National Park Service
U.S. Department of the Interior
Death Valley National Park
California/Nevada

Saline Valley Road Borrow Sites Environmental Assessment

June 1, 2011

PUBLIC COMMENT

If you wish to comment on the environmental assessment, you may mail comments to the name and address below or post comments online at http://parkplanning.nps.gov/deva. This environmental assessment will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we would be able to do so. We would make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspections in their entirety. Please address written comments to:

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SUMMARY

The National Park Service (NPS) is considering permitting the reactivation of sand and gravel borrow pits (sites) for maintenance of Saline Valley Road in Death Valley National Park (Park). Saline Valley Road is an 84-mile-long, graded-dirt road connecting California State Highway 190 at the southern terminus of Saline Valley Road to the Loretta Mine-Death Valley Road at the northern terminus.

This action is needed to repair and maintain sections of Saline Valley Road within the Park. Inyo County is responsible for maintenance of Saline Valley Road. Materials from selected borrow sites are needed to maintain this road in a cost-effective manner. No other materials sites are located at a reasonable distance to the road within the Park boundaries, and obtaining materials from outside the Park is expensive and increases the risk of introducing non-native plant species to the Park environment.

Two action alternatives (Alternatives B and C) and a no action alterative (Alternative A) were examined in this environmental assessment. The existing borrow pit alternative (Alternative B) would limit excavation of sand and gravel to the existing pit areas only; the proposed expansion areas would not be used. Alternative B would encompass about 12 acres of the existing pits. The second action alternative (Alternative C) would allow excavation of materials from the existing pits as well as from the proposed expansion areas. Alternative C would encompass about 41 acres, including about 30 acres of previously undisturbed desert scrub habitat.

Based on current conditions, it is estimated that 140,000 cubic yards of sand and gravel will be needed to repair and maintain Saline Valley Road over the 20-year permit period. Under Alternative B, about 146,000 cubic yards of material could be excavated from the existing pits but only by greatly increasing pit depth. Under Alternative C, at least 196,000 cubic yards of material could be excavated from the expanded pits while keeping the pits relatively shallow. In either case, the County would operate the borrow sites in a manner that would minimize impacts to local resources. At the end of the permit period, the County and the NPS will evaluate the need for continued extraction from the pits. If the NPS decides that keeping the pits open agrees with Park management objectives, another NEPA analysis would be needed before permits could be issued for continued extraction from the pits. If it is decided that any (or all) of the pits are no longer suitable as a source of road material, the County will re-contour and revegetate the sites to near natural conditions at the end of the permit period.

An examination of environmental impact topics found that both action alternatives could potentially cause negligible to moderate impacts (adverse and beneficial) to Park resources; however, most adverse impacts could be mitigated to insignificant levels. Because the use of borrow sites to maintain Saline Valley Road is a Park management objective, the action of removing sand and gravel from the sites would not in itself cause impairment of Park resources or values.

Given that the Park's primary purpose is to protect "significant desert features that provide world class scenic, scientific, and educational opportunities to visitors and academics to explore and study," both the "environmentally preferable" and the Park's operationally preferred alternative is Alternative B, use of the existing borrow sites only. Implementation of this alternative would provide for the immediate requirement to repair sections of Saline Valley Road without precluding the potential use of the expansion areas in the future, should the need be realized.

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Term
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CAA	Clean Air Act
CFR	Code of Federal Regulations
cuyd	Cubic yard
CWA	Clean Water Act
DO	NPS Director's Order
DVNP	Death Valley National Park
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
IDT	Inter-Disciplinary Team
GMP	General Management Plan
GPS	Global Positioning System
HazMat	Hazardous material
mg/L	Milligrams per liter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
Organic Act	Legislation creating the National Park Service
PEPC	Planning, Environment, and Public Comment
PM_{10}	Particulate matter less than 10 microns in diameter
SHPO	State Historic Preservation Office
sqyd	Square yard
T&E	Threatened and Endangered
THPO	Tribal Historic Preservation Officer
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1 PURPOSE AND NEED

The following section identifies the purpose and need for the proposed action and outlines desired outcomes and future conditions.

1.1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The National Park Service (NPS or Service) is considering permitting the reactivation of sand and gravel borrow pits (sites) for maintenance of Saline Valley Road in Death Valley National Park (DVNP or Park). Saline Valley Road is an 84-mile-long, graded-dirt road connecting California State Highway 190 at the southern terminus of Saline Valley Road to the Loretta Mine-Death Valley Road at the northern terminus.

This action is needed to repair and maintain sections of Saline Valley Road within the Park. Inyo County is responsible for maintenance of Saline Valley Road. Materials from the six borrow sites are needed to maintain this road in a cost-effective manner. No other materials sites are located at a reasonable distance to the road within the Park boundaries, and obtaining materials from outside the Park is expensive and increases the risk of introducing non-native plant species to the Park environment.

Saline Valley Road forms much of the northwestern boundary of DVNP. Prior to the passage of the California Desert Protection Act of 1994 (PL 103-433) that formed Death Valley National Park from expanded boundaries of Death Valley National Monument, the materials sites were located west of the monument boundary on lands administered by the Bureau of Land Management (BLM). During that period of time, Inyo County used several borrow sites under a permit issued by the BLM for maintenance of and repairs to Saline Valley Road.

Portions of Saline Valley Road were washed out in the late 1980s, particularly on the southern part of the roadway that goes through South Pass and Grapevine Canyon. Inyo County extracted sand and gravel from several sites for repair of the roadway, including the six sites considered in this environmental assessment (EA). In 1994, with the passage of the California Desert Protection Act, these sites became part of DVNP and are now administered by the NPS. These sites have not been used since 1994.

The proposed project consists of reopening and expanding six of the existing sand and gravel borrow sites along Saline Valley Road. The general location of the potential borrow sites along Saline Valley Road are shown in figure 1. The Park is preparing this EA to determine potential impact of use of these borrow sites on Park resources. This EA focuses on the borrow sites and does not address road maintenance activities along the roadway of Saline Valley Road.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 CFR Parts 1500–1508; National Park Service Director's Order #12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making;* and Section 106 of the National Historic Preservation Act (NHPA) of 1966 as amended, and implementing regulations, 36 CFR Part 800.

1.2 PURPOSE AND SIGNIFICANCE OF THE PARK

The purpose and significance of Death Valley National Park are stated in its General Management Plan (GMP) (NPS 2002):

> Death Valley National Monument was established by presidential proclamation under the Antiquities Act of 1906, on February 11, 1933. The original monument contained approximately 1,601,800 acres. Supplementary proclamations in March 1937 and January 1952 increased the monument's acreage to 2,067,793 acres. The monument was subsequently enlarged and changed to Death Valley National Park by Congressional action on October 31, 1994, with the passage of the California Desert Protection Act. Approximately 1.3 million acres of new lands were added, bringing the total acreage of the new Park to about 3,396,192 acres. Nearly [91%] of the Park was designated as wilderness by that same act. Death Valley National Park is the largest national park unit in the conterminous 48 states. The vast majority of its lands are located in the California counties of Inyo and San Bernardino, but a small portion of the Park is located in the Nevada counties of Nye and Esmeralda. California State Highway 190 crosses the Park east to west, and [Nevada] Highway 95 parallels the Park north to south on the Park's eastern boundary.
>
> Death Valley National Park dedicates itself to protecting significant desert features that provide world class scenic, scientific, and educational opportunities for visitors and academics to explore and study.

Significant attributes of the Park particularly relevant to the proposed action include:

- Death Valley National Park is world-renowned for its exposed, complex, and diverse geology and tectonics, and for its unusual geologic features, providing a natural geologic museum that represents a substantial portion of the earth's history.
- The extremely colorful, complex, and highly visible geology and steep, rugged mountains and canyons provide some of the most dramatic visual landscapes in the United States.
- Death Valley National Park is one of the largest expanses of protected warm desert in the world. Ninety-five percent of the Park is designated wilderness, providing unique opportunities for quiet, solitude, and primitive adventure in an extreme desert ecosystem.
- Contrary to many visitors' first impression, Death Valley National Park's natural resources are extremely diverse, containing a large variety of plant species and community types. The area preserves large expanses of creosote bush valleys and other vegetation typical of the Mojave Desert. Extreme conditions and isolation provide habitat for an unusually high number of plant and animal species that are highly adapted to these conditions.
- Death Valley National Park contains an unusually high number of well-preserved archeological sites, including rock art and alignments.

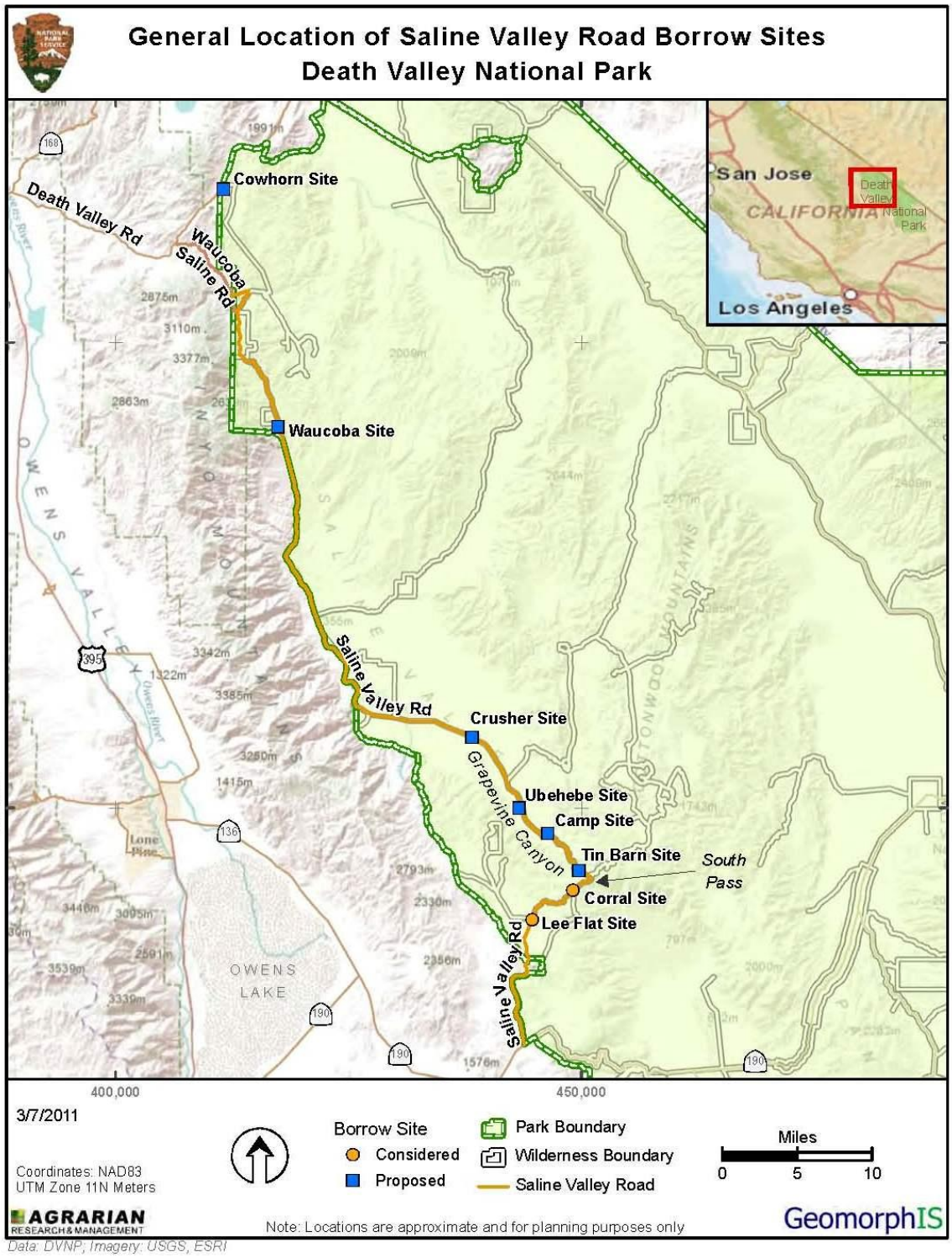

Figure 1. Saline Valley borrow site locations

The proposed reactivation of the Saline Valley Road borrow sites will help the Park meet a number of its management objectives (NPS 2002), the key ones being:

- Provide the visitor to Death Valley National Park with the opportunity to discover, explore, and understand the natural and cultural resources of the Park.
- Permit access to all areas of the Park, consistent with resource protection objectives and within optimum carrying capacities/use limits.
- Provide an opportunity for exploring the backcountry, experiencing the wildness of the high Panamint, Grapevine, Cottonwood, and Funeral ranges, as well as camping and sight-seeing in a setting of climatic relief from the valley floor; provide a wilderness experience for those who desire it, in balance with the limitation of the fragile resource.
- Work with California (Inyo and San Bernardino counties) and Nevada (Nye and Esmeralda counties) to obtain concurrent jurisdiction status for the Park.
- Cooperate with the state of California to provide for road maintenance and patrol, with Inyo County for health, educational, library, and law enforcement services, and with the U.S. Postal Service; ensure that all these services benefit employees, their families, and visitors.

The alternatives examined in this document were selected to meet the purpose and management objectives of DVNP while protecting those environmental resources that contribute to the Park's unique character.

1.2.1 Project Background

Previous Planning. The DVNP General Management Plan states that "[t]he use of borrow sources for road maintenance will be evaluated during the preparation of the road management plan" (NPS 2002). Such a plan has not yet been developed, necessitating the completion of this environmental assessment. The proposed action will be in compliance with the NPS Management Policies, specifically Section 9.1.3.3 – Borrow Pits and Spoil Areas (NPS 2006). This EA is limited to examining the potential effects of reactivating and expanding selected borrow sites used to maintain Saline Valley Road. Subsequent requests to use other borrow sites or to modify the proposed sites will require separate NEPA action. Additional permits such as a storm water discharge permit from the Lahontan Regional Water Quality Control Board, and Air Quality emissions permits from either Inyo County Environmental Health Services or Regional Air Quality Control Board lie beyond the scope of this document and will be the responsibility of Inyo County.

Internal Scoping. The Park initiated internal scoping in early 2010 which included cultural resources and biological field surveys of the existing borrow pits and the proposed expansion areas. During the internal scoping process, the Park outlined these preliminary site selection criteria:

- Each borrow site was previously used for obtaining materials for use on Saline Valley Road and thus native vegetation was previously disturbed in the area of excavation;
- Each borrow site contains appropriate material (sand and gravel) for road maintenance;
- Each borrow site is in a non-wilderness area;

- Each borrow site is adjacent to, or a short distance away (less than1/2 mile) from the roadway and is spaced out along the roadway to reduce material haul distances and associated impacts;
- Each borrow site is located on NPS-administered land within DVNP; and
- Material from the borrow sites will only be used on Saline Valley Road within DVNP.

In March and May 2010, the DVNP Archeologist and crew conducted cultural resource surveys of the eight Saline Valley borrow sites, to include the existing pits and proposed expansion areas. Table 1 indicates the basic geographic characteristics of the eight sites (see also figure 1, above).

Table 1. Geographic characteristics of existing Saline Valley borrow sites

Borrow Site	Material*	USGS 7.5' Quadrangle	Location	Elev. (feet)
Cowhorn	shale, decomp. granite	Joshua Flats, CA	T9S, R36E, Sect 1	6,720
Waucoba	decomp. granite	Waucoba Canyon, CA	T11S, R37E, Sect 28	5,000
Crusher	decomp. granite	West Ubehebe Peak, CA	T15S, R39E, Sect 1	1,266
Ubehebe	unknown	Nelson Range, CA	T15S, R40E, Sect 33	3,000
Camp	decomp. granite	Jackass Canyon, CA	unsurveyed	4,000
Tin Barn	decomp. granite	Jackass Canyon, CA	unsurveyed	5,655
Corral	unknown	Jackass Canyon, CA	unsurveyed	6,160
Lee Flat	decomp. granite	Lee Wash, CA	T16S, R40E, Sect 13	5,320

Source: Cultural Resources Report (NPS 2010c)
*decomp. granite = decomposed granite

Location maps for each of the eight original sites are presented in appendix A of this report (maps A-1 through A-8). The DVNP Cultural Resources Assessment (NPS 2010c) provides the following descriptions of the eight prospective borrow sites:

Cowhorn: The borrow site is comprised of a sloping surface, bounded by the highway and a small hill on the west side, and a steep slope to the east. The vegetation present is comprised of sagebrush, Joshua trees, ephedra, Russian thistle, and bunchgrasses.

Waucoba: The borrow site is comprised of a narrow flat located between two ridges, bordered on the east side by the Waucoba-Saline Road, and by a hillslope to the north and west. The surface is rocky and vegetation is dominated by bursage and grasses.

Crusher: The borrow site is comprised of an open and shallowly sloping area with mainly sandy granitic gravels and some larger rocks. A majority of the vegetation present is creosote.

Ubehebe: The borrow site is comprised of an open area that slopes to the northeast and is sparsely covered with shrubby vegetation, predominantly creosote. Small basalt boulders are interspersed throughout the survey area. The proposed borrow pit expansion area is bisected

by one large wash, and several smaller drainages. The existing borrow pit was formally closed in the past and the road ripped, and the road and pit have partially revegetated.

Camp: The borrow site is comprised of an open area that slopes to the north, with sandy soils. The borrow pit is bordered to the north by large granite rock outcroppings, which appear to be a popular place for climbing and camping. The Camp borrow pit has become over the years a popular campsite, with at least one school group using the former borrow pit area as a multi-week campsite. Vegetation present at the site includes mainly grass and shrub species, including ephedra, desert paintbrush, sagebrush, and beavertail cactus.

Tin Barn: The borrow site is comprised of a drainage which runs through the center of the proposed pit, surrounded by steeply sloping terrain both east and west of the drainage. Vegetation present includes sagebrush, pinyon, juniper, and various shrubs and grasses. The borrow pit and drainage appear to be sporadically used for camping.

