such as wedges, block and tackles, and winches. The Wilderness Act prohibits the use of motorized equipment and mechanical transport, but not mechanized equipment. Technological advances have improved the efficiency and function of traditional tools over the years. These improvements don't eliminate them from consideration as traditional tools. The defining characteristic of traditional or primitive tools is the reliance on human or animal power.

Mechanical transport includes travel within the wilderness by motorized vehicle of any kind. It also includes mechanical devices that provide transportation such as bicycles.

The use of traditional tools has been a cornerstone of wilderness management philosophy since 1964. As a result, certain skills that almost certainly would have vanished, have been kept alive. So few opportunities still exist to perpetuate these skills that are an important cultural tradition in our country. This is one of the benefits of wilderness.

## **How to Use This Guide**

This guide has been developed to help provide consistency to the way project proposals in wilderness are evaluated and to ensure that we constantly strive to maintain or improve wilderness character through the decisions that are made. The information in this guide needs to be accompanied by a clear understanding of wilderness values and the ability to translate that understanding to a variety of complex and/or difficult projects in wilderness.

The guide is not a NEPA document, decision document or policy, but rather a series of self-explanatory worksheets designed to assist in thinking through and/or documenting your analysis. The worksheets include a two step minimum requirements analysis: first, to determine if the project or activity proposed is the minimum necessary for administration of the area for the purpose of the Act, and second, to determine which tool(s) will have the least impact to the wilderness resource. The worksheets lead the wilderness manager through a series of questions to provoke thought and understanding about the necessity of the proposed project and the most appropriate tools to use.

The minimum requirements analysis is provided to stretch our imaginations for the least impactful way of administering the wilderness. The wilderness manager may authorize any of the generally prohibited activities or uses listed in Sec. 4(c) of the Wilderness Act if they are determined to be the minimum necessary to do the job and meet wilderness management objectives.

When deciding what projects or activities to undertake and tools to use, follow these steps:

1. Complete a minimum requirement analysis, Step 1 of the worksheets, for all proposed projects or activities. This step should not be used to justify use of motorized equipment or mechanical transport, but rather, to scrutinize the project or activity and make the best decision for wilderness in the long term.

2. Complete a “minimum tool” analysis for the project. This analysis can follow the attached worksheet or, if not, should at least address the same points. If the analysis shows a justifiable need for motorized equipment, it is important to have this analysis in writing to provide to the official(s) who can authorize the use of mechanical transport or motorized equipment in wilderness. For some units, this analysis may become an integral part of an environmental analysis required to document a decision to use motorized equipment.

Ongoing management practices, especially if they involve mechanical transport, motorized equipment, or structures, should be reviewed to determine if they are still necessary or the best way to complete the task at hand.

## **How Does the Minimum Requirements Analysis Tie to NEPA?**

The minimum requirement analysis is intended to assist you in making a decision and the worksheets will document your analysis. This process does not take the place of NEPA.

If a formal decision under NEPA will be required to implement your project, consider formatting your minimum tool analysis so that it can be incorporated directly into your environmental analysis. The minimum requirements analysis will tie to your statement of Purpose and Need for the project in your environmental analysis.

## **Instructions and worksheets for the Minimum Requirement Analysis for actions, projects, and activities in Wilderness**

The Minimum Requirement Decision Guide (MRDG) is designed for wilderness administrators to effectively analyze proposed actions to minimize negative impacts to wilderness character and values. It assumes a basic knowledge of the Wilderness Act of 1964, agency policies, and specific provisions of the wilderness designation legislation for each unit. This guide is suggested for wilderness administrators for the four federal land management agencies, the Bureau of Land Management, the National Park Service, the U.S. Fish & Wildlife Service and the U.S. Forest Service.

Section 4(c) of the Wilderness Act of 1964 prohibits certain activities in wilderness by the public, and, at the same time allows the agencies to engage in those prohibited activities in some situations. Section 4(c) states:

“... except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.”

Therefore, unless a generally prohibited use is allowed by specific unit designation, most of these activities are prohibited. However, in the above language, Congress acknowledged that there are times when exceptions are allowed to meet the minimum required administration of the area as wilderness.

The MRDG displays a two-step process to assist in making the right decision for wilderness. First, the administrator must decide if a problem or issue in the wilderness unit needs administrative action, and then, and only then, the administrator must decide what tool/action/method, available from a range of identified alternatives, would minimize negative impacts on wilderness character and values. This guide includes templates for documenting both steps of the decision-making process, instructions for completing each step, and a cover sheet for signatures. The MRDG and future revised editions of the MRDG can be found on the Arthur Carhart National Wilderness Training Center page at [www.wilderness.net](http://www.wilderness.net).

## STEP 1 – DETERMINING THE MINIMUM REQUIREMENT

### SHEET 1

#### Is Administrative Action Needed?

What is the problem/issue that **may** require administrative action? Do not include methods or tools here. This sheet only refers to the issue or problem, not proposed action/project, or tools to be used. Include references from other legislation, policy, or plans, decisions, analyses, and how this issue is addressed in those documents.

Briefly describe the issue/problem:

The following questions assist in analyzing whether the issue needs to be resolved in wilderness. Do not consider what tools are to be used here. Please circle **Yes** or **No**, and explain your reasoning:

1. Is this an emergency? **Yes** **No** If yes, follow established procedures for Search and rescue (SAR), fire or other plans/policies. If no, please continue.
2. Is this problem/issue subject to valid existing rights, such as access to valid mining claim, state lands, etc? **Yes** **No**  
If no, continue with **Sheet 1**.  
If yes, briefly explain here and then proceed to **Sheet 3**
3. Can the problem/issue be addressed by administrative actions outside a wilderness area? (For example, the administrative actions could be an information program at the visitor center or trailhead instead of a physical action in the wilderness, etc) **Yes** **No**  
If yes, conduct actions outside wilderness. If no, continue with **Sheet 2**.
4. Is there a special provision in legislation (the 1964 Wilderness Act or subsequent laws), that allows this project or activity? (For example, maintenance of dams or water storage facilities, access to private inholdings, etc.) **Yes** **No** **If yes, Go to SHEET 3; if no, Go To SHEET 2.**

### SHEET 2

#### Is Administrative Action Needed? (Continued)

The following questions are provided to evaluate whether resolving the issue protects wilderness character and values identified in the Wilderness Act. Answer the questions in terms of the need to resolve the issue/problem. If the answer to most of the questions is yes, then the

issue/problem probably requires administrative action. **Please circle Yes or No for each answer, and briefly explain.**

1. If the issue/problem is not resolved, or action is not taken, will the natural processes of the wilderness be adversely affected?  
**Yes                      No                      Why/How?**
  
2. If the issue/problem goes unresolved, or action is not taken, will the values of solitude or primitive and unconfined type of recreation be threatened?  
**Yes                      No                      Why/How?**
  
3. If the issue/problem goes unresolved or action is not taken will evidence of human manipulation, permanent improvements, or human habitation be substantially noticeable ?  
**Yes                      No                      Why/How?**
  
4. Does addressing the issue/problem or taking action protect the wilderness as a whole as opposed to a single resource?  
**Yes                      No                      Why/How?**
  
5. Does addressing this issue/problem or taking action contribute to protection of an enduring resource of wilderness for future generations?  
**Yes                      No                      Why/How?**
  
6. Is this an issue for reasons other than convenience or cost of administration?  
**Yes                      No                      Why/How?**

If administrative action is warranted, then proceed to Sheet 3 to determine the minimum tool or method for resolving the problem.