Corral: The borrow site is sloping to the south and covered with sagebrush and assorted grasses. The sediment is comprised of tan sandy silt, with basalt rock outcrops present in the northern section of the site, a sandy wash defining the eastern edge of the site, and the current corral defining the western edge. According to John Hunter, his family has been using the corral for many years, and the site is of the right age to qualify as a historic archeological site. The corral is still in use today and appears to have been modified many times over the years.

Lee Flat: The borrow site is largely flat with grasses, brushy vegetation, cholla, and Joshua trees interspersed throughout the site, with the exception of the existing pit which is highly disturbed though some natural revegetation has occurred. The sediment is comprised of a light brown sandy silt with occasional scattered basalt rocks. There is also evidence of recent cow trails, tracks, and flops throughout the survey area. There is abundant rodent sign, with many burrows and packrat nests near downed Joshua trees. The existing borrow pit appears to be used intermittently by campers.

Subsequent to the cultural survey, the Park conducted an Inter-Disciplinary Team (IDT) site visit on March 26, 2010. Park managers and resource staff, environmental consultants, and representatives of the Inyo County Road Department toured five of the borrow sites in the southern portion of the project area, and discussed potential issues and concerns related to the project. Two of the key concerns were the presence of a significant cultural site within the Corral borrow site and possible sensitive species habitat at the Lee Flat site. Lee Flat is located within the northern range of the Mohave ground squirrel (*Spermophilus mohavensis*), a California state-listed threatened species (Leitner 2008).

As a result of the resource surveys and the IDT visit, the Park Superintendent decided to eliminate the Corral and Lee Flat borrow sites from further consideration for reactivation.

External Scoping. Based on the internal scoping and site review, the Park released a public scoping letter and project description on July 20, 2010, that was mailed directly to interested parties and posted on the NPS "Planning, Environment, and Public Comment" (PEPC) website. The Park received 12 responses within the 30-day comment period and three additional comments shortly afterwards. Four

of the twelve responses were from public interest groups and one was from a federal agency (U.S. Fish and Wildlife Service).

1.2.2 Issues

The following general issue topics were identified during the internal and public scoping process:

1. Road maintenance to facilitate access to recreation sites.
2. Consistency with NPS regulations, policy, and DVNP plans.
3. Protection of sensitive biological and cultural resources.
4. Preservation of historic conditions and landscape.

Most public respondents voiced support of the proposed reactivation and/or expansion of the borrow sites in order to repair and maintain Saline Valley Road. The road provides the only direct access to Saline Valley Warm Springs, a popular recreation site located in the central part of Saline Valley. Support of the proposed action was conditioned, in some cases, on the project not harming other park resources such as endangered species and archeological sites, or changing the rugged and remote nature of Saline Valley Road and the surrounding landscape.

1.2.3 Impact Topics

Specific impact topics were developed for discussion focus, and to allow comparison of the environmental consequences of each alternative. These impact topics were identified based on federal laws, regulations, and Executive Orders; 2006 NPS Management Policies; and NPS knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic is given below, as is the rationale for dismissing specific topics from further consideration.

1.2.4 Impact Topics Included in the Analysis

The following are descriptions of the impact topics included in this environmental assessment and the rationale for their inclusion.

Geologic Resources and Soils

According to NPS Management Policies, gravel and sand materials from borrow pits on park lands may only be extracted and used for in-park purposes after compliance with NEPA and NHPA and written findings that:

- extraction and use of in-park borrow materials does not or will not impair park resources or values; and
- it is the park's most reasonable alternative based on economic, environmental, and ecological considerations; and
- no outside sources are reasonably available;
- after compliance with other applicable federal, state, and local requirements.

Parks should use existing pits, quarries, or sources, or create new pits, quarries, or sources in the park only after developing and implementing a parkwide borrow management plan that addresses the cumulative effects of borrow site extraction, restoration, and importation (NPS 2006).

The Park is also responsible for preserving soil resources of parks and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources. When soil excavation is an unavoidable part of an approved facility development project, the Service will minimize soil excavation, erosion, and off-site soil migration during and after the development activity (NPS 2006).

Paleontological resources, including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research. All NPS construction projects in areas with potential paleontological resources must be preceded by a preconstruction surface assessment prior to disturbance. For any occurrences noted, or when the site may yield paleontological resources, the site will be avoided or the resources will, if necessary, be collected and properly cared for before construction begins. Areas with potential paleontological resources must also be monitored during construction projects (NPS 2006).

The proposed action involves reactivation of existing borrow pits and the possible expansion of these pits. Reactivation of the sites would result in more sand and gravel material being removed from the existing pit area. Expansion of the pits would result in the removal of existing vegetation and topsoil, and the disturbance of other surface and sub-surface resources.

Species of Special Concern

Section 7 of the federal Endangered Species Act (ESA) requires that a federal agency consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service on any action that may affect endangered or threatened species or candidate species, or that may result in adverse modification of critical habitat. An EA or an environmental impact statement (EIS) may provide sufficient information to serve as a biological assessment for section 7 purposes. If a separate biological assessment is prepared, it must be part of any NEPA document (NPS 2001).

It is also NPS policy to inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance (NPS 2006).

Within Death Valley National Park there are confirmed populations or habitats for 21 state or federally recognized species of concern (NPS 2002). Because of the potential presence of special status species on the proposed Saline Valley Road borrow sites, a biological survey and review are required.

Continued excavation from the existing borrows pits, or expansion of the pits to adjacent areas, could harm animal and plant species within the site footprint. Of the eight borrow sites reviewed, however, only Lee Flat was deemed likely to contain species of special concern (the state-listed Mohave ground squirrel), and consequently was eliminated from further consideration.

Unique or Important Wildlife or Wildlife Habitat

The Organic Act of 1916 that created the NPS states that the Service will "…conserve the scenery and the natural and historic objects and the wildlife therein and ... provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 U.S. Code 1, the National Park Service Organic Act) (NPS 2001).

Death Valley National Park and the adjacent desert support a variety of wildlife species. Within Death Valley and the surrounding desert there are 51 species of native mammals, two species of exotic mammals, more than 346 species of birds, 36 species of reptiles, three species of amphibians, and six species of fishes. Small mammals are more numerous than large mammals such as desert bighorn, bobcat, mountain lion, and mule deer. (NPS 2002).

The Saline Valley Road and adjacent borrow sites are located in the desert scrub vegetation type, which dominates about three-fourths of the Park landscape. This type includes the alkali sink, creosote bush scrub, shadscale scrub, and sagebrush scrub communities (NPS 2002). None of the sites includes riparian habitats although some are upstream of potential xeric riparian zones. The prospective Lee Flat borrow site is in an area dominated by Joshua trees (*Yucca brevifolia*), a unique desert woodland species that may be threatened by climate change (Gucker 2006). However, this site was already eliminated from consideration due to the possible presence of the state-listed Mohave ground squirrel.

Although the proposed excavation activities would destroy vegetation and wildlife within the borrow pit or expansion area, measures would be taken to minimize impacts to adjacent habitat outside the approved project footprint.

Introduce or Promote Non-Native Species (Plant or Animal)

It is NPS policy to prevent the introduction of non-native (exotic) species into units of the national park system, and to remove, when possible, or otherwise contain individuals or populations of these species that have already become established in parks (NPS 2006).

Since it has been determined that importing sand and gravel from outside the Park is infeasible, the potential introduction of non-native species into the Park is not a significant issue. However, a 2010 botanical survey found that non-native, invasive plant species have become established at some of the six proposed borrow sites (NPS 2010a). This will require that the sites be treated with herbicides prior to moving borrow material to other areas of the Park along Saline Valley Road.

Visitor Experience, Aesthetic Resources

The backcountry of Death Valley has been used primarily by California residents who return to seek solitude and desert scenery (NPS 2002). Saline Valley Road is a graded dirt road that serves as access to trails located in the Inyo Mountains on Bureau of Land Management and U.S. Forest Service lands. The road also provides access to the Saline Valley Warm Springs area which attracts many visitors. It is estimated that as many as 14,000 people travel the Saline Valley Road each year, with Park rangers reporting 120 vehicles parked at the springs during the Thanksgiving Day holiday in 1996 (NPS 2002).

Unmaintained or minimally maintained dirt roads like Saline Valley Road provide a unique experience to park visitors (NPS 2002). Some visitors experience a strong sense of exploration, challenge, and adventure. Travel speeds are slow to moderate, with the potential of frequent stops. The areas through

which the Saline Valley Road passes are predominantly natural but with some evidence of people having used the area in the past and present.

The borrow pits being considered for reactivation are part of the existing landscape as they were developed prior to NPS acquisition of the area. The pits were last used in the 1990s, and none have been restored to their pre-disturbance condition. Although reactivation of the pits would not likely change the appearance of the local landscape, the proposed expansion of the pits would disturb much larger areas and may affect visitors' experience of the roadside viewscape.

Archeological Resources

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic and prehistoric properties, and to 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 (NPS 2001).

Prehistoric archeological sites are present throughout the Park at all elevations and in all environments. Historic archeological sites in the Park are largely associated with transportation corridors, water sources, and mining and ranching operations of the late 19th and early 20th centuries. The research and information potential of archeological sites is an important aspect of their National Register eligibility (NPS 2002).

Most of the prospective borrow sites along Saline Valley Road are located in alluvial deposits that are not considered prime locations for archeological sites. Park archeologists surveyed each of the sites to determine if any significant archeological or historical resources would be impacted by the proposed reactivation and expansion of the borrow sites. As a result of these surveys, the Corral site was eliminated from further consideration so as not to impact potential historical structures.

1.2.5 Impact Topics Dismissed from Further Consideration

The following impact topics were initially considered in the screening process but were dismissed from further analysis because they did not appear to significantly affect, or be affected by, the proposed action.

Geohazards

Naturally occurring geologic processes, which the NPS is charged to preserve unimpaired, can be hazardous to humans and park infrastructure. These may include earthquakes, volcanic eruptions, mudflows, landslides, floods, shoreline processes, tsunamis, and avalanches (NPS 2002).

The existing borrow sites and proposed expansion areas are located on alluvial fans or depositional areas that are in geologically stable terrain. The borrow pits (with the exception of the Tin Barn site) have shallow slopes, and any new excavation will be required to maintain gradual slopes on the edge of the pit. The pits will be designed so as not to create downslope or downstream landslide or mudflow hazard.

Air Quality

The NPS has a responsibility to protect air quality under both the 1916 Organic Act and the Clean Air Act of 1970 (CAA). Accordingly, the Service seeks to perpetuate the best possible air quality in parks to (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas (NPS 2006).

The management and enforcement of the Clean Air Act's air quality standards in the portion of the Death Valley National Park area incorporating the Saline Valley Road borrow sites (Inyo County) is conducted by the Great Basin Unified Air Pollution Control District (NPS 2002; GBUAPCD 2011). The Clean Air Act developed national ambient air quality standards for a finite number of criteria pollutants. The criteria pollutants are: sulfur dioxide, carbon monoxide, total suspended particulates, nitrogen oxides, lead, ozone, and particulate matter less than 10 microns in diameter (PM_{10}).

The principal air pollutant in the Saline Valley project area is fine dust (PM_{10}). In the most recent assessment, the eastern portion of Inyo County was designated as an "unclassified" area for national ambient air quality standards for PM_{10} but as a "non-attainment" area for state standards (ARB 2011).

Reactivation and expansion of the Saline Valley borrow sites will likely cause a temporary increase in dust and construction vehicle emissions during excavation. As with similar borrow site activities at the Park, heavy equipment such as D8 bulldozers, loaders, belly dumps, bobtail trucks, haul trucks, and maintenance trucks would be used in the excavation and processing of the sand and gravel material (NPS 2007). Processing activities would likely include a "grizzly" screening plant, which is a portable screen that separates the minerals based on particle size.

Best available control technology, such as maintaining a moist aggregate surface, will be used to suppress dust during the extraction, processing, and hauling of the material from the site. Long-term dust control will be accomplished by reclaiming the borrow site upon deactivation. Due to the temporary and short-term nature of the excavation activities, the proposed action is deemed to have a negligible effect on air quality and is dismissed from further analysis.

Soundscapes

Natural soundscape resources encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. The NPS will take action to prevent or minimize all noise that through frequency, magnitude, or duration adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified through monitoring as being acceptable to or appropriate for visitor uses at the sites being monitored (NPS 2006).

Vehicle noise is generally not an issue in DVNP because most of the Park area is well away from traffic and its noise (NPS 2002). Nearby off-highway vehicle open areas and mining operations cause noise in some areas of the Park. A more widespread noise impact is caused by the frequent low-level military overflights that occur in the Panamint and Saline Valleys.

Excavation and processing of the sand and gravel material at the proposed borrow sites will temporarily increase local ambient noise levels. Analysis of a similar borrow site at DVNP indicated that because the noise is concentrated within the processing area, is partially shielded by the pit walls, is typically far

from likely receptors, and will be of short duration, the proposed action will not likely have a significant effect on the local or regional soundscape (NPS 2007).

Water Quality or Quantity

The pollution of surface water and groundwater by both point and non-point sources can impair the natural functioning of aquatic and terrestrial ecosystems and diminish the utility of park waters for visitor use and enjoyment. The NPS will take all necessary actions to maintain or restore the quality of surface waters and groundwater within the Park consistent with the federal Clean Water Act (CWA) and all other applicable federal, state, and local laws and regulations (NPS 2006).

Although there are no perennial springs or streams within the existing borrow sites or their proposed expansion areas, the sites are situated near to ephemeral stream channels, and further excavation of these sites could produce sediments that would affect downstream water quality. However, with implementation of the proposed mitigation measures, including containment of runoff from the pits, potential impacts to water quality and quantity will be negligible.

Streamflow Characteristics

The NPS manages watersheds as complete hydrologic systems in order to minimize human-caused disturbance to the natural upland processes that deliver water, sediment, and wood debris to streams (NPS 2006). The NPS protects watershed and stream features primarily by avoiding impacts on watershed and riparian vegetation and by allowing natural fluvial processes to proceed unimpeded.

Most of the Saline Valley borrow sites are located on the lower slopes of alluvial fans, near tributary or distributary channels of dry washes (ephemeral streams). Only the Tin Barn site is immediately upstream from a channel exhibiting riparian habitat. The access road to the Ubehebe site crosses a dry wash. The Corral site is located near a permanent water source but was dismissed from further consideration.

All borrow pits will be designed to prevent off-site flow of storm water or sediments. Consequently, the only changes to streamflow characteristics will be the disruption of drainage within the disturbed area, which is expected to have a negligible overall effect on ephemeral streamflow and watershed functionality.

Marine or Estuarine Resources

No marine or estuarine resources occur in the project area.

Floodplains or Wetlands

Executive Orders 11988 and 11990, Floodplain Management and Wetland Protection, direct NPS to avoid, to the extent possible, the long- and short-term adverse impacts associated with modifying or occupying floodplains and wetlands. They also require NPS to avoid direct or indirect support of floodplain or wetland development whenever there is a practical alternative (NPS 2001, 2002).

All but one of the proposed borrow sites are located on the lower slopes of alluvial fans and do not impact floodplains or wetland areas. The Tin Barn site is located across the road above a small wetland area within Grapevine Canyon. The proposed pit extractions will result in no impacts to the hydrologic and sediment regime of the wetland, provided that runoff from the disturbed area is contained, i.e. a

berm or dam on the downslope end is maintained at a height which will contain any runoff from the pit during times of heavy rains.

Land Use, Including Occupancy, Income, Values, Ownership, Type of Use

All of the existing Saline Valley Road borrow sites and proposed expansion areas are on land acquired by DVNP during the 1994 park expansion (NPS 2002). The borrow sites and their access roads were excluded from designated wilderness areas and most are connected to the nearby road by a "cherry-stem" extension.

Although adjacent to designated wilderness, the noise and dust generated by the occasional, short-term use of the borrow sites is not anticipated to have any significant impact on wilderness values above other current activities.

No permanent residences are located near the borrow sites. The Corral site, the one site containing a man-made structure (corral), is part of an active grazing allotment but was eliminated from further consideration because of historic property concerns.

Rare or Unusual Vegetation

A management objective of DVNP is to ensure the perpetuation of rare and endangered plants and animals and those species endemic (specific) to Death Valley National Park (NPS 2002).

The DVNP contains three federally listed species, two California Rare species, 34 plants considered rare and endangered by the California Native Plant Society, and an additional 103 rare species of management concern. However, none of these species were found in the vegetation surveys of 2010, nor are they known to occur in the habitats where the borrow sites are located.

Unique Ecosystems, Biosphere Reserves, World Heritage Sites

DVNP is part of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) - designated Mojave and Colorado Deserts Biosphere Reserve. The proposed action, if implemented, would not change or significantly affect that designation.

Unique or Important Fish or Fish Habitat

No unique or important fish or fish habitat occurs in the project area or immediately downstream from the project area.

Recreation Resources, Including Supply, Demand, Visitation, Activities

The 1916 Organic Act, which created the NPS, directs the Service to conserve park resources "unimpaired" for the enjoyment of future generations. The 1970 National Park System General Authorities Act, as amended in 1978, prohibits the Service from allowing any activities that would cause derogation of the values and purposes for which the parks have been established (except as directly and specifically provided by Congress) (NPS 2006).

The Saline Valley Warm Springs, a popular recreation area within the Park's 1994 expansion area, is accessed by Saline Valley Road. Reactivation of the borrow sites will allow for repair and maintenance of this access route, and facilitate travel to the springs. Some of the existing borrow sites are used occasionally for roadside camping; although this is incidental to the use of the site for borrow material.

Regardless of the action taken, Inyo County will continue to maintain Saline Valley Road to some extent and the public will continue to access recreational resources in Saline Valley.

Prehistoric/Historic Structure

NPS policy states that the treatment of historic and prehistoric structures will be based on sound preservation practices to enable the long-term preservation of a structure's historic features, materials, and qualities. There are three types of treatment for extant structures: preservation, rehabilitation, and restoration (NPS 2006).

As part of the cultural survey conducted for this project, it was determined that the livestock corral at the Corral borrow site may be eligible for listing on the National Register of Historic Places. As a result, the decision was made to eliminate this site from further consideration.

Cultural Landscapes

NPS policy is to treat cultural landscapes so as to preserve significant physical attributes, biotic systems, and uses when those uses contribute to historical significance. Treatment decisions will be based on a cultural landscape's historical significance over time, existing conditions, and use. Treatment decisions will consider both the natural and built characteristics and features of a landscape, the dynamics inherent in natural processes and continued use, and the concerns of traditionally associated peoples (NPS 2006).

Many cultural landscapes exist in the Park that are potentially eligible for listing on the National Register, but cultural landscape studies have not been undertaken to identify their character-defining elements. Landscapes reflecting mining, ranching, ethnographic, and administrative activities can be seen throughout the Park. The cultural resources survey conducted for this project did not identify any of the borrow sites as being within established cultural landscapes.

Ethnographic Resources

Park ethnographic resources are the cultural and natural features of a park that are of traditional significance to traditionally associated peoples. These peoples are the contemporary park neighbors and ethnic or occupational communities that have been associated with a park for two or more generations (40 years), and whose interests in the park's resources began before the park's establishment (NPS 2006).

No ethnographic resources were identified as being associated with any of the proposed borrow sites. The Corral, Tin Barn, Camp, Ubehebe, and Crusher borrow sites are located in the Timbisha Shoshone Natural and Cultural Preservation Area. While no prehistoric or ethnographic sites are identified as being in the project area, there are several ethnohistoric villages in the Saline Valley area. The Timbisha Shoshone Tribal Historic Preservation Officer (THPO) has been contacted during compliance for this project.

Museum Collections

DVNP staff are responsible for monitoring, documenting, and preserving a large, diverse museum collection that includes more than 177,000 cataloged objects and specimens, some stored in substandard conditions. An additional 23,000 archeological artifacts and records are located at the NPS

Western Archeological Center in Tucson, Arizona. Museum collections include historical objects and archival documents, archeological artifacts, ethnological materials, biological specimens, geological samples, and paleontological materials (NPS 2002).

The proposed borrow site reactivation and expansion would have no effect on the collection or curation of museum objects.

Socioeconomics, Including Employment, Occupation, Income Changes, Tax Base, Infrastructure

The borrow sites are located in a remote area of DVNP far from population centers. Although the reactivation of the borrow sites and the associated improvement to Saline Valley Road may facilitate access to recreational areas, it is not anticipated to substantially affect the local economy or employment in the region.

Minority and Low Income Populations, Ethnography, Size, Migration Patterns

Executive Order 12898, Environmental Justice in Minority and Low-Income Populations, directs federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority and low income populations (NPS 2004).

The borrow sites are located in a remote area of DVNP far from population centers. The proposed action will not disproportionately affect low income or minority populations, or affect traditional use of the area.

Energy Resources

No energy resources will be affected by this proposed action.

Other Agency or Tribal Land Use Plans or Policies

The U.S. Department of the Interior, Secretarial Order 3175 and ECM95–2 memoranda require bureaus to explicitly address environmental impacts of their proposed actions on Indian Trust Resources in any environmental document (NPS 2001).

No Indian Trust lands are involved in this proposed action.

Resource, Including Energy, Conservation Potential, Sustainability

An unquantified amount of vehicle and equipment fuel will likely be saved by Inyo County Road Department by mining sand and gravel from borrow sites within the Park rather than hauling it from outside the Park. This assumption was inherent in the decision to allow use of the in-park borrow sites for maintaining Saline Valley Road.

Urban Quality, Gateway Communities

Panamint Springs Resort on State Highway 190 is near the southern entrance to Saline Valley Road, and Big Pine is located west of the northern entrance. Visitors to the Saline Valley likely represent only a small portion of persons using services at these two DVNP "gateway communities." Reactivation and expansion of the borrow sites and improved maintenance of Saline Valley Road will likely have no significant effect on these communities.

Long-Term Management of Resources or Land/Resource Productivity

The NPS requires all persons who conduct mineral development within parks to do so in conformance with applicable statutes, regulations, and NPS policies (NPS 2006). These statutes include the Mining in the Parks Act, the Mineral Leasing Act, the Acquired Lands Mineral Leasing Act, the Surface Mining Control and Reclamation Act of 1977, the National Park System General Authorities Act, the Alaska National Interest Lands Conservation Act, and enabling statutes for individual parks. Applicable regulations include 36 CFR Part 9, Subpart A and Subpart B; 43 CFR Parts 3100–3500; and special use regulations.

As part of their operation permit, the Inyo County Road Department will be required to reclaim and revegetate borrow sites once extraction is complete. The restoration to near natural conditions will support the long-term sustainability of the local ecosystems.

2 ALTERNATIVES

This section identifies the alternatives considered in the environmental analysis and evaluates how they meet the objectives specified in the purpose and need section.

2.1 THE NO ACTION ALTERNATIVE (ALTERNATIVE A)

The No Action Alternative represents the Park's ongoing routine of resource management and implementing previously approved plans. The No Action Alternative provides a basis for comparing present Park operations with the action alternatives and their anticipated environmental consequences. Should the No Action Alternative be selected, the NPS would respond to future needs and conditions without major actions or changes in the present course.

Under the No Action Alternative, the NPS would not issue a permit to Inyo County to reactivate the existing borrow pits or to expand the pits beyond their current borders. Inyo County would need to import sand and gravel for road repair and maintenance from outside the Park, re-use material currently within the roadway, or employ other methods for maintaining the Saline Valley Road. There would be no requirement for Inyo County to maintain or reclaim the existing borrow sites or restore surface vegetation. Implementation of the No Action Alternative would result in no additional impact to biological or cultural resources at the borrow sites beyond that currently occurring.

2.2 THE EXISTING BORROW PIT ALTERNATIVE – PREFERRED (ALTERNATIVE B)

Under the Existing Borrow Pit Alternative, the NPS would issue Inyo County a 20-year permit to excavate and process sand and gravel only from selected, existing borrow pits. No expansion of the pits would be allowed. This alternative would protect biological and cultural resources in the proposed (undisturbed) expansion area. However, it would greatly limit the amount of borrow material available for maintenance of Saline Valley Road. This alternative would likely result in the excavation of deeper pits at each site. At the end of the permit period, the County and the NPS will evaluate the need for continued use of the pits. If the NPS decides that keeping the pits open agrees with Park management objectives, another NEPA analysis would be needed before permits could be issued for continued extraction from the pits. If it is decided that any (or all) of the pits are no longer suitable as a source of road material, the County will reclaim the borrow sites at the end of the permit period.

2.3 THE EXPANDED BORROW PIT ALTERNATIVE (ALTERNATIVE C)

Under the Expanded Borrow Pit Alternative, the NPS would issue Inyo County a 20-year permit to excavate and process sand and gravel from the existing borrow pits as well as their adjacent expansion areas. This alternative would greatly increase the supply of sand and gravel for road maintenance and would allow the pits to remain active longer. Implementation of this alternative would result in the disturbance of several acres of native habitat. Visitor experience could be altered as the pits grow to many times their current size, and there would be potential impacts to water and air resources. At the end of the permit period under this alternative, the County and the NPS will evaluate the need for continued use of the pits. If the NPS decides that keeping the pits open agrees with Park management objectives, another NEPA analysis would be needed before permits could be issued for continued

extraction from the pits. If it is decided that any (or all) of the pits are no longer suitable as a source of road material, the County will reclaim and revegetate the borrow sites at the end of the permit period.

Site maps showing the surveyed boundaries of the existing borrow pits and proposed expansion areas are presented in appendix B (maps B-1 through B-6). Note that the expansion area boundaries in these maps were modified from the County's initially surveyed areas. These maps represent the Park's approved expansion boundaries. In some cases the original pit area has been modified to keep the work area within Park boundaries, away from roads, or to otherwise limit future pit activities to a specific area.

2.4 SAND AND GRAVEL DEMAND AND SUPPLY

In order to achieve its objective to "maintain Saline Valley Road to its current surface condition by Inyo County" while meeting its mandate to minimize impact to park resources, the Park needs to balance the borrow-material supply with the actual demand. The following discussion presents a basis for determining the demand and supply requirements of the project.

Photos C-1 through C-4 in appendix C show representative conditions on the Saline Valley Road between the Ubehebe and Lee Flat borrow sites. Photos C-5 through C-12 depict site conditions at the eight original existing borrow sites.

2.4.1 Sand and Gravel Demand Assumptions

In their permit request, the Inyo County Road Department did not quantify the amount of sand and gravel needed to maintain Saline Valley Road over the next 20 years. Instead, the County provided the Park with GPS survey data showing the boundaries of the existing eight borrow pits and proposed expansion areas containing similar borrow material.

The following simplifying assumptions were made in determining the sand and gravel requirements for road maintenance:

- The in-park portion of Saline Valley Road is 71.3 miles long.
- Over the next 20 years, the equivalent of 6 inches (0.17 yards) of gravel "lift" would be required over the entire length of the in-park portion of the road (see table D-1, appendix D).
- The average road width is 20 feet (6.67 yards).

Calculations in table D-2 show that the total amount of gravel needed, based on the simplifying assumptions, would be about 140,000 cubic yards. Note that in actuality the County will not be spreading gravel evenly over the entire length of the road but will apply the material to select sections or crossings needing maintenance. However, without specific information on where the material is needed, to what depth, and at what frequency, the assumptions above serve as a reasonable first approximation.

The amount of sand and gravel material previously used on the road during the past 20 years or more can be estimated from the amount of material excavated from the original eight borrow pits. Table D-3 uses the pit areas provided by the County and the average depth (visual estimate) of each pit to determine the total excavated volume from these eight sites. The total estimated volume of borrow

material extracted is about 84,000 cubic yards. This amount may underestimate the total material used to maintain Saline Valley Road because it does not account for other gravel sources available to the County prior to the Park's acquisition of the area. A conservative upper limit of the amount of borrow material used in the past to maintain the road would be 100,000 cubic yards. This estimate of the amount of borrow material used for past maintenance indicates that the assumed requirement of 140,000 cubic yards is likely sufficient to meet the road maintenance needs for the next 20 years.

2.4.2 Gravel Availability From Borrow Sites

Tables D-4 and D-5 provide estimates of how much sand and gravel could be excavated from the existing six (approved) pits and expansion areas currently under consideration, given certain assumptions about area and average depth. Under Alternative B (existing pits), the existing six pits would have to be excavated to an average depth of 2.6 yards (8 feet) below their current surface level to acquire enough material to meet the demand (146,000 cubic yards). The Tin Barn site is an exception; only a small amount of material would be removed from this site in order to bring the pit walls into compliance with the 3:1 (H:V, height to vertical distance) side slope requirements. The total area to be excavated across all six sites would be about 12 acres (i.e., the cumulative area of the existing pits).

Under Alternative C (expanded pits), a much larger area would be available for excavation (41 acres). The average depth for most sites could be as low as 1 yard (3 feet). If the entire area were used, the cumulative volume of sand and gravel available from the expanded sites would be at least 196,000 cubic yards, about twice the amount previously extracted from these areas, and about 40 percent more than the estimated requirement. Note that under the original County request, 52 acres would have been disturbed and at least 250,000 cubic yards of material potentially obtained from the six borrow sites (calculations not shown).

A key distinction between the two action alternatives is that the pits would need to be excavated much deeper if only the existing pits were used instead of the existing pits plus expansion areas. A pit with an average depth of 4 yards (12 feet) would require that some parts be much deeper to allow for 3:1 side slopes. These deep pits could present a safety hazard to humans and wildlife, and be more challenging to reclaim at the end of the permit period, assuming that the County required all of the available borrow material. Expanding the pits into the approved expansion areas would allow the County more flexibility regarding where they acquire the needed material, would likely keep the pits shallower, and would allow the pits to be more easily re-contoured for reclamation and revegetation.

2.5 PROPOSED BORROW PIT OPERATIONS

Borrow pit operations will be the same at each of the six borrow sites and for both action alternatives. The proposed operations will be similar to those used at the DVNP Towne Pass borrow site (NPS 2007). The NPS will require Inyo County Road Department to submit an operations and reclamation plan for Park review and approval prior to issuing a special use permit to use the sites. The pit area, access road, and stockpile areas will be included in the plans.

Operations at the borrow sites will take place on an intermittent basis over the next 20 years. The NPS determined 20 years to be a reasonable period of use for the site based on park planning considerations, monitoring requirements, and Inyo County road maintenance needs. Each borrow site will be reclaimed after the extractable material has been removed or at the end of the 20-year permit period.

While the borrow sites are in active use, material will be excavated on an as-needed basis. Material extraction operations may include the use of a D8 bulldozer, loaders, belly dumps, bobtail trucks, haul trucks, and a maintenance truck. Material extraction will proceed to a depth of no more than 12 feet (4 yards) below the local surface elevation. Slopes within the site will be no greater than 3:1. A 50-foot setback from the property boundary will be implemented for all extraction activity.

Processing activities will likely include a "grizzly" screening plant, which is a portable separation screen that requires no power to operate and separates minerals based upon particle size. This aspect of the operations will generate noise and emissions. A portable screening operation may be moved onto the site during periods of operation. Usable and unusable material will be separated at the screening plant and stored in the stockpile area. Usable material will eventually be transported off site. Fine-grained unusable road maintenance material will be stockpiled for use in reclamation. Unusable material is estimated to compose 5 percent of the extracted volume, which is more than the amount of waste needed for re-soiling.

Aggregate production consumes energy in a number of ways. The vehicles used to extract and transport the material use petroleum fuels and lubricants, and the processing equipment consumes electricity. The amount of fuel used to deliver aggregates to road maintenance sites will be dependent on the haul distance and per-mile consumption. The amount of fuel consumed varies with the size of the load, miles traveled, and the number of stops and turns along the route. Fuel use within the site for extraction activities will be more constant. During extraction operations, diesel fuel may be stored on the site for on-site activities in an above-ground fuel tank. The tank will be situated within a Lahontan Regional Water Quality Control Board-approved containment basin. The Inyo County Road Department will adhere to all applicable and appropriate best management practices (BMPs). A complete HazMat (hazardous material) plan will be developed by the Road Department and included in the Operations Plan. Fuel use associated with reclamation activities will be insignificant in comparison to fuel use for operations activities, and will not require on-site storage.

Electricity will be needed at the plant for washing, screening, and mixing operations. A standard trailer-mounted, portable, diesel generator will likely be provided to produce the needed electricity. Use of generator facilities will take place during daylight hours on an as-needed basis. Electricity will not be needed for reclamation activities.

Water requirements for this site will be limited to that needed for processing and dust control. Water will be purchased from a potable water source and trucked to the site; the water will not be grey water. The only type of wastewater produced by this proposed operation will be processing and screening water that will be collected in the sedimentation basins and allowed to evaporate or infiltrate. Bottled water will be trucked to the site to provide safe drinking water for employees. During operations, commercial, self-contained, portable toilets will be brought to the site and maintained by a commercial vendor. Water will not be used in revegetation efforts; rather, the soil will be raked and native seeds spread and left to germinate on their own.

The hours of operation have the potential to be 24 hours per day, 7 days per week, on an intermittent, emergency-maintenance-use basis. Most use will occur during regular business hours of 7 a.m. to 5 p.m., Monday through Friday, primarily during daylight hours. It is estimated that this operation will employ two or three people.

During the operational phase, transportation by employees to the site will not significantly increase traffic on Saline Valley Road. Transportation of aggregate resources to road maintenance locations will not increase traffic on Saline Valley Road except during periods of emergency road repairs. Transportation during concurrent reclamation activities will not add appreciably to the extraction operations' effects.

The termination date for the borrow site operations is 20 years from date of permit approval. Renewal of this activity may be sought after the termination date if the demand for the minerals is delayed. Renewal will only be granted if there is an advance indication that the need for materials will continue. After completion of the extraction phase, final site reclamation will be implemented.

Reclamation of this site will not preclude additional extraction operations at a future date. The aggregate resource is believed to extend beyond 20 feet deep; the current operations plan will not have exhausted on-site aggregate materials resources.

2.6 MITIGATION MEASURES OF THE ACTION ALTERNATIVES

Mitigation measures designed to lessen the adverse effects of the proposed action alternatives are presented in appendix E of this report. In general, the measures are designed to:

- comply with federal laws and regulations and NPS policies;
- minimize wind and water erosion;
- blend the disturbed lands into the surrounding landscape; and
- return the site to a beneficial end use.

The mitigation requirements include maintenance, monitoring, and reporting during the active life of each pit, and the reclamation, revegetation, monitoring, and reporting at pit closure or abandonment. Reclamation objectives include controlling drainage, stabilizing soils, lessening the time needed for vegetation of the site to recover, and providing an environment conducive to natural reestablishment of vegetation. This will be achieved by:

- re-contouring all disturbances to blend with surrounding topography and restoring natural drainage patterns;
- replacing topsoil or surface fines;
- loosening compacted soils to enhance water absorption and to allow greater penetration of plant root systems;
- stabilizing soils and minimizing erosion; and providing a seedbed, which will encourage natural and aided revegetation.

The six approved borrow sites are located in non-wilderness areas of DVNP that support desert scrub habitats without any special designated uses other than open space. The sites will be reclaimed as open space and wildlife habitat, which will leave the sites in a productive end use that is readily adaptable to alternative end uses and is compatible with the land use designation. Reclamation of the sites will not preclude consideration of the sites for additional extraction operations at a future date. The County will

immediately reclaim and restore any borrow pits that are deactivated or abandoned prior to the end of the 20-year permit period.

2.7 ALTERNATIVES CONSIDERED BUT DISMISSED

The following alternatives were considered during the project scoping phase and were subsequently dismissed from further consideration.