## **STEP 2: DETERMINING THE MINIMUM TOOL**

**SHEET 3:** Determining the Minimum Tool: Fill out a Sheet 3 for each alternative. Identify and describe a range of alternatives including those that utilize traditional tools and non-motorized and mechanized means as well as other methods.

Alternative # \_\_\_\_\_

Describe briefly or attach description:

**Circle yes or no:**

Does this alternative involve:  
use of temporary road?                      Yes                      No

use of motor vehicles?	Yes	No
use of motorized equipment?	Yes	No
use of motorboats?	Yes	No
landing of airplanes?	Yes	No
landing of helicopters?	Yes	No
use of mechanical transport?	Yes	No
creating a structure or installation?	Yes	No
Other impacts to wilderness character?	Yes	No

**The next set of descriptions may be put on Optional SHEET 3a, if desired:**

Describe the biophysical effects/benefits of this alternative:

Describe the social/recreation effects/benefits:

Describe societal/political effects/benefits:

Describe health and safety concerns/benefits:

Describe economic and timing considerations/benefits:

Describe heritage resource considerations/benefits:

**SHEET 3: Selection of Minimum Required Action**

What is the method or tool that will allow the issue/problem to be resolved or an action to be implemented with a minimum of impacts to the wilderness?

The Selected alternative is # \_\_\_\_\_.

**Approvals:**

**Prepared by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Recommended by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Recommended by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**SHEET 4: Selection of the Minimum Tool Alternative**

Describe the rationale for selecting this alternative

**Attach all alternative sheets to this summary page.**

Describe the specific operating requirements for the action. Include information on timing, locations, type of actions, etc. (Use this space or attach a separate sheet)

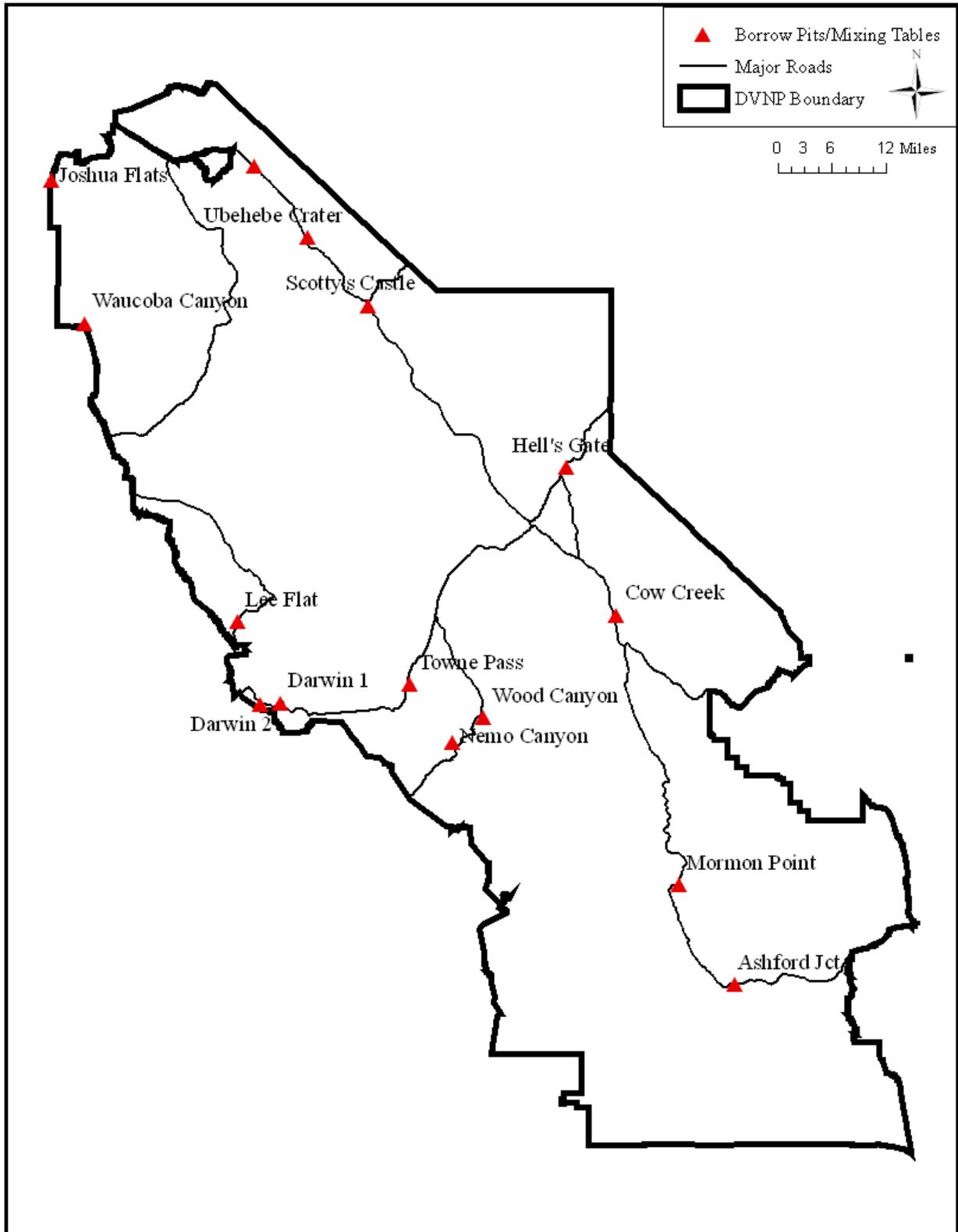
What are the maintenance requirements?

What standards and designs will apply?

Develop and describe any mitigation measures that apply.

What will be provided for monitoring and feedback to strengthen future effects and preventative actions to be taken to help in future efforts?

# Appendix E. Borrow Pits and Mixing Tables



# Appendix F. Safety and the Use of Herbicides

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## Background

The use of herbicides can be an essential aspect of Integrated Pest Management. Different types of herbicides are appropriate for different species in different situations. All weed control efforts will focus on minimizing the negative impacts of herbicide. More information about a variety of herbicides is available from US EPA (2008).

No herbicide of any type would be deliberately applied to water. In cases where there is a risk that herbicide may come in contact with water, only aquatic herbicides will be used. Herbicide will not be applied in high winds.

All NPS and contract employees or volunteers who handle herbicide will be provided with appropriate safety gear and protective clothing at no personal expense.

All California, Nevada, Environmental Protection Agency, Occupational Safety and Health Administration and NPS Integrated Pest Management pesticide safety, handling, reporting, storage, and disposal regulations will be followed. Only Category III or IV chemicals will be used. (Category III and IV refer to the least toxic herbicides available.) Herbicides will be applied using hand held or backpack sprayers only, and only by trained personnel under the supervision of a qualified applicator certified in California and/or Nevada, depending on where the application is being made.

All herbicide will have dye added (red or blue), to ensure that the proper amount is applied, and to ensure that spills are visible.

Similar or different formulations of the same herbicide may be sold under different trade names. This EPMP proposes the approval of the chemical formulae of herbicides, and is not restricted to the use of chemicals under particular trade names, given that the manufacturer has met all relevant agency requirements.

## Labeling/MSDS

Pesticide labels are regulated by the EPA; each commercially sold pesticide formulation has a registered EPA number. These labels describe what can or cannot be done with a particular herbicide, including whether or not it can be used in aquatic situations and restrictions on how much may be used per acres over a given period of time. Pesticide labels also contain information regarding public and worker safety, first aid, physical and chemical hazards, and many other safety related subjects, as well as environmental fate and other natural resource related subjects. OSHA Right to know laws also applies; all workers have the right to have access to Material Safety Data Sheets for any toxic chemicals found in the work place. The restrictions printed on pesticide labels are legally binding federal regulations.

Trade Names	Registered Use	Approved Target Plants	Mode of Action	Method of Application	DVNP Target Plants*
<b>Glyphosate</b>					
Roundup Pro, Roundup Ultra, Rodeo, GlyPro, Accord, Glyphomax, Touchdown)	General Use	Grasses, herbaceous plants including deeprooted perennial exotic plants, brush, some broadleaf trees and shrubs, and some conifers. Does not control all broadleaf woody plants.	Absorbed by leaves and rapidly moves through the plant. It acts by preventing the plant from producing an essential amino acid. This reduces the production of protein in the plant, and inhibits plant growth	Aerial spraying, spraying from a truck, backpack or handheld sprayer, wipe application, frill treatment, cut stump treatment.	Palms, halogeton, sweet clover, ornamental grasses
<b>Imazapyr</b>					
Arsenal, Habitat	General Use	Annual and perennial grass, broad-leaved weeds, brush, vines, and deciduous trees.	Absorbed by leaves and roots, moves rapidly through plants. Disrupts photosynthesis and interferes with cell growth and DNA synthesis.	Ground or aerial foliage spray, basal bark and stem treatment, cut stump treatment, tree injection.	Salt cedar, athels
<b>Triclopyr</b>					
Garlon, Remedy, Access, Pathfinder II	General Use	Woody plants and broadleaf plants.	Disturbs plant growth. It is absorbed by green bark, leaves and roots and moves throughout the plant. Accumulates in the meristem (growth region) of the plant.	Ground or aerial foliage spray, basal bark and stem treatment, cut surface treatment, tree injection	Salt cedar, athels; never applied near water

\* Target plants include only those known species in the Park. As new species are detected, treatment may be conducted as outlined in Chapter 2.

## Safety and Resource Protection Precautions

The forms on this page and the next are to be reviewed by all applicators and handlers, with a Qualified Applicator, prior to herbicide application

### Record of Pesticide Handler Training Death Valley National Park

Name of Qualified Applicator: \_\_\_\_\_

QA Signature: \_\_\_\_\_

Pesticide(s): \_\_\_\_\_

Date: \_\_\_\_\_

Training is to be conducted at the start of each work day.

Name(s) of pesticide handlers:

	Pesticide Handler Initials
Specific use of pesticide identified	
All written materials specified have been read, including pesticide specimen label, MSDS, and N-series pamphlets	
Safe and effective mixing procedures	
Safe and effective use of application equipment	
Safe and effective application procedures, including drift control	
Safe and effective storage and transportation: a) in sight or locked up b) secured in pick up bed, not in cab	
Proper personal protective equipment (PPE), including clothes, respirator, if necessary, goggles, gloves, shoes	
If applicable, fitting, using, and maintaining respirator	
Wash hands and arms with soap and water before eating, drinking, smoking, going to the bathroom	
Wear clean work clothes each day. Proper procedures for handling and cleaning contaminated clothing	
Health risks of the pesticide. Symptoms of poisoning: pinpoint pupils, breathing, dizziness, headache	
First aid procedures for each pesticide. Contacts for pesticide contamination information	
Emergency medical information- name, location and phone number where treatment can be obtained	
Carbamates and organophosphates with DANGER or WARNING labels will not be used	
No pesticides with DANGER label will be used	
Proper disposal of empty herbicide containers- triple rinse and disposal procedures	
Location of right-to-know information and ways to obtain help in obtaining or understanding pesticide information	

# IMPORTANT

**For Herbicide Applicators and Crews in Death Valley**  
**Read it once, then again, out loud and to yourself as many times as it takes!**

This sheet is an addition to the safety talk for crews using herbicide in DEVA. This information must be communicated to each crew member.

The National Park Service, in particular its wilderness areas, are held to the very highest standard for environmental protection. Our mission is the protection of natural and cultural resources and human safety. That means we are willing to take the extra time and money to accomplish these things. It also means we must halt any work that interferes with this mission.

We **MUST** use the strongest precautions to make sure we use the appropriate chemicals in the right places, while making sure to use the minimum amount of chemical to get the job done. Avoiding damage to native flora and fauna, water and air resources, cultural resources, and human safety while we perform exotics treatment is **CRITICAL**.

To avoid unintentional damage, responsibility falls on both the applicators and Park employees! We must help each other to **ASK** and **TELL**:

- 1) What are boundaries of the treatment area? Where do we start and stop? Flagging is the best way to delineate the treatment area.
- 2) Are there areas to avoid within the treatment area? In general, assume that you should **NOT treat within 200 ft. of surface water**, unless specifically told to do so.
- 3) What methods will be used to minimize trampling the soil and vegetation?
- 4) Who will be assigned to quality control? Every work group **MUST** have at least one individual who is assigned to quality control. This individual must not be an herbicide applicator. When groups are split up, the smaller groups must also have one individual who performs quality control. Their **PRIMARY** job is to communicate the project boundaries, look for water, identify travel routes to minimize trampling, and communicate safety issues.
- 5) Are there plants that can be pulled or mechanically removed? Plants that can be pulled, must be pulled, and **NOT** treated chemically. **DO NOT treat *Tamarix* sp. seedlings with herbicide.**
- 6) How do we make sure the chemical hits the target and nothing else? If the equipment or weather prevents proper application, then stop work. If fatigue or other factors prevent proper application, then switch workers, or stop work.