Use of Off-Park Borrow Sources. During the initial review of Inyo County's request to reactivate the Saline Valley borrow pits, the Park was guided by NPS policies regarding in-park use of borrow pits and spoil areas (NPS 2006). Specifically, the Park Superintendent determined that materials from the borrow pits on DVNP land would be extracted and used only:

- by the Park Service or its agents (i.e., Inyo County);
- for in-park administrative uses (i.e., maintenance of Saline Valley Road within Park boundaries);
- after compliance with the National Environmental Policy Act and National Historic Preservation Act, including written findings that:
    - extraction and use of in-park borrow materials does not or will not impair park resources or values; and
    - it is the park's most reasonable alternative based on economic, environmental, and ecological considerations; and
    - no outside sources are reasonably available;
- after compliance with other applicable federal, state, and local requirements.

Consequently, the Park dismissed as infeasible an alternative to haul in sand and gravel material from off-park borrow sites.

Use of Lee Flat and Corral Borrow Sites. As a result of the internal scoping process, two of the eight in-park sites were eliminated from further consideration and analysis. The Lee Flat site at the southern end of the project area was determined to be within the range of the Mohave ground squirrel, a California state-listed threatened species, and would require additional survey and monitoring before reactivation. The Corral site, also in the southern portion of the project area, contains a potentially historic structure and other cultural resources that may be harmed by reactivation or expansion of the borrow pit. Consequently, the Lee Flat and Corral borrow sites were dismissed from further consideration. The Park may choose to re-evaluate the use of these sites after further analysis (i.e., in-depth studies of ground squirrel and historic designations).

Use of County-Delineated Expansion Areas. As part of Inyo County's request for reactivation of the Saline Valley borrow sites, the County Road Department submitted GPS survey data showing the boundaries of the existing borrow pits and the proposed pit expansion areas. After review of likely gravel requirements and environmental considerations, the Park modified the proposed expansion areas to better conform to the Park's management objectives. Specifically, the Park reduced the size of the proposed expansion areas and limited expansion to certain areas. Thus, the County's initial proposed

expansion areas were eliminated from further consideration and instead replaced with Park-specified expansion areas for impact analysis.

2.8 THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE

In accordance with NPS DO-12 (NPS 2001), the NPS is required to identify the "environmentally preferable alternative" in all environmental documents. The environmentally preferable alternative is the alternative that will promote the national environmental policy expressed in NEPA [Sec. 101(b)]. This includes alternatives that:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- 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.
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Given that the primary purpose of Death Valley National Park is to protect "significant desert features that provide world class scenic, scientific, and educational opportunities to visitors and academics to explore and study," the environmentally preferable alternative would be the one that causes least disturbance to the existing landscape and preserves the natural and cultural resources of the area. For this reason, the Existing Borrow Pit Alternative (Alternative B) represents the Park's environmentally preferable alternative for accomplishing the proposed action objectives.

Reactivation of the selected six borrow pits would provide the Inyo County Road Department with enough sand and gravel material to make near-term repairs to Saline Valley Road, as well as fulfill at least some of its long-term road maintenance needs. Since future road maintenance needs are dependent on future weather and road-use conditions, the actual amount of borrow material required cannot be predicted with any certainty. Permitting use of the existing borrow pits would meet the County's immediate requirements while protecting Park resources, yet still allow the County to request expansion of the borrow pits in the future should the need arise.

The Expanded Borrow Pit Alternative (Alternative C) would provide Inyo County with greater assurance that sand and gravel materials would be available for the long-term (20-year) maintenance needs of Saline Valley Road. Having the option to expand the existing pits would allow the County Road Department more flexibility in choosing the appropriate material and pit location needed for their maintenance activities. Expanding the Camp and Ubehebe sites (and to a lesser extent, the Tin Barn site) would provide borrow material closer to the southernmost part of Saline Valley Road, where fewer sites

are located (after elimination of the Lee Flat and Corral borrow sites from consideration). This would decrease the distance, and therefore the fuel energy, required to haul material to the high-maintenance Grapevine Canyon section of the road.

In terms of environmental impacts, the Expanded Borrow Pit Alternative would lead to the disturbance of several more acres of desert habitat, and the possible loss of undetected cultural resources. It would increase the disturbance "footprint" and make the pits more visible to park visitors, perhaps diminishing their recreational experience. Expanding the pits would increase the possible impact on water and air quality, and the soundscape, and reduce use of the area by sensitive species or general wildlife.

Unlike the two action alternatives, the No Action Alternative would protect existing Park resources but would not meet the primary objective of repair and maintenance of Saline Valley Road. If the Park chose not to issue the permit to reactivate and/or expand the selected borrow pits, the County would not be able to properly repair and maintain Saline Valley Road. This would continue to inhibit visitor access to the Warm Springs and other recreational areas within Saline Valley. If the Park did not issue a permit to reactivate the pits, the County would have no reason to reclaim and revegetate the disturbed borrow sites.

2.9 THE PARK PREFERRED ALTERNATIVE

The same rationale that makes the Existing Borrow Pit Alternative (Alternative B) the environmentally preferable alternative makes it the Park's "preferred alternative" for this project. Selecting Alternative B for this project does not preclude future use of the proposed expansion areas. Given the uncertainties as to the actual amount of borrow material needed to maintain Saline Valley Road over the next 20 years, limiting excavation to the existing pits would be a prudent choice to meet the Park's near-term management needs. The pending preparation of the parkwide Borrow Materials Management Plan and Road Management Plan would provide an appropriate venue to revisit the proposal to expand the Saline Valley borrow sites. Table 2 provides a brief summary of the alternatives for comparison.

Table 2. Comparative summary of alternatives

Alternative A - No Action	Alternative B - Preferred Alternative	Alternative C
ACTION: No Action Meets Project Needs? No, does not provide materials for road repair and maintenance.	ACTION: Existing Borrow Pits Meets Project Needs? Yes, meets near-term material needs for road repair and maintenance.	ACTION: Expand Borrow Pits Meets Project Needs? Yes, meets near- and long-term road repair and maintenance needs.

2.10 SUMMARY OF ENVIRONMENTAL CONSEQUENCES/IMPACT COMPARISON MATRIX

Table 3 presents a summary matrix of impacts by topic for each of the three alternatives.

Table 3. Summary of environmental consequences

Impact Topics	Alternative A - No Action	Alternative B - Existing Borrow Pits (Preferred Alternative)	Alternative C - Expanded Borrow Pits
Geologic Resources and Soils	No direct impact on resource. May cause cumulative impact if existing borrow pits not restored.	Minor adverse impact to resource. Restoration of site after permit period would be long-term beneficial impact.	Moderate to major impacts on local geologic and soil resources, depending on extent and depth of excavation. However, meets GMP goal to maintain Saline Valley Road.
Species of Special Concern	No impact on resource.	Potential minor impact to animal species during material excavation and processing.	Potential minor impact to animal species during material excavation and processing.
Unique or Important Wildlife or Wildlife Habitat	No direct impact on resource. May cause cumulative impact if existing borrow pits not restored.	Negligible impact to resource. No unique or important wildlife or habitat at existing borrow pits.	Negligible impact to resource. No unique or important wildlife or habitat at existing borrow pits or expansion areas.
Non-Native Plant Species	No direct impact on resource. May cause cumulative impact if existing borrow pits not restored.	Possible moderate impact on dispersal of species on and off site. Mitigated by treating and stockpiling topsoil on site.	Possible moderate impact on dispersal of species on and off site. Mitigated by treating and stockpiling topsoil on site.
Visitor Experience	Minor impact if no action prevents repair of Saline Valley Road (inhibits visitor access to recreation sites).	Possible minor adverse impact caused by excavation activity. Beneficial impact in the repair of Saline Valley Road and users' access to recreation areas.	Possible minor adverse impact caused by expanded excavation activity. Beneficial impact in the repair of Saline Valley Road and users' access to recreation areas.
Archeological Resources	No impact to resource.	Negligible impact. No significant archeological resources found at existing borrow pits.	Negligible impact. No significant archeological resources found at existing borrow pits.

3 AFFECTED ENVIRONMENT

This section presents information about the existing environment relevant to understanding the impact of the No Action and other alternatives.

3.1 LOCATION AND GENERAL DESCRIPTION

Death Valley National Park includes all of Death Valley, a 156-mile-long north/south-trending trough that formed between two major block-faulted mountain ranges: the Amargosa Range on the east and the Panamint Range on the west. The California Desert Protection Act added most of the Saline, Eureka, northern Panamint, and Greenwater valleys to the Park in 1994 (NPS 2002).

Saline Valley, on the western edge of DVNP, is a northwest-trending alluvial valley located in central Inyo County. The valley is bounded by consolidated rocks of the Saline and Last Change Ranges on the north and northeast, by the Inyo Mountains on the west, by the Nelson Range on the south, and by the Panamint Range on the east (DWR 2004). Saline Valley Road (also known as the Waucoba Saline Road in the northern portion) runs generally north to south along the western edge of the Valley. At about 60 miles south, the road crosses over from Saline Valley into the Lee Flat basin.

The borrow sites are located at variable distances along Saline Valley Road, and one, the Cowhorn site, is located several miles north of Saline Valley. Elevations at the six sites range from about 1,200 feet to 6,700 feet above mean sea level. The borrow sites are generally situated on alluvial slopes containing the type of sand and gravel material needed by the Inyo County Road Department. The entire area is within the Mojave Desert ecoregion, and the borrow sites generally have desert scrub type vegetation, although they are adjacent to desert woodland at higher elevations.

3.2 GEOLOGIC RESOURCES AND SOILS

Death Valley National Park and the Saline Valley are part of the larger Basin and Range Province (NPS 2002). The Park has a complex geology resulting from a range of orogenic and sedimentary processes. The geomorphology of Saline Valley, as with other parts of the Death Valley region, can be divided into three physiographic provinces: the playa floor of the valley; extensive alluvial fans that form a bajada along valley bounding range fronts; and steep, long, essentially bare bedrock hillslopes that rise to high mountain peaks and are incised by deep canyons (Owena et al. 2010).

Miles and Goudey (1997) characterized the geology and soils of the Saline Valley-Cottonwood Mountains ecological region subsection as follows:

> This subsection is between the Inyo Mountains and Death Valley. It includes the Last Chance Range, Saline Range, Cottonwood Mountains, Nelson Range, Saline Valley, Eureka Valley, and many smaller valleys. It has a hot to temperate, arid climate.
>
> Lithology and Stratigraphy. The bedrock is mainly Mesozoic granitic; Paleozoic marine sedimentary; and Tertiary volcanic rocks. Most all of the Paleozoic is represented, at least from Cambrian through Carboniferous. Pliocene volcanic rocks are mostly basalt, but there are other Tertiary volcanic rocks that are silicic. The Quaternary is represented by both alluvial and, in

Saline, Eureka, and Racetrack Valleys, lacustrine deposits. Eolian sand deposits are extensive in Saline and Eureka Valleys.

Geomorphology. This subsection contains steep mountains, moderately steep hills, gently to moderately sloping alluvial fans and pediments, and nearly level floodplain and basin floor. Most of the mountains are aligned north-south, but the Nelson Range is aligned toward the northwest. There are high plateaus in the Nelson Range and on Hunter Mountain that appear to be old pediments. The elevation range is from about 1,100 feet up to 7,063 in the Saline Range, 7,701 in the Nelson Range, 7,454 on Hunter Mountain, 8,456 in the Last Chance Range, and 8,953 feet on Tin Mountain in the Cottonwood Mountains. Mass wasting, fluvial and eolian erosion and deposition, and freeze-thaw are the main geomorphic processes.

Soils. The soils on mountains and hills are mostly Lithic Torriorthents and Aridic Argixerolls, plus shallow Typic Torriorthents and shallow Aridic Haploxerolls on granitic rocks and Lithic Haplargids on volcanic rocks. Soils on alluvial fans and basin floors are mostly Typic and Xeric Torriorthents, plus Xerollic Haplargids and shallow Durorthids on older alluvial fans. There are Typic Salorthids on lacustrine deposits. The soils are well drained, except for poorly drained soils on lacustrine deposits. Soil temperature regimes are mostly thermic and mesic, with some frigid at higher elevations. Soil moisture regimes are aridic, except aquic in some lacustrine deposits.

The Inyo County Road Department selected the existing borrow sites in alluvial deposits that yielded the kind of sand and gravel needed for their road maintenance needs. In 2009/2010, the Road Department mapped potential expansion areas adjacent to these existing pits in order to increase the supply of usable borrow material. These proposed expansion areas were subsequently reduced in size to minimize potential impacts to other resources.

3.3 SPECIES OF SPECIAL CONCERN

Death Valley has three federally listed plant species, two California Rare species, 34 plants considered rare and endangered by the California Native Plant Society, and an additional 103 rare species of management concern. However, none of these plant species of management concern were found in the vegetation surveys of 2010, nor are they known to occur in the habitats where the borrow pits are located.

In June 2010, DVNP biologists surveyed the six proposed borrow sites for wildlife species of special concern (NPS 2010b). During the visits, biologists made incidental observations of mammals, birds, reptiles, invertebrates, and related sign (tracks, feces, burrows, etc.) at each site. Small mammal trapping was conducted at the Waucoba and Camp borrow sites. Observations were also made of vegetation and other conditions at each site. Several “sensitive” species were observed (primarily birds) but none were designated ESA Species of Management Concern. Also in June 2010, the DVNP botanist conducted a botanical survey of the six proposed borrow sites and found no rare, sensitive, or special status species (NPS 2010a).

As part of the agency scoping, the U.S. Fish and Wildlife Service, Ventura Office, reported that, to the best of their present knowledge, no federally listed, proposed, or candidate species, or critical habitat occurs

within the vicinity of the proposed action (USFWS 2010). A subsequent search of the California Department of Fish and Game's Natural Diversity Data Base also indicated no listed state or federal species occurred within the project area.

3.4 UNIQUE OR IMPORTANT WILDLIFE OR WILDLIFE HABITAT

The diversity of Death Valley National Park's plant communities result partly from the region's location in the Mojave Desert, a zone of tension and overlap between the Great Basin Desert to the north and the Sonoran Desert to the south (NPS 2002). This location, combined with the great relief found within the Park—from 282 feet below sea level to 11,049 feet above sea level—supports vegetation typical of three biotic life zones: the lower Sonoran, the Canadian, and the Arctic/Alpine in portions of the Panamint Range. 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.

The Saline Valley borrow sites are located in the desert scrub vegetation type. This is the most extensive vegetation type in DVNP (NPS 2002). This vegetation type dominates about three-fourths of the Park landscape and includes the alkali sink, creosote bush scrub, shadscale scrub, and sagebrush scrub communities. The alkali sink or salt flat community occurs in the lower elevations of the Park.

Some of the borrow sites border on the desert woodland vegetation type. Desert woodland is an open, well-spaced community ranging from elevations of about 7,000 feet up to about 9,500 feet above mean sea level. Much of the soil within this community is bare and surfaced with a hard, wind-scoured layer similar to desert pavement. The community is dominated by singleleaf pinyon pine (*Pinus monophylla*) and scattered individuals of juniper (*Juniperus osteosperma*).

Although the desert scrub and desert woodlands are important components of the DVNP ecosystem, they are not considered unique or important wildlife habitat. The Saline Valley borrow sites are not near wetland or riparian habitats, and they are generally sparsely vegetated. Expansion of the borrow pits would result in the disturbance of several acres of desert habitat during the period of active use. At the end of the 20-year permit period, all sites would be reclaimed and the vegetation restored. Neither the wildlife nor botany surveys conducted in 2010 detected unique or important wildlife nor wildlife habitat at the six proposed borrow sites (beyond those already considered species of special concern) (NPS 2010a, 2010b).

3.5 NON-NATIVE PLANT SPECIES

A botanical survey conducted by the Park Botanist in June 2010 reported that red brome (*Bromus madritensis* ssp. *rubens*) and cheatgrass (*Bromus tectorum*) had spread extensively along the Saline Valley Road. Significant amounts of brome and cheatgrass were found at the Camp, Cowhorn, and Waucoba borrow sites. Significant amounts of Russian thistle (*Salsola* sp.) were also found at the Camp and Waucoba borrow sites. Russian thistle is not widespread in the Saline Valley and is exacerbated by disturbance. Weed-control mitigation must be implemented to prevent the spread of Russian thistle to other areas of Saline Valley.

3.6 VISITOR EXPERIENCE, AESTHETIC RESOURCES

Currently, very few of the total number of visitors to DVNP venture onto unpaved roads to visit the remote sections of the Park such as Saline Valley, but that number is expected to increase in the coming years (NPS 2002). The backcountry of Death Valley has been primarily used by California residents who return to seek solitude and desert scenery. Key visitor attractions to Saline Valley include the Warm Springs, sand dunes, salt tram, and other historic mining locations. The valley combines both natural features and visible remains of prehistoric and historic human land use.

Most of the public comments received during external scoping were supportive of the proposed action largely because it would allow Inyo County to maintain Saline Valley Road and facilitate access to recreation sites. At least one commentator emphasized the need to maintain the rustic, rugged nature of Saline Valley Road precisely to discourage its use by the casual visitor. Another commentator was concerned that reactivation of the Camp site would interfere with its use as a non-developed camp site. Other than that, none of the commentators indicated that reactivation and expansion of the borrow sites would adversely affect their recreational experience, although there was an interest in minimizing impacts to other resources.

3.7 ARCHEOLOGICAL RESOURCES

Historic archeological sites in the Park are largely associated with transportation corridors, water sources, and mining and ranching operations of the late 19th and early 20th centuries (NPS 2002). The research and information potential of historical archeological sites is an important aspect of their National Register eligibility.

The Park Archeologist and crew surveyed seven of the eight prospective borrow pits March 19–22, 2010, and the eighth (Ubehebe Borrow Pit) on May 11, 2010 (NPS 2010c). The following excerpt summarizes the methods and results of the survey:

> Transect spacing at all pits was 20 m or less, with the entire proposed expansion area surveyed, as well as the existing pit. For the Ubehebe Pit, we also resurveyed the access road in order to determine if any archeological resources were present that would be disturbed by reopening the road. Four new archeological sites were documented during this project, and one previously recorded site was updated. The sites include a historic corral, an extensive artifact scatter, and three small lithic scatters.
>
> All archeological sites were documented on State of California Site Record Forms. As the Park is reportedly making an effort to exclude all of the sites from the area of potential effect for the borrow pit activations (by excluding pits, or making the pits smaller so that they do not intrude onto the site), the project is expected to not have an impact on archeological resources. Several isolated finds were also found during the project. The isolated finds include isolated lithics, rock cairns, survey markers, a memorial marker dated 1969, and a possible cleared rock circle. As isolated finds, they are not eligible for inclusion on the National Register of Historic Places. Most of the finds will not be impacted by this project, as they are either located outside of the area of potential effect, or at the proposed borrow pits that have been excluded due to Resource concerns. Therefore, isolated finds will not be impacted by this proposed project.