**Thanks for your good work helping to preserve the unique resources of Death Valley  
National Park!**

## Appendix G. Maps

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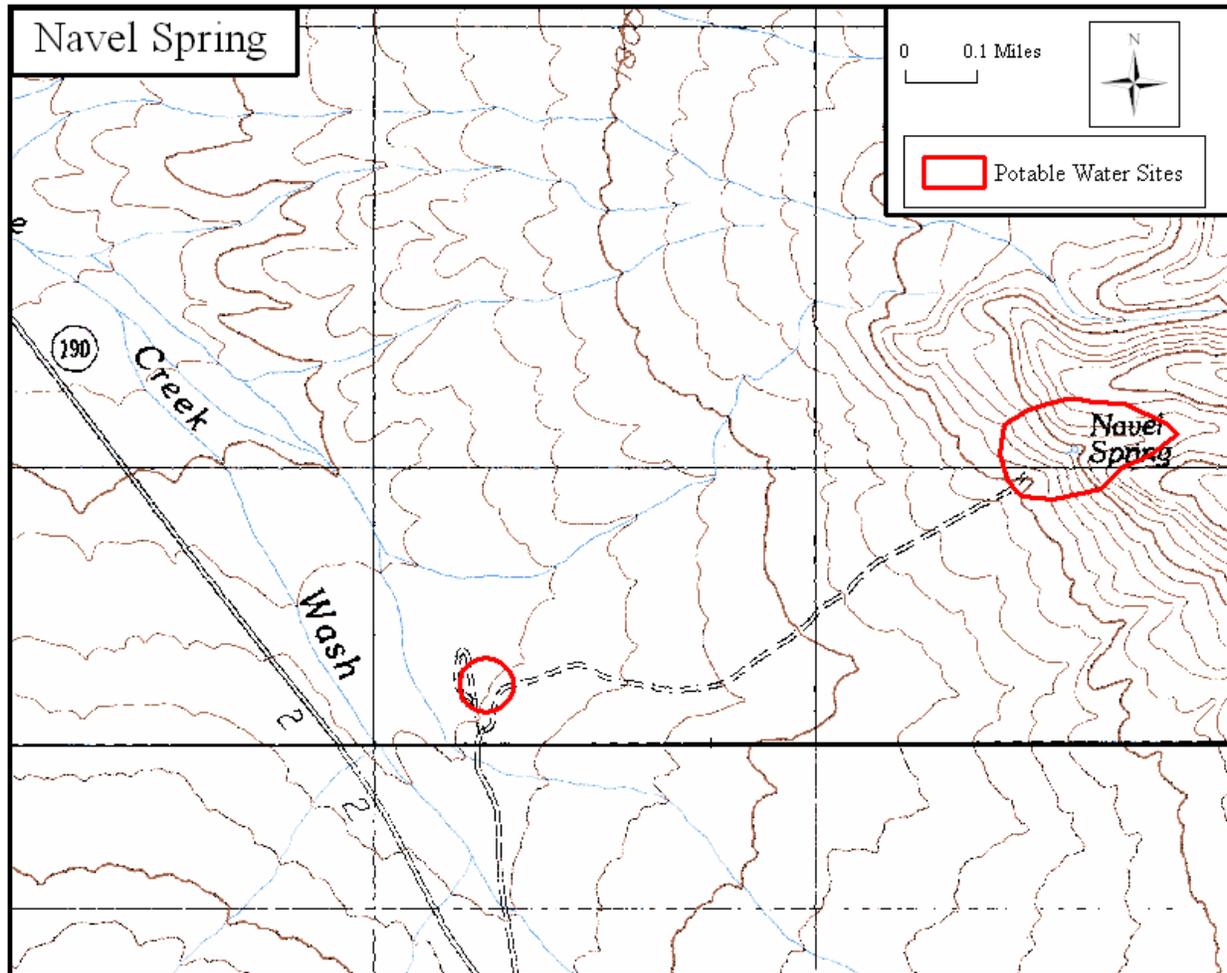
Maps of the proposed treatment areas for the draft plan are available upon request to Death Valley National Park. Write or call:

Death Valley National Park Superintendent  
Attn: Exotic Vegetation Management Plan  
Death Valley National Park  
P.O. Box 579  
Death Valley, CA 92328  
(760) 786-3200

# Appendix H. Potable Water Collection Sites

The maps shown here indicate potable water collection sites, or infiltration galleries, which provide drinking water to Park staff and visitors. Under both Alternatives, herbicide use would be excluded from the areas marked in red. Note: Herbicide label restrictions may preclude use from larger areas than shown here; the restrictions as given on the label must be followed.

**\*Still need Mesquite**

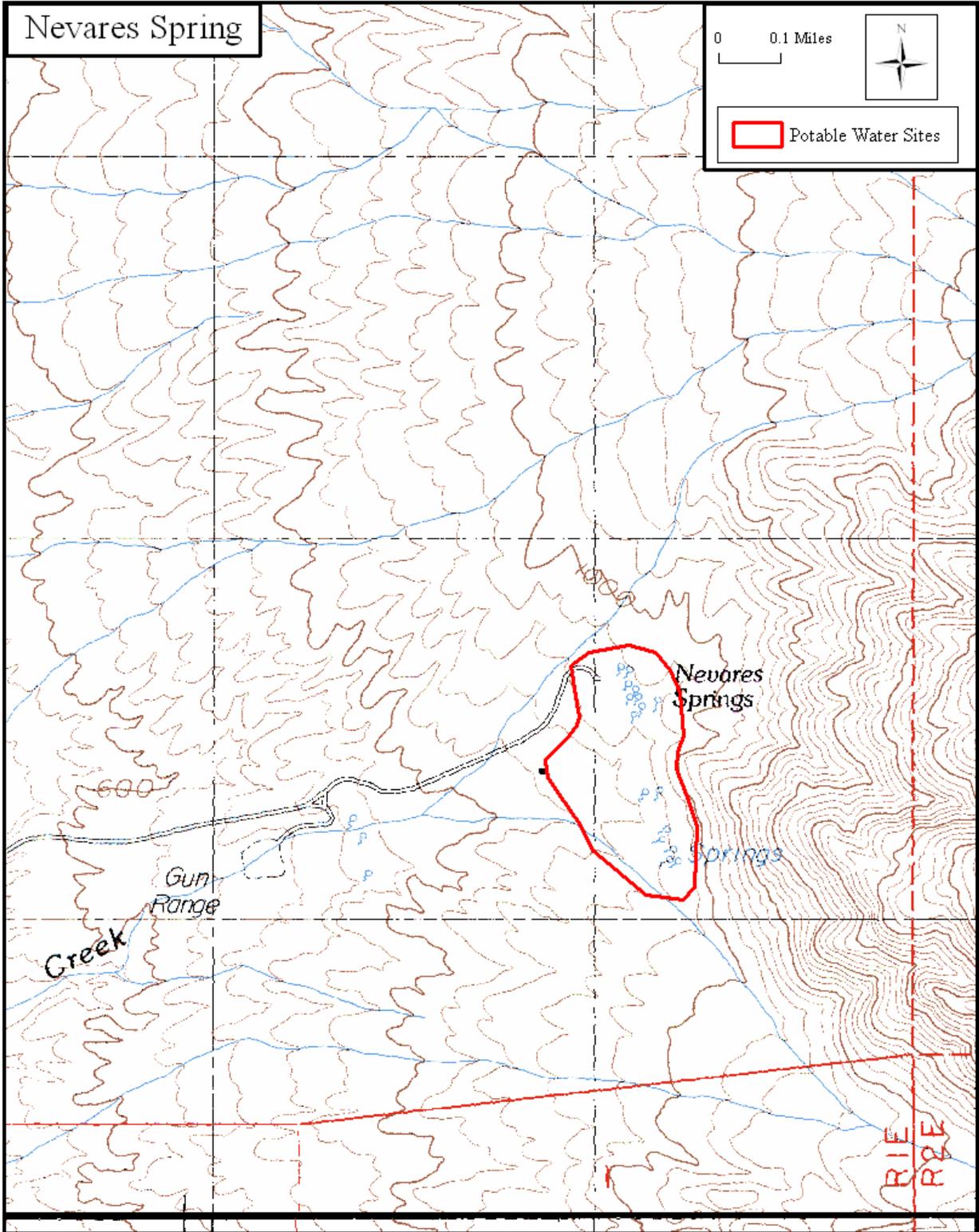


# Nebares Spring

0 0.1 Miles



Potable Water Sites

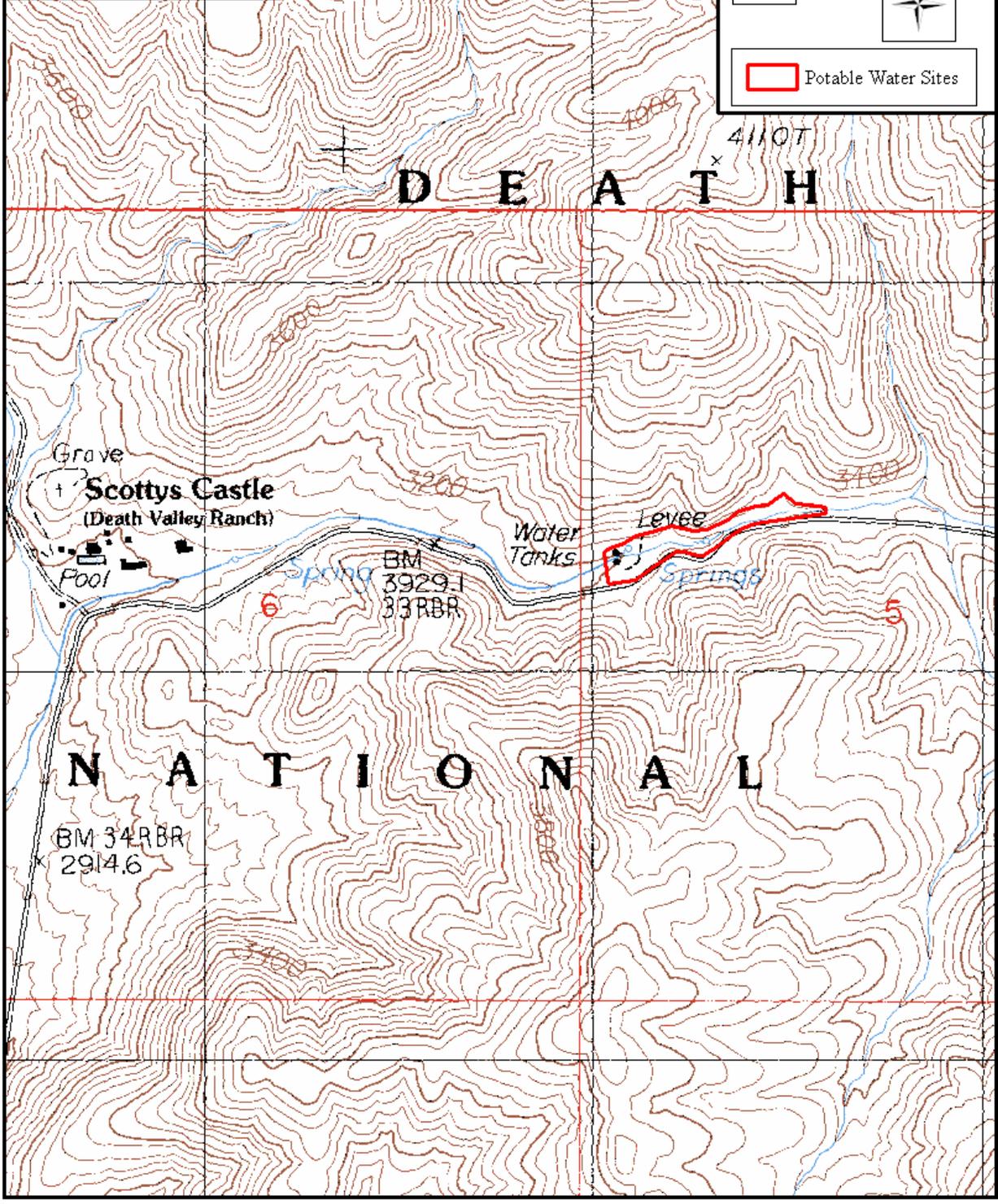


# Scotty's Castle

0 0.1 Miles



☐ Potable Water Sites

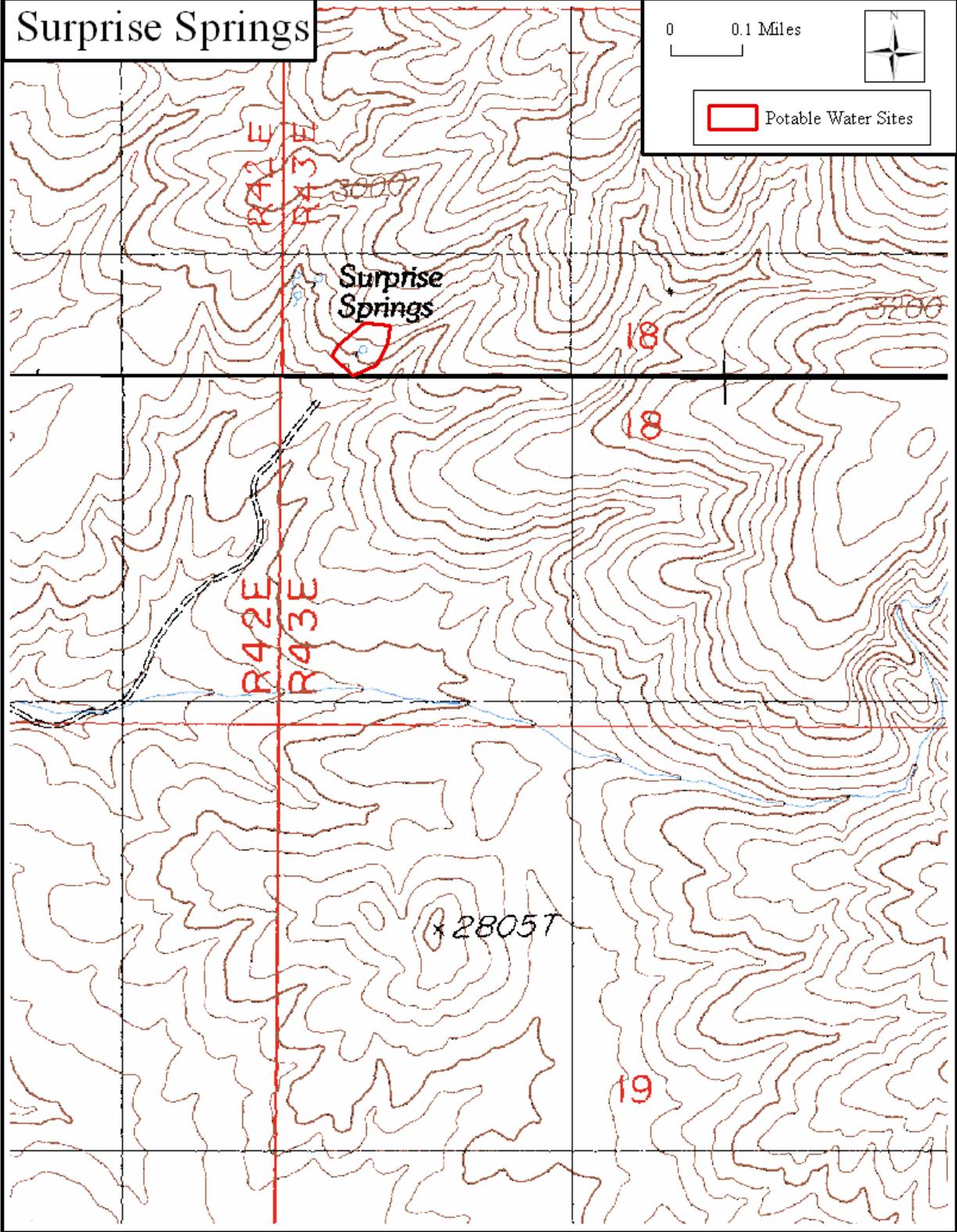


# Surprise Springs

0 0.1 Miles



 Potable Water Sites

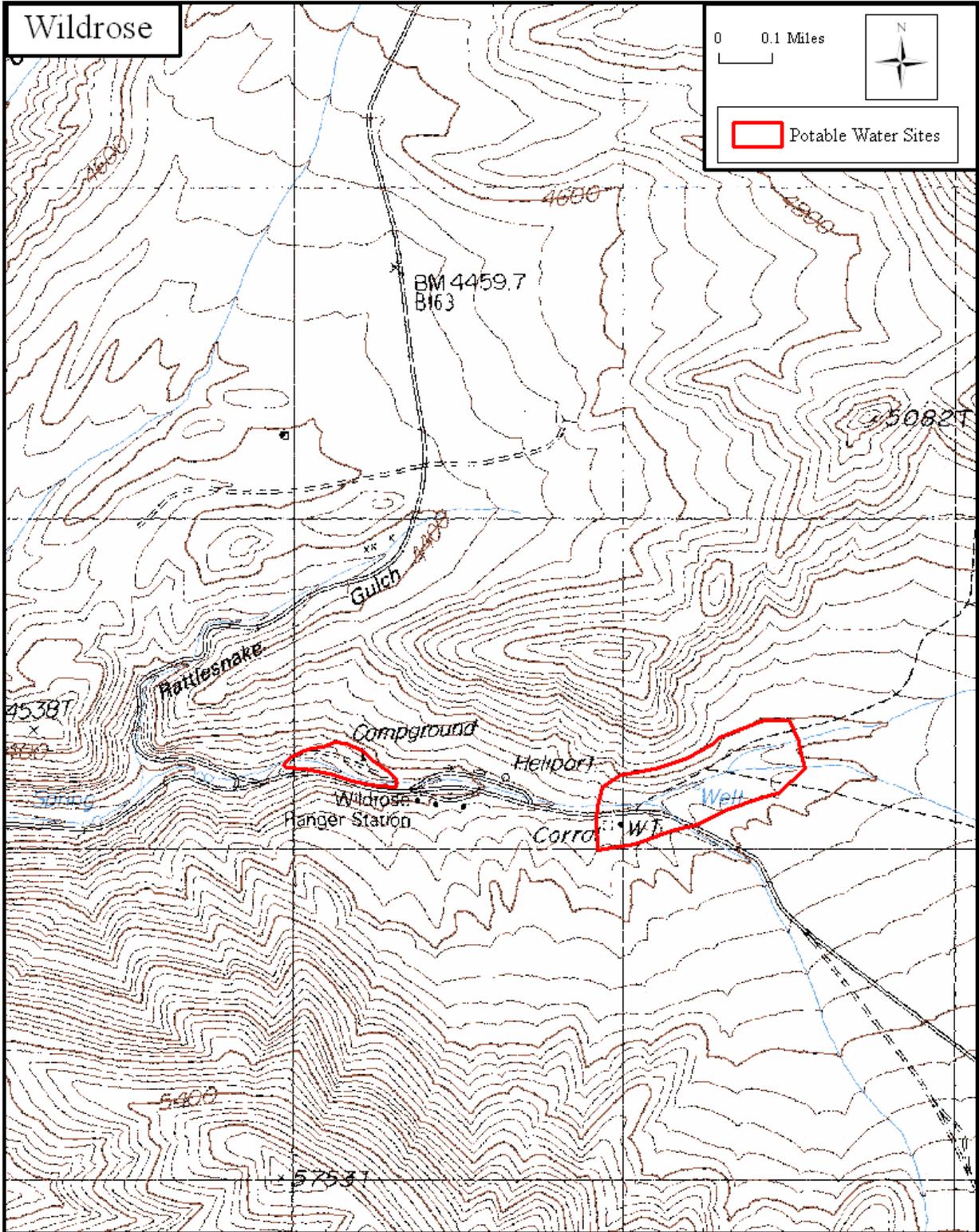


Wildrose

0 0.1 Miles



 Potable Water Sites