As a result of these surveys, the Corral site was eliminated from further consideration. The boundaries for other borrow sites were modified to avoid nearby cultural sites.

3.8 SUMMARY OF AFFECTED ENVIRONMENT

The Saline Valley Road and associated borrow sites are located in a remote, rugged part of DVNP that has a long history of human use and resource exploitation. It is not a pristine wilderness but an area that retains many of the natural and man-made characteristics of earlier times. Mining, roads, and surface disturbance are as much a part of the Saline Valley environment as the native wildlife, landscapes, and cultural resources. The reactivation and expansion of borrow sites to maintain Saline Valley Road would not in itself be out of place in this environment. The degree to which the project alternatives might adversely change the nature of this environment is discussed in the next section below.

4 ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences associated with the alternatives including direct, indirect, and cumulative impacts.

4.1 METHODOLOGY

The environmental analysis of the alternatives, and conclusions drawn from this analysis, included review of existing literature and park studies; information provided by DVNP and consultant specialists; Inyo County Road Department and other agencies; public comment; and professional judgment.

Key assumptions used in the impact analysis include:

- Appropriate sand and gravel material can be excavated from the existing pits at least 2.3 yards (7 feet) below the current pit bottom.
- Appropriate sand and gravel material can be excavated from the proposed pit expansion areas at least 1 yard (3 feet) below the current land surface.
- The Inyo County Road Department will prepare site-specific operation, maintenance, and reclamation plans that will be reviewed and approved by the NPS prior to issuance of the 20-year permit.

The potential environmental effects for each of the impact topics are examined in terms of context, impact intensity, duration, direct and indirect impacts, cumulative effects, and impairment of park resources or values.

4.1.1 Context

The context of this analysis focuses on potential impacts to the Saline Valley environment in general and the borrow sites in particular. The proposed project will have little or no impact on the greater DVNP environment, the Mojave Desert ecoregion, or global ecosystems.

4.1.2 Impact Intensity Thresholds

Impact Intensity is a measure of the severity of an impact. The intensity of an impact may be:

- Negligible, when the impact is localized and not measurable or at the lowest level of detection;
- Minor, when the impact is localized and slight but detectable;
- Moderate, when the impact is readily apparent and appreciable; or
- Major, when the impact is severe and highly noticeable.

Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment/assessment of effect. The following are the impact intensity descriptions developed for this analysis.

Geologic Resources and Soils

Negligible	Little or no excavation of sand and gravel material from existing pits during the 20-year permit period (10% or less of the estimated historic usage per appendix D, table D-3). Topsoil in surrounding area not disturbed.
Minor	Borrow pits reactivated, and excavation of sand and gravel material from existing pits does not exceed historic excavation rates during 20-year permit period (10-100% of the estimated historic usage per appendix D, table D-3; except for Tin Barn site which would not exceed 10%). Topsoil in surrounding area not disturbed.
Moderate	Borrow pits reactivated and expanded into proposed/approved expansion areas and/or excavated to less than 2-yards average depth during 20-year permit period. Amount of gravel excavated from each site does not exceed the amounts shown in appendix D, table D-5. Any removed topsoil is treated and stockpiled for use during reclamation.
Major	Borrow pits reactivated and expanded into proposed/approved expansion areas and/or excavated to more than 2-yards average depth during 20-year permit period. Amount of gravel excavated from each site equals or exceeds the amounts shown in appendix D, table D-5. Removed topsoil is not treated or stockpiled on site for use during reclamation.

Species of Special Concern

Negligible	Little or no effect on the behavior, reproduction, or survivability of federally listed, state-listed, or other species of special concern inhabiting or passing through the borrow sites, relative to adjacent habitat.
Minor	Occasional disturbance of species of special concern inhabiting or passing through borrow sites. Limited to times of pit operation.
Moderate	Destruction of habitat used by species of special concern (via pit expansion). Pit operation discourages species of special concern from using the borrow sites or nearby areas.
Major	Permanent loss of species of special concern habitat within the proposed expansion area. Pit operation discourages species of special concern from using the borrow sites or nearby areas. Activities that result in an unpermitted "take" of a federally listed species.

Unique or Important Wildlife or Wildlife Habitat

Negligible	Little or no effect on the behavior, reproduction, or survivability of unique or important wildlife or wildlife habitat at the borrow sites relative to adjacent habitat.
Minor	Occasional disturbance of unique or important wildlife inhabiting or passing through borrow sites. Limited to times of pit operation.
Moderate	Destruction of habitat used by unique or important wildlife (via pit expansion). Other activities that discourage species of special concern from using the borrow sites.
Major	Permanent loss of important or unique animal species and/or wildlife habitat within the proposed expansion area. Activities that discourage species of important wildlife from using the borrow sites or nearby adjacent areas.

Non-Native Plant Species

Negligible	No non-native plant species detected at existing borrow pits or proposed expansion areas per botanical survey.
Minor	Few non-native, invasive plant species detected at existing borrow pits or proposed expansion areas per botanical survey. Species composition and plant density typical of other areas along Saline Valley Road.
Moderate	Obvious infestation of non-native, invasive plant species at the existing borrow pits and proposed expansion areas. Species not yet widespread along Saline Valley Road. Requires herbicide treatment and on-site stockpiling of topsoil.
Major	Substantial infestation of non-native, invasive plant species at the existing borrow pits and proposed expansion areas. Species not yet widespread along Saline Valley Road. Requires herbicide treatment and on-site stockpiling of topsoil, and washing of vehicles and equipment prior to leaving site.

Visitor Experience

Negligible	Little or no effect on visitors' sense of solitude, remoteness, or ruggedness of the Saline Valley. The borrow sites fit in as part of the overall environment.
Minor	Loss of some sense of remoteness, wildness, or historic nature of area caused by the reactivation of borrow pits. Loss of camping opportunities at the reactivated site.
Moderate	Obvious appearance of land disturbance caused by the expansion of the borrow pits. Intrusion of modern human activities on the historic and natural landscape.
Major	Obvious appearance of industrial-scale activity on the historic and natural landscape, caused by full-scale expansion of borrow pits, presence of machinery and stockpiled material on site, and other modern man-made features.

Archeological Resources

Negligible	Little or no disturbance to archeological sites or isolates in the existing borrow pit.
Minor	Disturbance or destruction of isolated artifacts, found by survey not to be of significance, during reactivation and expansion of pits.
Moderate	Potential disturbance or destruction to off-site archeological resources due to on-site activities, such as runoff and sediment production that erodes or deposits material on downslope or downstream sites.
Major	Destruction of recorded archeological resources near to the excavation due to operation of equipment or vehicles outside the permitted work area.

4.1.3 Duration

The duration of likely impacts can be short-term or long-term, depending on the impact topic. The total period of impact analysis is the 20-year permit period. However, actual use of the borrow sites would be infrequent (likely less than 5 times over 20 years), of short duration (less than two weeks), and variable among the six borrow sites (i.e., not all borrow pits would be used at the same time or intensity). The

use of any particular borrow site would depend on road maintenance requirements and the location and amount of sand and gravel available at the site.

4.1.4 Direct and Indirect Impacts

Impacts can either be direct or indirect. A direct impact is an effect that is caused by an action and occurs at the same time and place. An indirect impact is an effect that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable.

4.1.5 Cumulative Effects

NEPA regulations require an assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined in 40 CFR 1508.7 as:

> … the impact on 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The DVNP General Management Plan (NPS 2002) lists several ongoing or future projects, some of which may have a cumulative effect when combined with the proposed project. The most relevant planning projects include:

- Saline Valley Site Management Plan. A plan for actions to improve the Saline Valley Warm Springs recreation area, maintain Saline Valley Road, and protect other resources.
- Sand and Gravel for Road Management. Evaluation of borrow sources for road maintenance related to the Road Management Plan.
- Road Management Plan. Plan to determine such things as the status of duplicate road sections, road surface conditions, and the level of maintenance.
- Natural and Cultural Resource Management Plan Update. A plan that identifies the Park's research needs, threats to Park resources, projects that would mitigate the threats, and a ranking of these projects.

In addition, the Park has undertaken planning for a number of construction and management projects at specific sites or areas of the park, to include infrastructure improvement, habitat protection, and abandoned mine safety projects. None of these specific projects has a direct bearing on or interaction with the Saline Valley Road Borrow Sites project and they are not considered in terms of cumulative effects.

4.1.6 Impairment of Park Resources or Values

National Park Service Management Policies (NPS 2006) and Directors Order 12 (NPS 2001) require analysis of potential effects to determine if actions would impair park resources and values. Typically, impacts with the potential for impairment would be determined to be major, or occasionally moderate, in intensity in NEPA impact analysis; impacts of a negligible to minor intensity would not have the potential for impairment.

According to NPS Management Policies:

> The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park and monument resources and values. However, the laws do give NPS management 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 NPS management discretion to allow certain impacts within parks, that discretion is limited by 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, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects 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 to opportunities for enjoyment of the park; or
> - identified as a goal in the park's Master Plan or General Management Plan or other relevant NPS planning documents.

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 enjoyment of the park, or 3) identified as a goal in the park's general management plan or other relevant NPS planning documents, there would be no impairment of park resources or values related to certain impact topics.

4.1.7 Impacts to Cultural Resources and Section 106 of the NHPA

Compliance with Section 106 of the National Historic Preservation Act is being coordinated by the Park Archeologist in conjunction with this EA. The Park Archeologist has prepared an Assessment of Actions Having an Effect on Cultural Resources document, which concluded that the proposed actions would have no significant impact on cultural resources (NPS 2010c).

4.2 IMPACT ANALYSIS

The impact analysis is organized by alternative and subdivided by impact topics under that alternative.

4.2.1 Alternative A - No Action

Under Alternative A, the No Action Alternative, the NPS would not issue a permit for the reactivation of the existing six borrow pits or the expansion of the pits into the adjacent areas. Inyo County Road

Department would have to maintain Saline Valley Road using another approved method or forego maintenance of the road. No resources at the existing borrow sites would be further impacted and no reclamation would be done to these sites.

Geologic Resources and Soils

Impact: This alternative would have no direct impact on the geologic resources and soils at the six existing borrow sites. It would have a cumulative adverse impact with past borrow site actions since the site would not be reclaimed or the vegetation actively restored.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment to the Park geologic resources or soils.

Species of Special Concern

Impact: This alternative would have no direct impact on species of special concern at the six existing borrow sites. It may have a cumulative adverse impact with past borrow site actions since no reclamation or restoration would take place and any current habitat problems would not be corrected.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment to species of concern within the Park.

Unique or Important Wildlife or Wildlife Habitat

Impact: This alternative would have no direct impact on unique or important wildlife or wildlife habitat at the six existing borrow sites. It may have a cumulative adverse impact with past borrow site actions since no reclamation or restoration would take place and any current wildlife habitat issues would not be corrected.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment to unique or important wildlife or wildlife habitat within the Park.

Non-Native Plant Species

Impact: This alternative would have no direct impact on the dispersal of non-native plant species at or from the six existing borrow sites. It may have a cumulative adverse impact with past borrow site actions since no reclamation or restoration would take place, and the invasive plant species currently infesting the borrow pits would not be controlled with herbicide treatment.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment to the native plant resources at the borrow sites. However, not controlling the non-native species at these sites may contribute to long-term impairment of native ecosystems within the Saline Valley.

Visitor Experience

Impact: This alternative would have minor adverse impact on visitor experience. By not permitting reactivation of the borrow sites, Inyo County Road Department may not be able to make current or future (next 20 years) repairs to Saline Valley Road that require use of local borrow material. The continued poor road conditions would hinder visitor access to recreation areas such as the Saline Valley

Warm Springs. The No Action Alternative would have a cumulative adverse impact over time as the road condition continues to deteriorate. There would be no reclamation of the borrow sites, which might be deemed as negative to visitors who prefer natural environments.

A beneficial impact of the No Action Alternative would be that there would be no further excavation of the existing pits or expansion of the pits into surrounding areas. Visitors who find active land disturbance discomfiting, would not be affected. Campers who use the Camp site or other borrow sites for roadside camping would benefit by not having the pits reactivated or expanded.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment of the Park's ability to provide positive visitor experiences.

Archeological Resources

Impact: This alternative would have no impact on archeological resources at the six existing borrow sites. It would have no cumulative adverse impact relative to other ongoing or planned projects.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this action would not cause any impairment to cultural resources within the Park.

4.2.2 Alternative B - Existing Borrow Pits (Preferred Alternative)

Under Alternative B, the Existing Borrow Pits Alternative, the NPS would issue a 20-year permit allowing Inyo County to excavate sand and gravel from the existing borrow pits but not from the adjacent areas. Inyo County would be required to reclaim the sites to natural contours and restore native vegetation at the end of the permit period.

Geologic Resources and Soils

Impact: This alternative would result in a minor adverse impact to the geologic resources and soils of the six borrow sites, since only the existing pits would be used. Topsoil and vegetation in the adjacent areas would not be disturbed. A beneficial effect would be the ultimate reclamation and restoration of these sites at the end of the permit period. This would alleviate potential long-term or cumulative effects to the geologic resources and soils. This alternative does not conflict with or cause additional impacts to the development of the new Gravel Management Plan or Road Management Plan being developed for DVNP.

Impairment of Park Resources and Values: Because the maintenance of Saline Valley Road is identified as a goal in the DVNP General Management Plan (NPS 2002), the reactivation of these six borrow sites and their limited use would not be considered an impairment of Park resources or values.

Impairment of Park Resources and Values: Reactivation of the existing borrow sites, operated according to an approved plan, and reclaimed and revegetated to natural conditions at the end of the permit period, would not impair Park water resources.

Species of Special Concern

Impact: This alternative would likely have only a minor impact on species of special concern at or near the existing borrow pits. Recent surveys found no evidence that federally listed species inhabit the sites.

Those animal species that were observed were highly mobile and could easily move away from the sites during the infrequent, short-duration operations at the sites. No special concern plant species were detected at the sites.

Since this alternative uses only the existing borrow pits, none of the adjacent areas would be disturbed by excavation. There would be no cumulative loss of native habitat. There would be no cumulative impact related to other ongoing resource planning activities or currently planned projects.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, and only the existing pits would be used for borrow material, this action would not cause any impairment to species of concern within the Park.

Unique or Important Wildlife or Wildlife Habitat

Impact: No unique or important wildlife or wildlife habitat were detected at the six existing borrow sites, and consequently this alternative would have negligible impact on these resources. It would also not have a cumulative impact on these resources.

Impairment of Park Resources and Values: Since no unique or important species or habitat were detected on these sites, reactivation of the existing borrow pits would not cause any impairment to these resources within the Park.

Non-Native Plant Species

Impact: This alternative may have a moderate impact on the dispersal of non-native plant species at or from the six existing borrow sites. As one of the mitigation measures, the top few inches of aggregate (where weeds are present) would be stockpiled and treated with herbicide to control the spread of weeds both on and off site. Even with this treatment, it will be difficult to completely control the incidental spread of weed seeds and plant parts. The potential for spreading weeds will be long-term (20-year permit period), although actual land disturbing activities (excavation and processing in existing pits) will last only a couple weeks at a time. The ultimate reclamation and revegetation of these sites with native species will have a long-term positive impact on local habitats. This alternative causes no cumulative impacts with other projects in the area.

Impairment of Park Resources and Values: Because the borrow sites and invasive plant species problems existed prior to the Park's acquisition of the area, this alternative would not cause a impairment to the native plant resources at the borrow sites, if the mitigation and restoration requirements are met.

Visitor Experience

Impact: This alternative would have only a minor adverse impact on visitor experience. Infrequent, limited excavation of the existing pits would likely not be noticed by most of the visitors to Saline Valley. A beneficial effect to many visitors would be the improvements to Saline Valley Road that would allow them more ready access to recreation areas. Another potential minor impact would be the occasional loss of camping activities when sand and gravel is actively being excavated from the pits. As suggested by the public scoping comments, this alternative, combined with Saline Valley Road maintenance, would likely have a net positive cumulative effect on visitor experience in Saline Valley.

Impairment of Park Resources and Values: Because the maintenance of Saline Valley Road is identified as a goal in the DVNP General Management Plan (NPS 2002), the reactivation of these six borrow sites and their limited use would not be considered an impairment of Park resources or values.

Archeological Resources

Impact: This alternative would have a negligible impact on archeological resources at the six existing borrow sites. Significant impacts would occur only if subsurface sites or artifacts were damaged or destroyed during excavation of the existing pits. This will be mitigated in part by the requirement for Inyo County Road Department to immediately notify the Park should archeological resources be discovered on site. Given the unlikelihood of loss of archeological resources within the existing pit areas, this alternative would have no cumulative effect on archeological resources protection within the Park.

Impairment of Park Resources and Values: Since the borrow sites existed prior to the Park's acquisition of the area, this alternative would not cause any impairment to cultural resources within the Park.

4.2.3 Alternative C - Expanded Borrow Pits

Under Alternative C, the Expanded Borrow Pits Alternative, the NPS would issue a 20-year permit allowing Inyo County to excavate sand and gravel from the existing borrow pits and to expand the pits into approved areas adjacent to the pits. Inyo County would be required to reclaim the sites to natural contours and restore native vegetation at the end of the permit period.