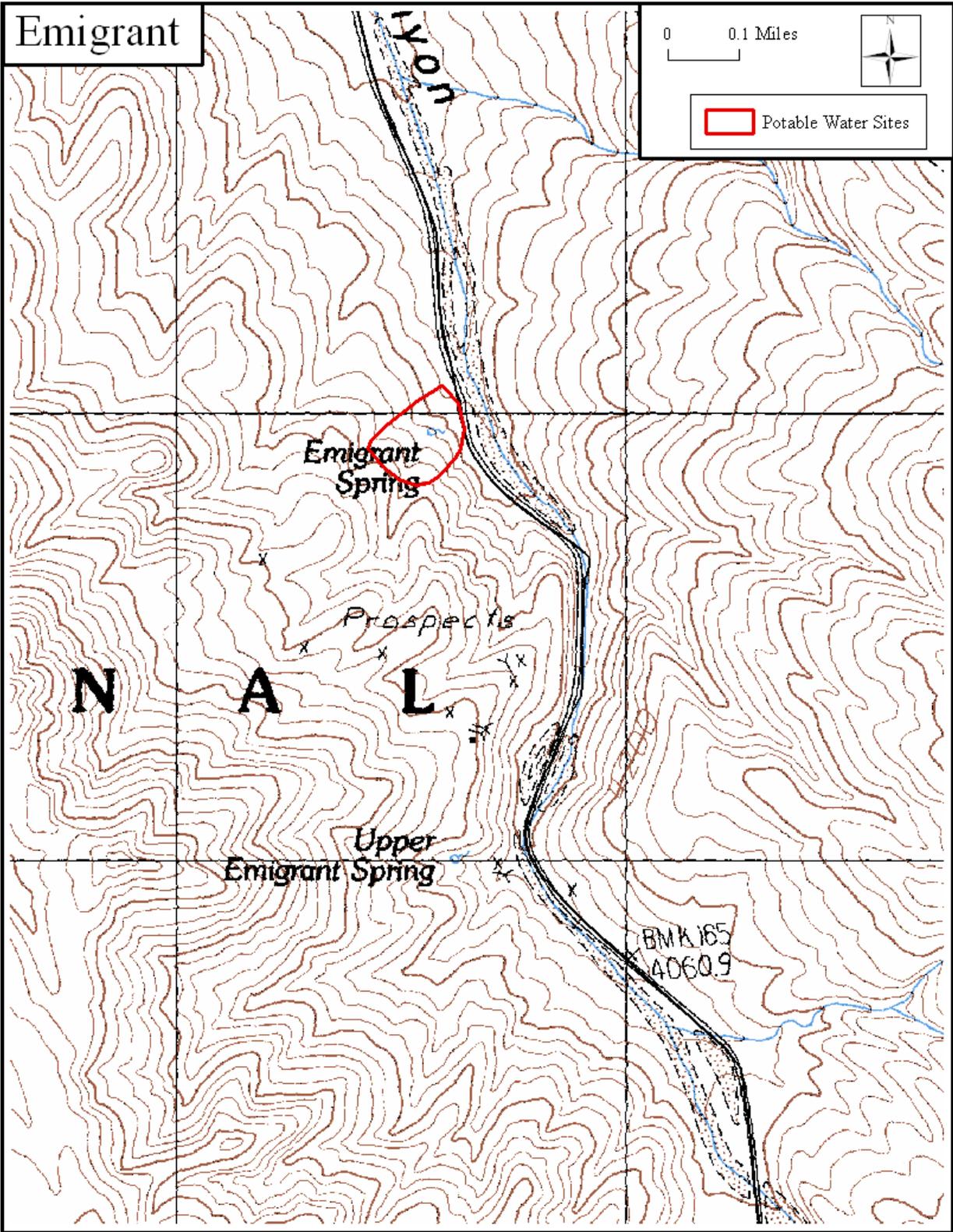


# Emigrant

0 0.1 Miles



☐ Potable Water Sites



# Appendix I. Park Sensitive Plants

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Locations of Park Sensitive Plants are not disclosed in this document for general public review and circulation. However, site-specific information may be obtained through specific requests to Death Valley National Park.

<i>Scientific Name</i>	<i>Common Name</i>	<i>Special Status</i>
<b><i>Apiaceae</i></b>		
<i>Cymopterus gilmanii</i>	Gilman's cymopterus	2.3
<i>Cymopterus ripleyi</i>	Ripley's cymopterus	1B.2
<i>Lomatium foeniculaceum</i> ssp. <i>macdougalii</i>	MacDougal's biscuitroot	2.2
<b><i>Asteraceae</i></b>		
<i>Chaenactis douglasii</i> var. <i>alpina</i>	alpine dusty maidens	2.3
<i>Chaetadelpa wheeleri</i>	dune broom	2.2
<i>Chrysothamnus albidus</i>	white-flowered rabbitbrush	4.2
<i>Chrysothamnus gramineus</i>	Panamint rock goldenrod	2.3
<i>Chrysothamnus greenei</i>	Greene's rabbitbrush	2.3
<i>Enceliopsis covillei</i>	Panamint daisy	1B.2
<i>Enceliopsis nudicaulis</i> var. <i>nudicaulis</i>	sunray	4.3
<i>Ericameria gilmanii</i>	Gilman's goldenbush	1B.3
<i>Ericameria nana</i>	dwarf goldenbush	4.3
<i>Erigeron compactus</i>	cushion daisy	2.3
<i>Erigeron elegantulus</i>	volcanic daisy	4.3
<i>Erigeron uncialis</i> var. <i>uncialis</i>	limestone daisy	2.2
<i>Hulsea vestita</i> ssp. <i>inyoensis</i>	Inyo hulsea	2.2
<i>Hymenopappus filifolius</i> var. <i>nanus</i>	little cutleaf	2.3
<i>Iva acerosa</i>	cooper weed	4.2
<i>Perityle inyoensis</i>	Inyo laphamia	1B.2
<i>Perityle villosa</i>	Hanaupah rock daisy	1B.3
<b><i>Boraginaceae</i></b>		
<i>Cryptantha costata</i>	ribbed cryptantha	4.3
<i>Cryptantha holoptera</i>	winged cryptantha	4.3
<i>Cryptantha tumulosa</i>	New York mountains cryptantha	4.3
<i>Plagiobothrys salsus</i>	salty popcornflower	2.2
<b><i>Brassicaceae</i></b>		
<i>Arabis bodiensis</i>	Bodie Hills rock cress	1B.3
<i>Arabis dispar</i>	unequal rockcress	2.3
<i>Arabis microphylla</i> var. <i>microphylla</i>	small-leaved rock cress	4.3
<i>Arabis pulchra</i> var. <i>munciensis</i>	Darwin rockcress	2.3
<i>Arabis shockleyi</i>	Shockley's rockcress	2.2
<i>Boechea yorkii</i>	York's rockcress	1B.3
<i>Caulostramina jaegeri</i>	Jaeger's caulostramina	1B.2
<i>Physaria chambersii</i>	double bladderpod	2.3
<i>Sibara deserti</i>	desert sibara	4.3
<b><i>Brassicaceae</i></b>		
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i>	foxtail thelypodium	2.2

**Cactaceae**

<i>Ferocactus cylindraceus</i> var. <i>lecontei</i>	barrel cactus	NVCY
<i>Sclerocactus johnsonii</i>	pineapple cactus	2.2
<i>Sclerocactus polyancistrus</i>	Mojave fish-hook cactus	4.2

**Capparaceae**

<i>Cleomella brevipes</i>	little stinkweed	4.2
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**Celastraceae**

<i>Mortonia utahensis</i>	Utah mortonia	4.3
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**Chenopodiaceae**

<i>Atriplex argentea</i> var. <i>hillmanii</i>	Hillman's silverscale saltbush	2.2
<i>Nitrophila mohavensis</i>	Amargosa nitrophila	1B.1, FE, CE, NCE

**Crassulaceae**

<i>Dudleya saxosa</i> ssp. <i>saxosa</i>	Panamint liveforever	1B.3
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**Cyperaceae**

<i>Fimbristylis thermalis</i>	hot springs fimbristylis	2.2
<i>Schoenus nigricans</i>	black sedge	2.2

**Euphorbiaceae**

<i>Tetracoccus ilicifolius</i>	holly-leaved tetracoccus	1B.3
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**Fabaceae**

<i>Astragalus atratus</i> var. <i>mensanus</i>	Darwin Mesa milkvetch	1B.1
<i>Astragalus cimae</i> var. <i>sufflatus</i>	broad-shouldered milkvetch	1B.3
<i>Astragalus funereus</i>	black milkvetch	1B.2
<i>Astragalus geyeri</i> var. <i>geyeri</i>	Geyer's milkvetch	2.2
<i>Astragalus gilmanii</i>	Gilman's milkvetch	1B.2
<i>Astragalus inyoensis</i>	Inyo milkvetch	4.2
<i>Astragalus lentiginosus</i> var. <i>micans</i>	shining milkvetch	1B.2
<i>Astragalus lentiginosus</i> var. <i>sesquimetalis</i>	Sodaville milkvetch	1B.1, CE, NCE
<i>Astragalus mohavensis</i> var. <i>hemigyris</i>	curved-pod milkvetch	1A
<i>Astragalus mohavensis</i> var. <i>mohavensis</i>	Mojave rattleweed	NVW
<i>Astragalus oophorus</i> var. <i>oophorus</i>	big-podded milkvetch	4.3
<i>Astragalus platytropis</i>	broad-keeled milkvetch	2.2
<i>Astragalus preussii</i> var. <i>preussii</i>	Preuss's milvetch	2.3
<i>Astragalus serenoii</i> var. <i>shockleyi</i>	naked milkvetch	2.2
<i>Lathyrus hitchcockianus</i>	Bullfrog Hills wild pea	NVW
<i>Lupinus holmgrenanus</i>	Holmgren's lupine	2.3

**Fabaceae**

<i>Lupinus magnificus</i> var. <i>magnificus</i>	Panamint Mountains lupine	1B.2
<i>Lupinus nevadensis</i>	Nevada lupine	4.3
<i>Lupinus pusillus</i> var. <i>intermontanus</i>	intermontane lupine	2.3
<i>Pediomelum castoreum</i>	Beaver Dam scurfpea	4.3
<i>Psoralea fremontii</i> var. <i>attenuatus</i>	Fremont's indigo bush	2.3

**Gentianaceae**

<i>Centaurium namophilum</i> var. <i>namophilum</i>	spring-loving centaury	NVT, NE, FT
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**Hydrophyllaceae**