Geologic Resources and Soils

Impact: This alternative would result in moderate to major impacts to the geologic resources and soils of the six borrow sites, since both the existing pits and approved expansion areas would be excavated. The intensity of effect would be determined by how much material the County Road Department actually extracted from the pits and how much surface area had to be disturbed to meet road maintenance needs. The impact to these resources will vary at each site since borrow material would be extracted from sites nearest the road maintenance areas.

A beneficial effect of this alternative would be the ultimate reclamation and restoration of these sites at the end of the permit period. This would alleviate potential long-term or cumulative effects to the geologic resources and soils. This alternative does not conflict with or cause additional impacts to the development of the new Gravel Management Plan or Road Management Plan being developed for DVNP.

Impairment of Park Resources and Values: Because the maintenance of Saline Valley Road is identified as a goal in the DVNP General Management Plan (NPS 2002), the reactivation of these six borrow sites and their expansion would not be considered an impairment of Park resources or values, despite the localized resource depletion.

Species of Special Concern

Impact: This alternative would likely have only a minor impact on species of special concern at or near the existing borrow pits. Recent surveys found no evidence that federally listed species inhabit the sites. Those animal species that were observed were highly mobile and could easily move away from the sites during the infrequent, short-duration operations at the sites. No special concern plant species were detected at the sites.

Since this alternative would involve excavation of both existing pits and expansion areas, several additional acres of desert scrub habitat would be disturbed. However, the cumulative impact to species of special concern within Saline Valley would be negligible.

Impairment of Park Resources and Values: This alternative would not significantly impair species of special concern resources or values within the Park.

Unique or Important Wildlife or Wildlife Habitat

Impact: No unique or important wildlife or wildlife habitat were detected at the six existing borrow pits or proposed expansion areas, and consequently this alternative would have negligible to minor impacts on these resources. The expansion of the sites to undisturbed areas will cause the temporary loss of desert scrub habitat that might be used by important wildlife species; however, reclamation and revegetation of these sites at the end of the 20-year permit period would restore this habitat. No other past, present, or foreseeable actions are known to cause additional habitat loss in this area. Therefore, implementation of this alternative will not cause a significant cumulative impact to wildlife or wildlife habitat.

Impairment of Park Resources and Values: The desert scrub vegetation type is the most common habitat type in the Park. The temporary reduction in desert scrub acreage will not cause impairment to wildlife or wildlife habitat within the Park.

Non-Native Plant Species

Impact: This alternative may have a moderate impact on the dispersal of non-native plant species at or from the six existing borrow sites. The likelihood of negative impact is increased as more acreage in the expansion area is disturbed. This potential impact will be mitigated by the requirement to stockpile and treat with herbicide the top few inches of soil or aggregate (where weeds are present) in order to control the spread of weeds both on and off site. Even with this treatment, it will be difficult to completely control the incidental spread of weed seeds and plant parts. The potential for spreading weeds will be long-term (20-year permit period), although actual land-disturbing activities (excavation and processing in existing pits) will last only a couple weeks at a time. The ultimate reclamation and revegetation of these sites with native species will have a long-term positive impact on local habitats. This alternative causes no long-term cumulative impacts with other projects in the area.

Impairment of Park Resources and Values: Because the borrow sites and invasive plant species problems existed prior to the Park's acquisition of the area, this alternative would not cause a impairment to the native plant resources at the borrow sites if the mitigation and restoration requirements are met.

Visitor Experience

Impact: This alternative would have only a minor to moderate adverse impact on visitor experience. The expansion of the borrow pits into new areas will likely be visible to many visitors traveling the Saline Valley Road. The enlarged pits and evidence of modern activity may reduce the sense of wildness for some visitors. Other visitors may find their experience enhanced by improved road conditions resulting from the reactivation and expansion of the borrow pits. The infrequent, short-term operations at the pits may discourage some campers who have frequented the sites in the past. However, the expansion of the

pits to new areas may increase the roadside camping areas at the sites. As suggested by the public scoping comments, this alternative, combined with Saline Valley Road maintenance, would likely have a net positive cumulative effect on visitor experience in Saline Valley.

Impairment of Park Resources and Values: Because the maintenance of Saline Valley Road is identified as a goal in the DVNP General Management Plan (NPS 2002), the reactivation and expansion of these six borrow sites would not be considered an impairment of Park resources or values.

Archeological Resources

Impact: This alternative would have a negligible impact on archeological resources at the six existing borrow sites. Significant impacts would occur only if subsurface sites or artifacts were damaged or destroyed during excavation of the existing pits or expansion areas. This will be mitigated in part by the requirement for the Inyo County Road Department to immediately notify the Park should archeological resources be discovered on site. Given the unlikelihood of loss of archeological resources within the approved borrow site expansion areas, this alternative would have no cumulative effect on archeological resources protection within the Park.

Impairment of Park Resources and Values: Since the recent archeological survey found no archeological resources in the existing pits or approved expansion areas, this alternative would not cause any impairment to cultural resources within the Park.

4.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

An examination of environmental impact topics found that both action alternatives could potentially cause negligible to moderate impacts (adverse and beneficial) to Park resources; however, most adverse impacts could be mitigated to insignificant levels. Because the use of borrow sites to maintain Saline Valley Road is a Park management objective, the action of removing sand and gravel from the sites would not in itself cause an impairment of Park resources or values.

Given that the Park's primary purpose is to protect "significant desert features that provide world class scenic, scientific, and educational opportunities to visitors and academics to explore and study," both the "environmentally preferable" and the Park's operationally preferred alternative is Alternative B, use of the existing borrow sites only. Implementation of this alternative would provide for the immediate requirement to repair sections of Saline Valley Road without precluding the potential use of the expansion areas in the future, should the need be realized.

5 CONSULTATION AND COORDINATION

This section lists persons, organizations, and agencies that were contacted for information and that assisted in identifying important issues, developing alternatives, and/or analyzing impacts.

NPS and Inyo County

Name	Title	Organization
Leah Bonstead	Archeologist	Death Valley National Park
Sarah Craighead	Superintendent	Death Valley National Park
Jane Cipra	Botanist	Death Valley National Park
Richard Friese	Hydrologist	Death Valley National Park
Linda Manning	Wildlife Biologist	Death Valley National Park
Brent Pennington	Chief Ranger	Death Valley National Park
Carre Shandor	Facilities Management Specialist	Death Valley National Park
Victoria Wilkins	Environmental Compliance Specialist	Death Valley National Park
Ted Pedersen	Director, Public Works	Inyo County Road Department
Paul Valdon	Road Maintenance	Inyo County Road Department

Other Organizations and Agencies Consulted

Organization or Agency Name
Amargosa Conservancy
Amargosa Valley Library
American Motorcyclist Association
Bishop Branch Library
California Department of Fish and Game
California Department of Transportation
California Desert Protection League
California Native Plant Society
California State Clearinghouse
California State Water Resources Control Board
Death Valley '49ers, Inc.
Death Valley Natural History Association
Desert Protective Council
Furnace Creek Inn & Ranch Resort
High Desert Multiple Use Coalition

Organization or Agency Name
Inyo County Board of Supervisors
Inyo County Planning Department
Lone Pine Branch Library
Lone Pine Chamber of Commerce
National Park Conservation Association
National Park Service, Pacific West Region
Native American Rights Fund
Panamint Springs Resort
Ridgecrest Branch Library
Saline Preservation Association
Sierra Club
Sierra Club, Desert Committee
The Athenian School
U.S. Bureau of Land Management, Ridgecrest Office
U.S. Fish and Wildlife Service
California State Parks, Department of Historic Preservation
Timbisha Shoshone Tribe

6 LIST OF PREPARERS

The following individuals were responsible for preparation of this environmental assessment and supporting documentation.

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Leah Bonstead	Archeologist	Death Valley National Park
Linda Manning	Wildlife Biologist	Death Valley National Park
Jane Cipra	Botanist	Death Valley National Park
Richard Friese	Hydrologist	Death Valley National Park

Agrarian Research/GeomorphIS

Name	Title	Education/Qualifications	Experience
Bruce F. Goff, PhD	Project Manager / Principal NEPA Planner	PhD Watershed Science; MS Watershed Mgmt.; BS Renewable Natural Resources	27 years
Eileen D. Goff, GISP	GIS Specialist	MS Geography, BS Anthropology	26 years
Lee Ann Heathcote	Editor / Document Manager	BA Environmental Studies	15 years
Frank Stradling	Construction Specialist	MBA, BS Range Mgmt., Construction Contractor	30 years
Jeff Lincer, PhD	Wildlife Biologist	PhD Terrestrial Ecology; MS Wildlife Mgmt.; BS Forest Hydrology	36 years

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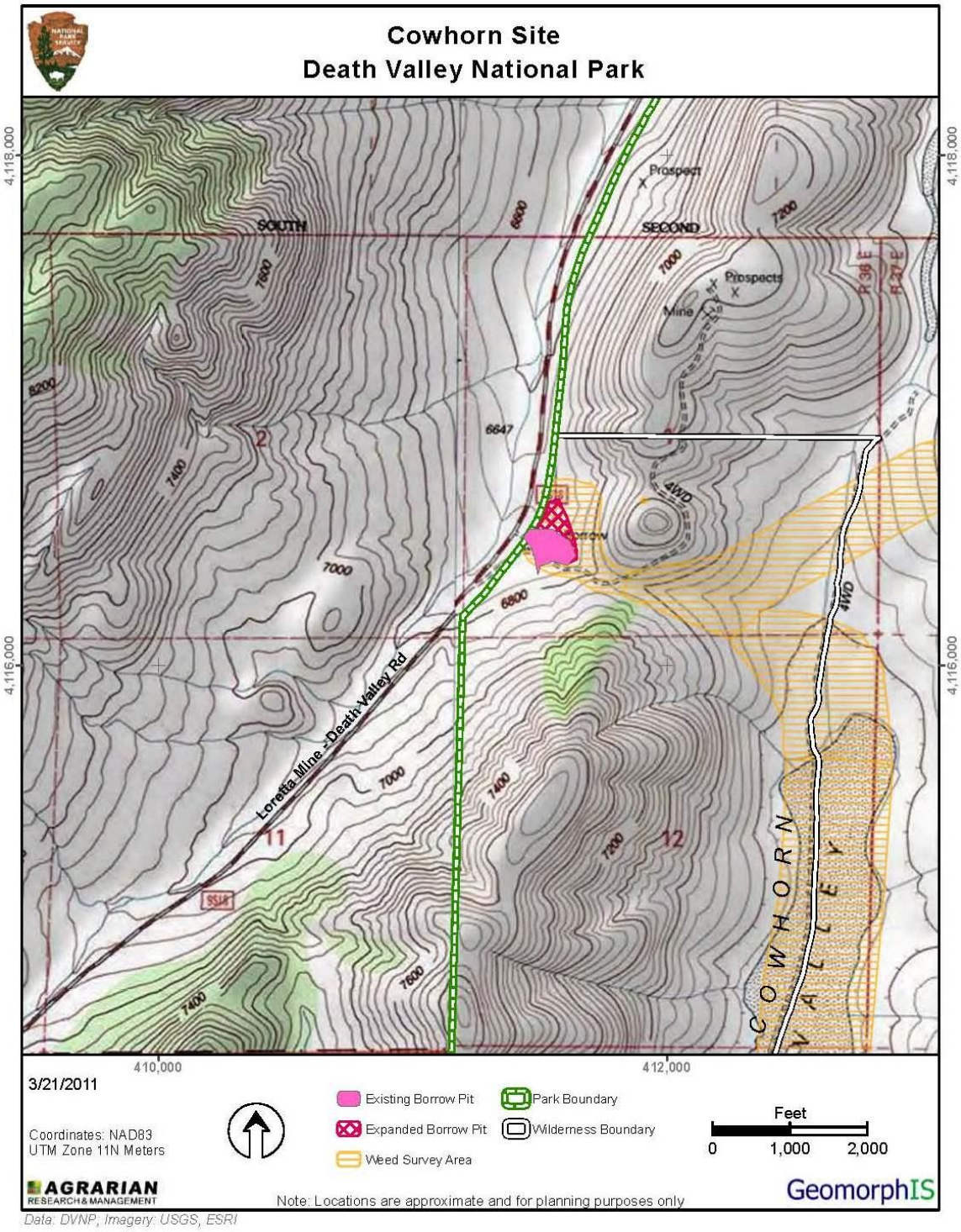
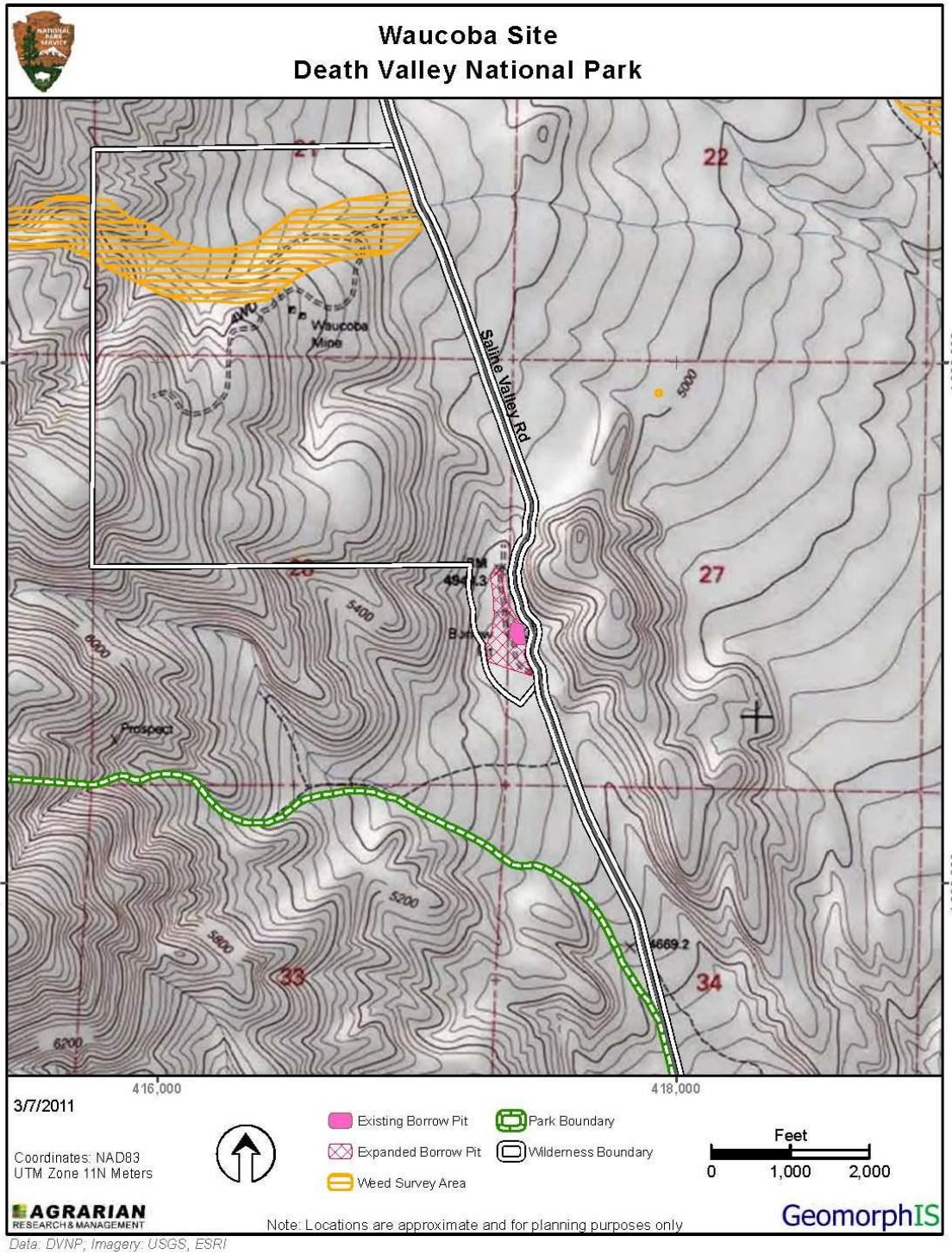
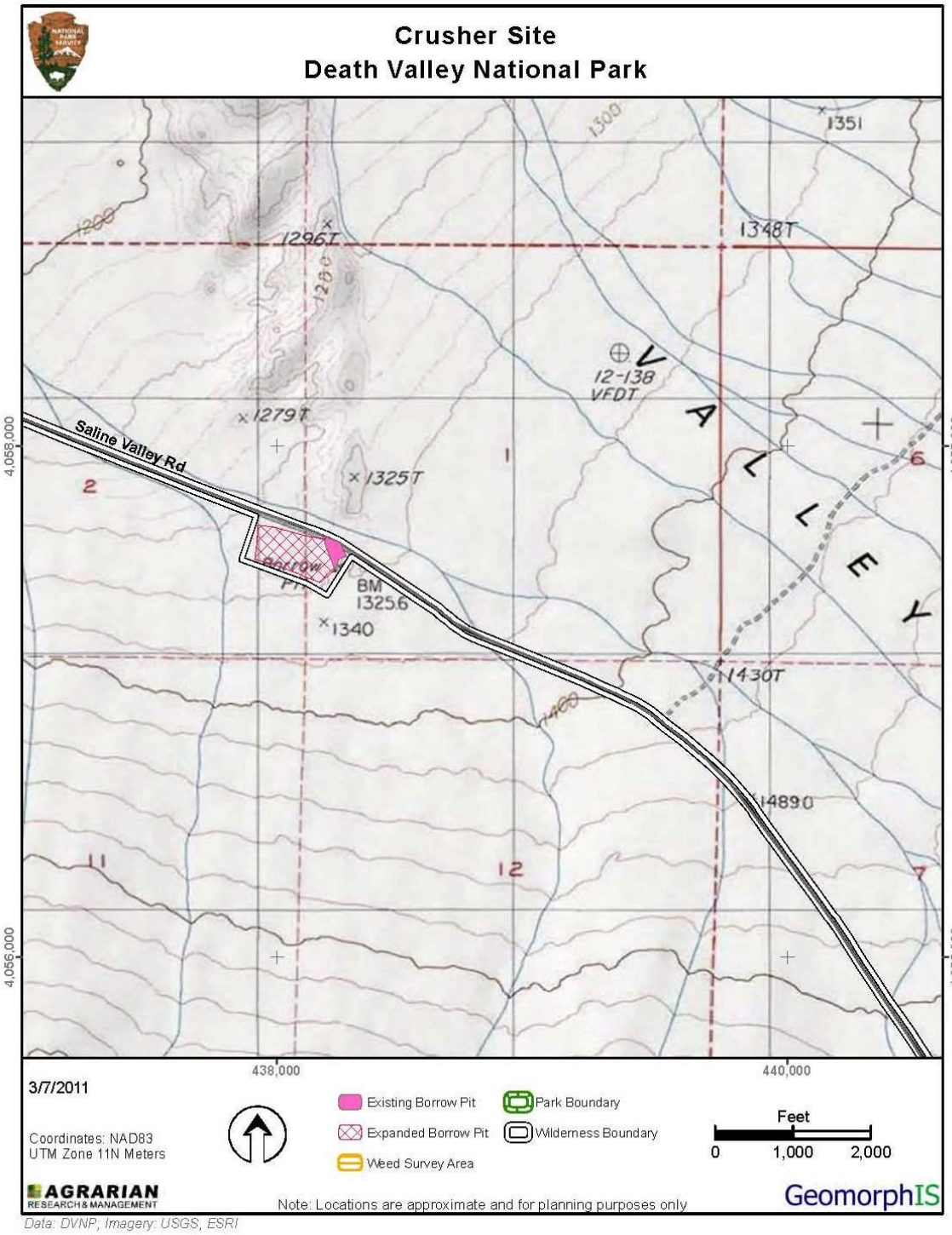
APPENDIX A – LOCATION MAPS



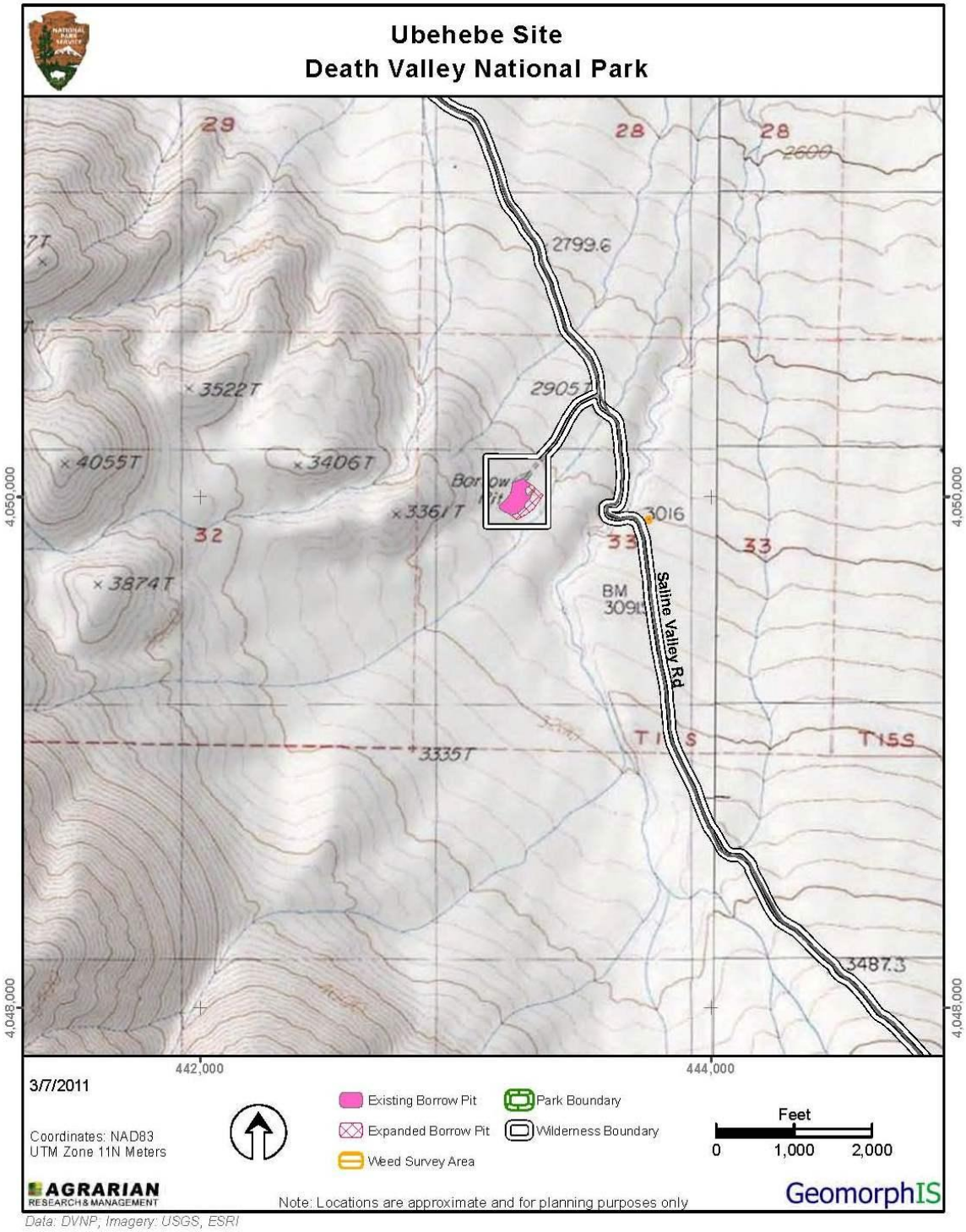
Map A- 1. Cowhorn borrow site location



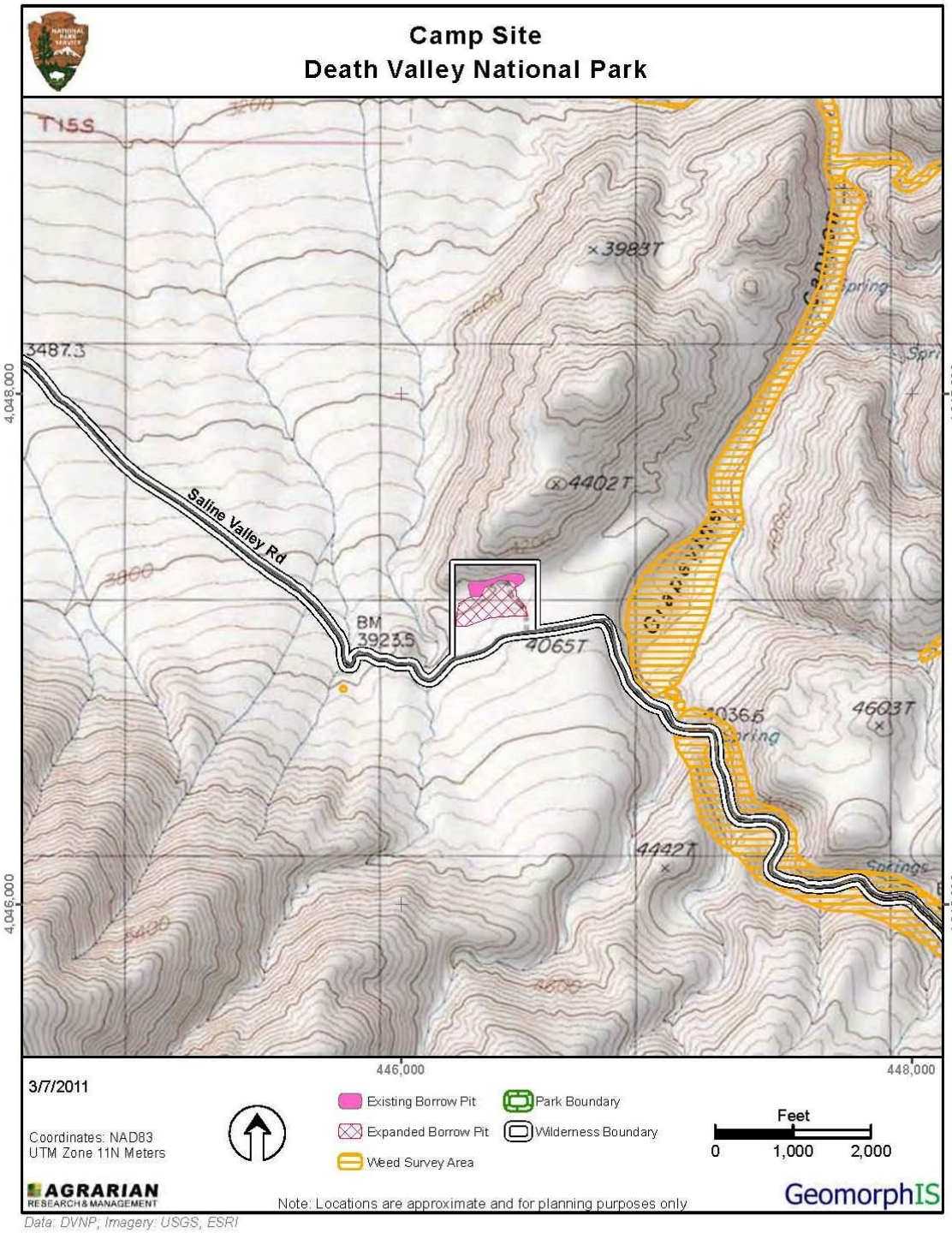
Map A- 2. Waucoba borrow site location



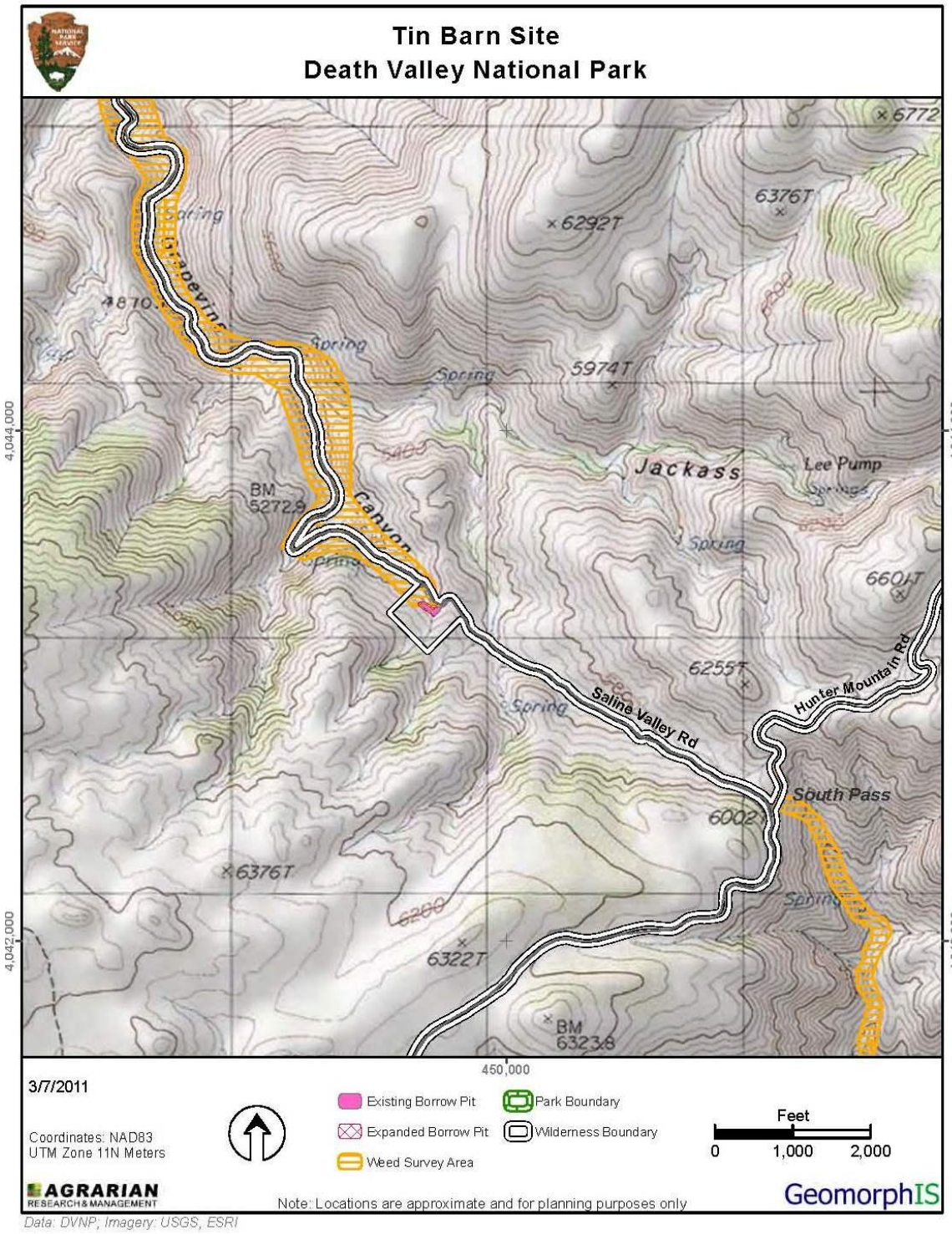
Map A- 3. Crusher borrow site location



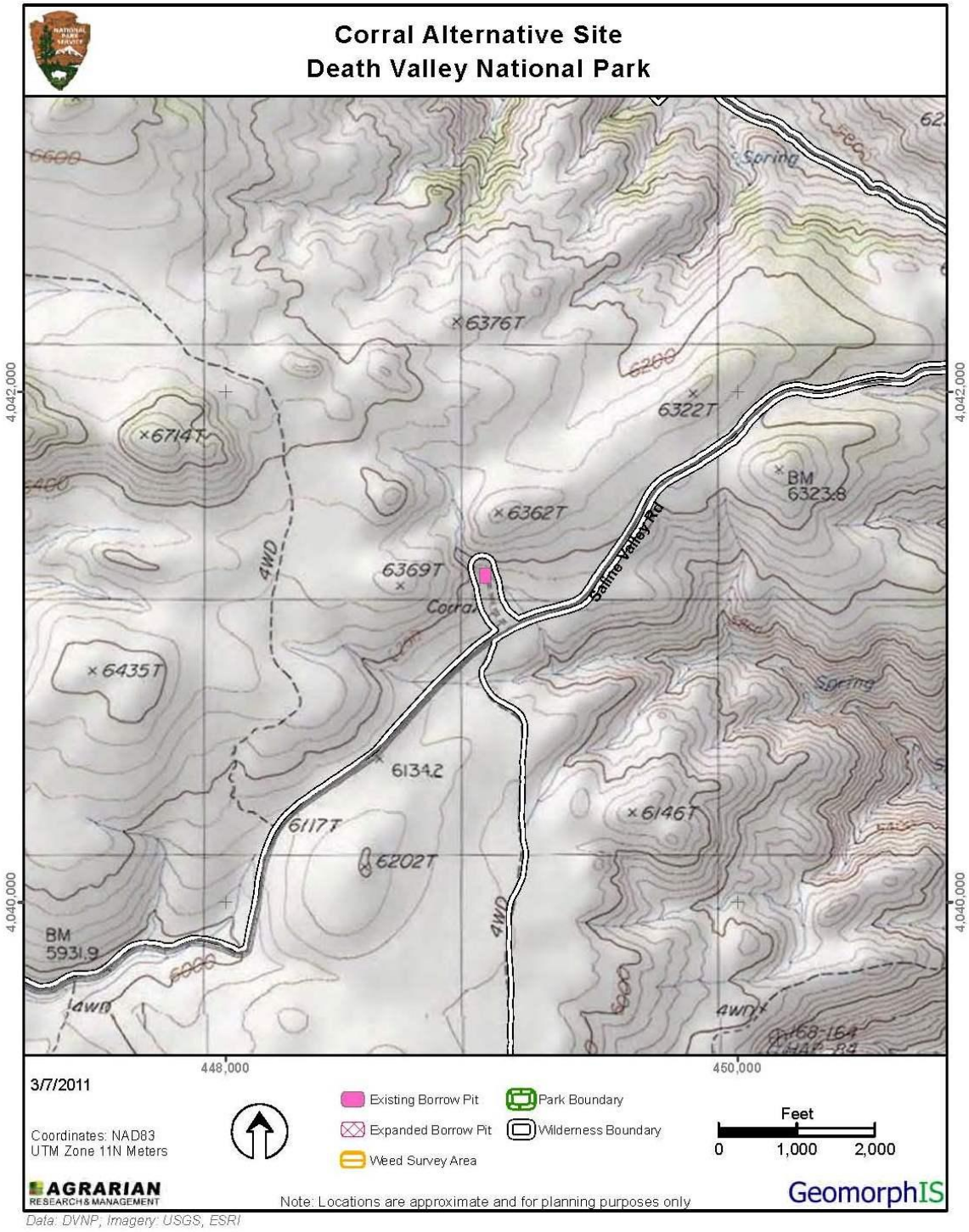
Map A- 4. Ubehebe borrow site location



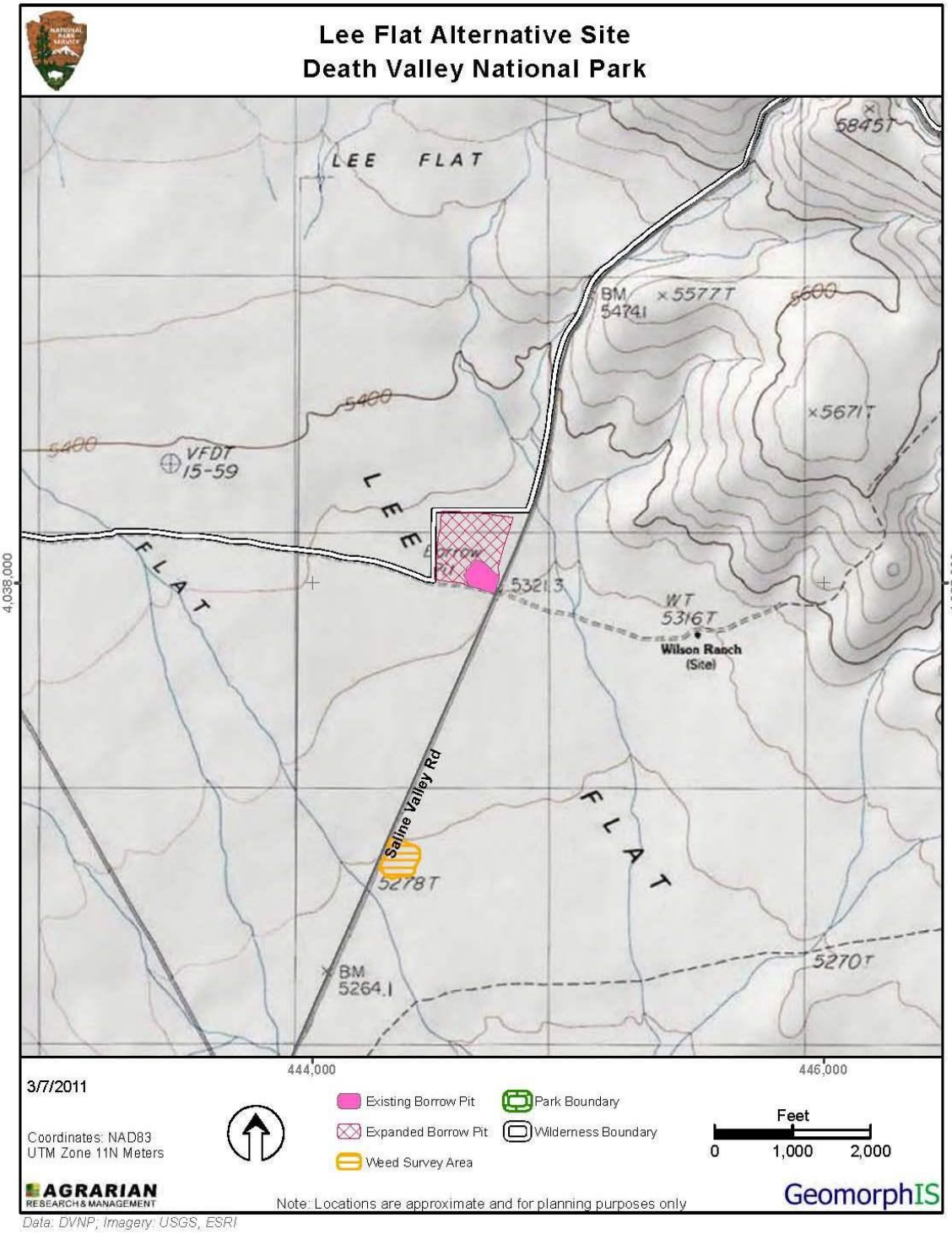
Map A- 5. Camp borrow site location