<i>Phacelia amabilis</i>	Saline Valley phacelia	3.3
<i>Phacelia anelsonii</i>	Aven Nelson's phacelia	2.3
<i>Phacelia gymnoclada</i>	naked-stem phacelia	2.3
<i>Phacelia mustelina</i>	Death Valley round-leaved phacelia	1B.3
<i>Phacelia peirsoniana</i>	handsome scorpionweed	4.3
<i>Phacelia pulchella</i> var. <i>gooddingii</i>	Goodding's phacelia	2.3
<b><i>Iridaceae</i></b>		
<i>Sisyrinchium funereum</i>	Death Valley blue-eyed-grass	1B.3
<b><i>Juncaceae</i></b>		
<i>Juncus cooperi</i>	Cooper's rush	4.3
<i>Juncus nodosus</i>	knotted rush	2.3
<b><i>Lamiaceae</i></b>		
<i>Hedeoma nanum</i> var. <i>californicum</i>	California false pennyroyal	4.3
<i>Salvia funerea</i>	Death Valley sage	4.3
<i>Scutellaria lateriflora</i>	blue skullcap	2.2
<b><i>Liliaceae</i></b>		
<i>Allium atrorubens</i> var. <i>cristatum</i>	wild onion	4.3
<i>Androstephium breviflorum</i>	short-leaved androstephium	2.3
<i>Calochortus panamintensis</i>	Panamint Mariposa lily	4.2
<i>Fritillaria pinetorum</i>	pinewoods mission bells	4.3
<i>Muilla coronata</i>	crowned muilla	4.2
<b><i>Loasaceae</i></b>		
<i>Petalonyx thurberi</i> ssp. <i>gilmanii</i>	Death Valley sandpaper plant	1B.3
<b><i>Malvaceae</i></b>		
<i>Sphaeralcea rusbyi</i> var. <i>eremicola</i>	Rusby's desert mallow	1B.2
<b><i>Onagraceae</i></b>		
<i>Camissonia boothii</i> ssp. <i>alyssoides</i>	Pine Creek evening primrose	4.3
<i>Camissonia boothii</i> ssp. <i>intermedia</i>	intermediate shredding primrose	2.3
<i>Camissonia minor</i>	Nelson's evening primrose	2.3
<i>Oenothera caespitosa</i> ssp. <i>crinita</i>	caespitose evening primrose	4.2
<i>Oenothera californica</i> ssp. <i>eurekaensis</i>	Eureka Dunes evening primrose	1B.2, CR, FE
<b><i>Papaveraceae</i></b>		
<i>Arctomecon merriamii</i>	white bear poppy	2.2
<b><i>Philadelphaceae</i></b>		
<i>Fendlerella utahensis</i>	Utah fendlerella	4.3
<i>Jamesia americana</i> var. <i>rosea</i>	cliff bush	4.3
<b><i>Pinaceae</i></b>		
<i>Pinus longaeva</i>	western bristlecone pine	4.3
<b><i>Poaceae</i></b>		
<i>Achnatherum aridum</i>	Mormon needle grass	2.3
<i>Blepharidachne kingii</i>	King's eyelash grass	2.3
<i>Bouteloua trifida</i>	red grama	2.3
<i>Erioneuron pilosum</i>	hairy erioneuron	2
<i>Imperata brevifolia</i>	satintail	NVW
<i>Leymus salinus</i> ssp. <i>mojavensis</i>	salt ryegrass	2.3

<i>Spartina gracilis</i>	alkali cord grass	4.2
<i>Swallenia alexandrae</i>	Eureka Valley dune grass	1B.2, CR, FE
<b><i>Polemoniaceae</i></b>		
<i>Gilia ripleyi</i>	Ripley's gilia	2.3
<i>Linanthus arenicola</i>	sand linanthus	NVD
<i>Phlox dolichantha</i>	Big Bear Valley phlox	1B.2
<i>Saltugilia latimeri</i>	southern Gilia	1B.2
<b><i>Polygalaceae</i></b>		
<i>Polygala heterorhyncha</i>	spiny milkwort	2.3
<b><i>Polygonaceae</i></b>		
<i>Dedeckera eurekaensis</i>	July gold	1B.3, CR
<i>Eriogonum contiguum</i>	Reveal's buckwheat	2.3
<i>Eriogonum eremicola</i>	Wildrose Canyon buckwheat	1B.3
<b><i>Polygonaceae</i></b>		
<i>Eriogonum gilmanii</i>	Gilman's buckwheat	1B.3
<i>Eriogonum hoffmannii</i> var. <i>hoffmannii</i>	Hoffmann's buckwheat	1B.3
<i>Eriogonum hoffmannii</i> var. <i>robustius</i>	robust Hoffmann's buckwheat	1B.3
<i>Eriogonum intrafractum</i>	napkin ring buckwheat	1B.3
<i>Eriogonum microthecum</i> var. <i>lapidicola</i>	Inyo Mountains buckwheat	4.3
<i>Eriogonum microthecum</i> var. <i>panamintense</i>	Panamint Mountains buckwheat	1B.3
<i>Eriogonum nutans</i>	nodding buckwheat	2.3
<i>Eriogonum puberulum</i>	downy buckwheat	2.3
<i>Eriogonum shockleyi</i> var. <i>shockleyi</i>	Shockley's buckwheat	4.3
<i>Gilmania luteola</i>	golden carpet	1B.3
<i>Oxytheca watsonii</i>	Watson's puncturebract	2.2
<b><i>Primulaceae</i></b>		
<i>Dodecatheon pulchellum</i>	alkali shooting star	4.2
<b><i>Pteridaceae</i></b>		
<i>Cheilanthes wootonii</i>	Wooton's lace fern	2.3
<i>Pellaea truncata</i>	cliff-brake	2.3
<b><i>Rosaceae</i></b>		
<i>Ivesia arizonica</i> var. <i>arizonica</i>	Arizona whitefeather	3
<i>Physocarpus alternans</i> ssp. <i>panamintensis</i>	dwarf ninebark	2.3
<b><i>Rubiaceae</i></b>		
<i>Galium hilendiae</i> ssp. <i>carneum</i>	Panamint Mountains bedstraw	1B.3
<i>Galium hypotrachium</i> ssp. <i>tomentellum</i>	Telescope Peak bedstraw	1B
<i>Galium munzii</i>	Munz's bedstraw	4.3
<b><i>Salicaceae</i></b>		
<i>Populus angustifolia</i>	narrow leaved cottonwood	2.2
<b><i>Scrophulariaceae</i></b>		
<i>Cordylanthus eremicus</i> ssp. <i>eremicus</i>	desert bird's-beak	4.3
<i>Cordylanthus tecopensis</i>	Tecopa bird's-beak	1B.2
<i>Maurandya petrophila</i>	rock lady	1B.2, CR
<i>Mimulus glabratus</i> ssp. <i>utahensis</i>	Utah monkeyflower	2.1
<i>Mimulus parryi</i>	redspot monkeyflower	2.3

<i>Mimulus rupicola</i>	Death Valley monkeyflower	4.3
<i>Penstemon calcareus</i>	limestone beardtongue	2.3
<i>Penstemon fruticiformis</i> var. <i>amargosae</i>	Death Valley beardtongue	1B.3
<b><i>Scrophulariaceae</i></b>		
<i>Penstemon pahutensis</i>	Pahute Mesa beardtongue	2.3
<i>Penstemon scapoides</i>	pinyon beardtongue	4.3
<b><i>Selaginellaceae</i></b>		
<i>Selaginella leucobryoides</i>	Mojave spike-moss	4.3
<b><i>Solanaceae</i></b>		
<i>Oryctes nevadensis</i>	Nevada oryctes	2.

### Special Status Definitions

Federal Listing	CA State list	CNPS List (Precedes the period)	CNPS Threat Code (Follows the period)	NV Rank (Follows 'NV', if present). Codes are under revision.
FE: Federally endangered	CR: California Rare	1A: Plants presumed extinct in California.	.1: Seriously endangered in California	1: Critically imperiled due to extreme rarity, imminent threats, or and/or biological factors
FT: Federally threatened	CE: CA endangered	1B: Plants rare and endangered in California and throughout their range.	.2: Fairly endangered in California	2: Imperiled due to rarity and/or other demonstrable factors
		2: Plants rare, threatened or endangered in California but more common elsewhere.	.3: Not very endangered in California	3: Rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction
		3: Plants for which more information is needed.		4: Apparently secure, though frequently quite rare in parts of its range, especially at its periphery
		4: Plants of limited distribution; a "watch list."		5: Demonstrably secure, though frequently quite rare in parts of its range, especially at its periphery
				E: Endangered; T: Threatened; W: watch list; NCE: critically endangered; CY: protected cactus/yucca; D: delisted