Map A- 6. Tin Barn borrow site location

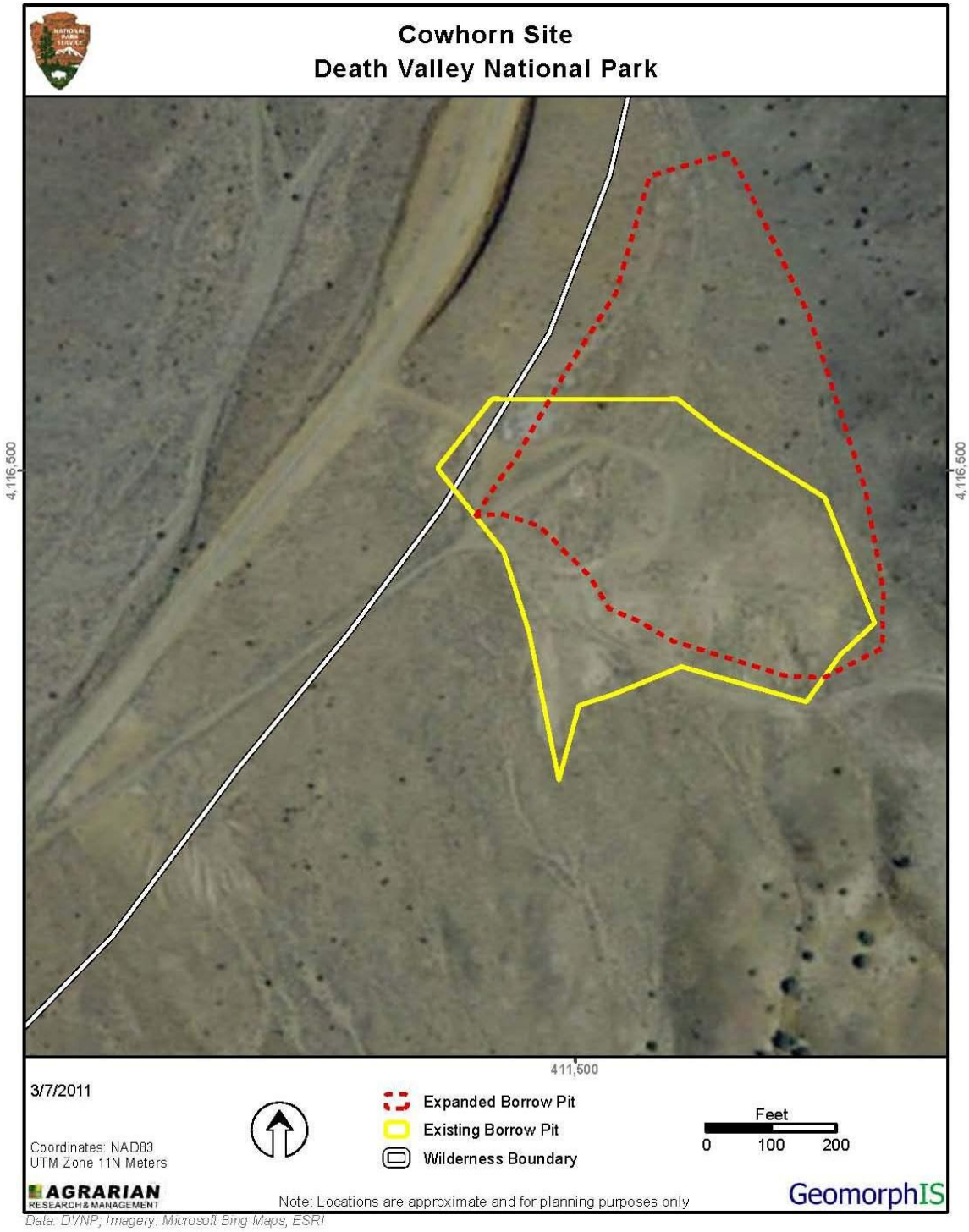


Map A- 7. Corral borrow site location

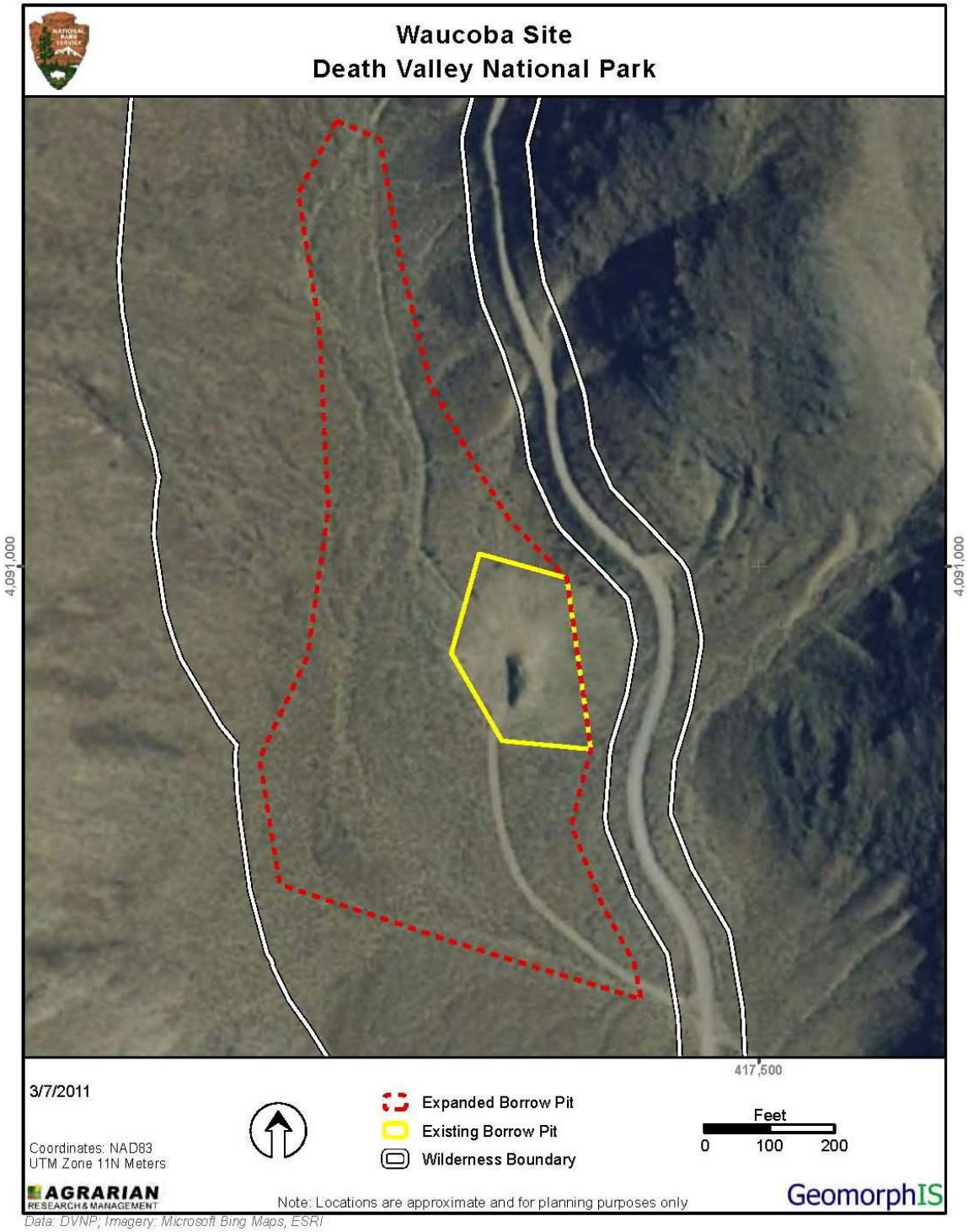


Map A- 8. Lee Flat borrow site location

APPENDIX B – SITE BOUNDARY MAPS

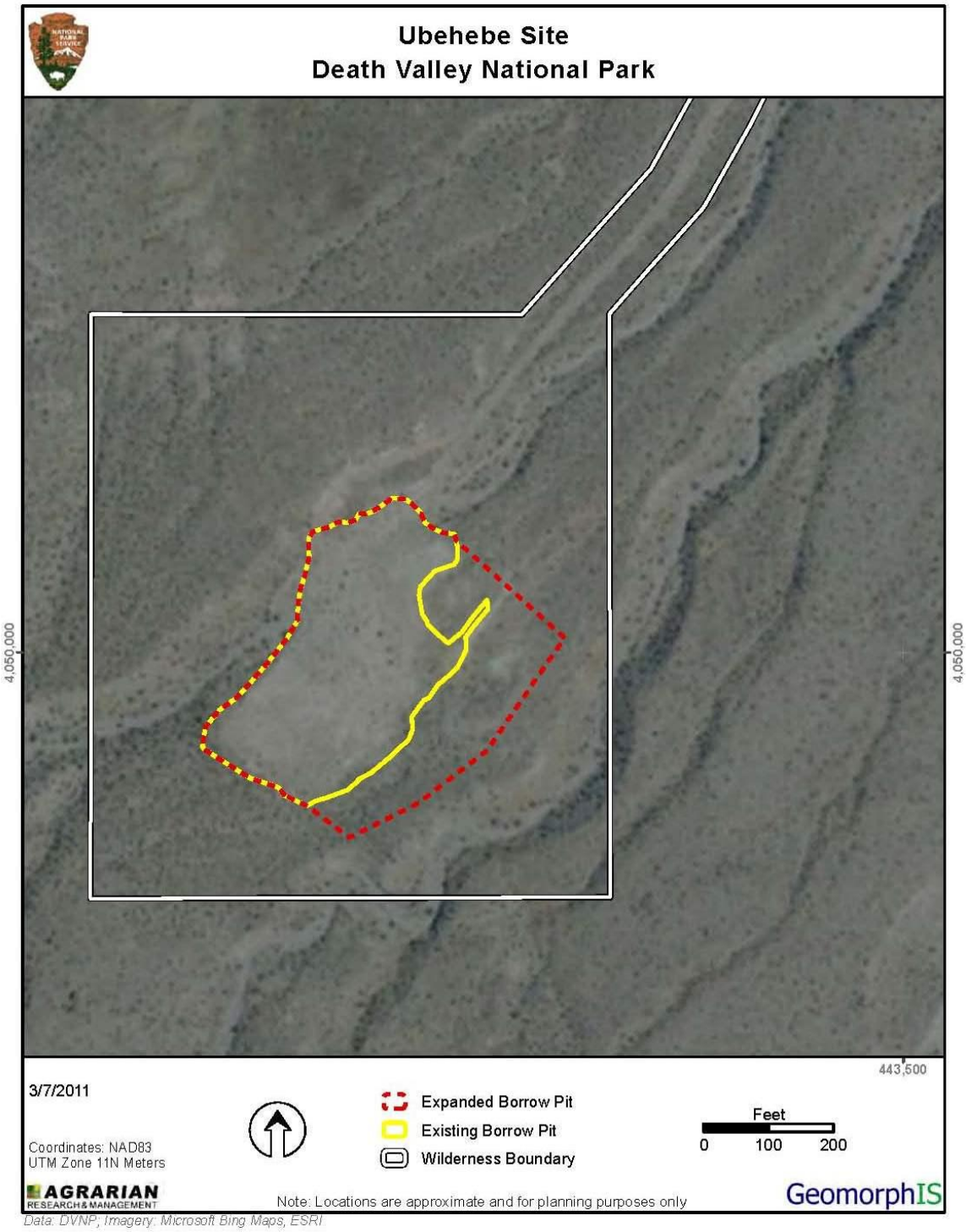


Map B- 1. Cowhorn borrow site boundaries

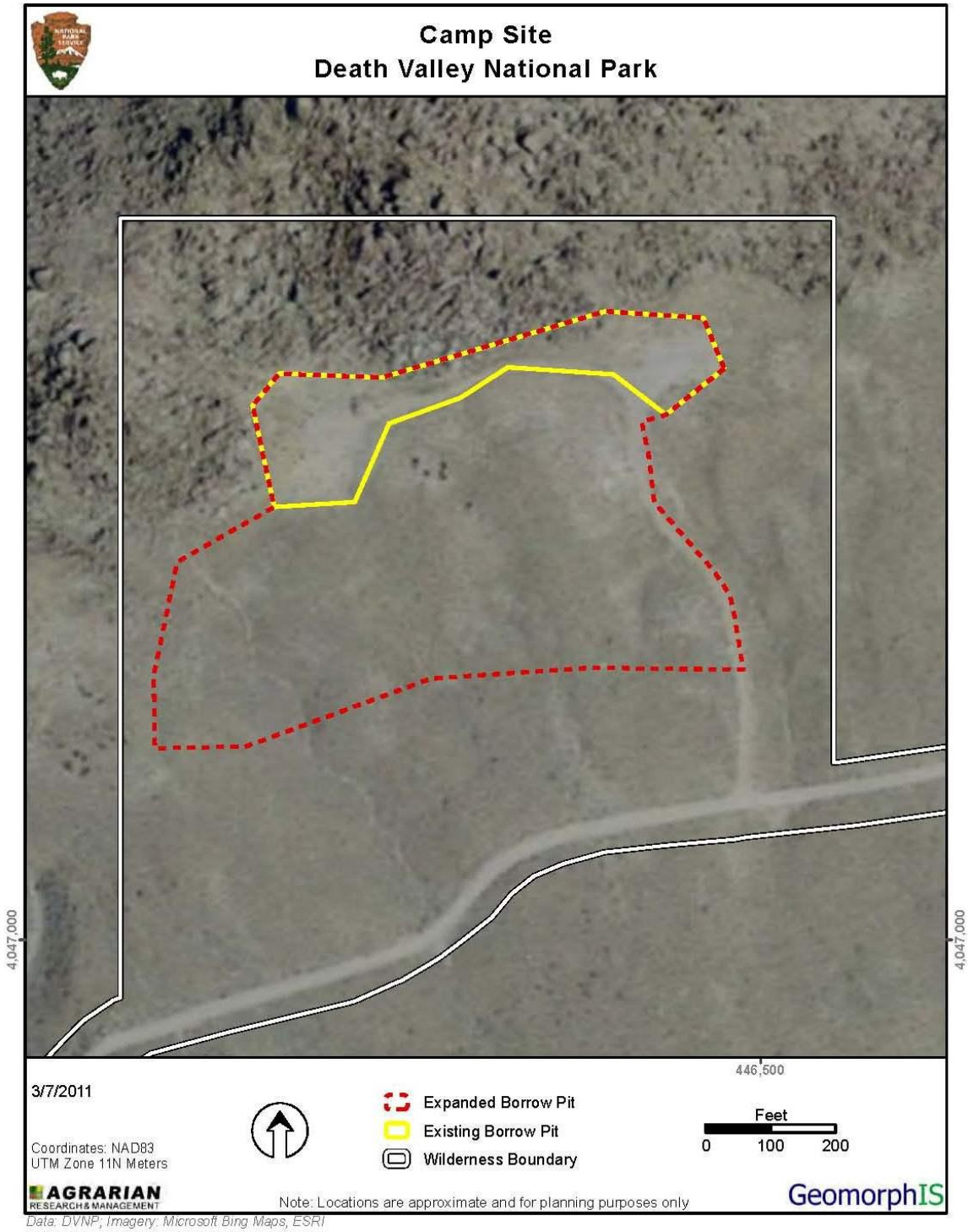


Map B- 2. Waucoba borrow site boundaries

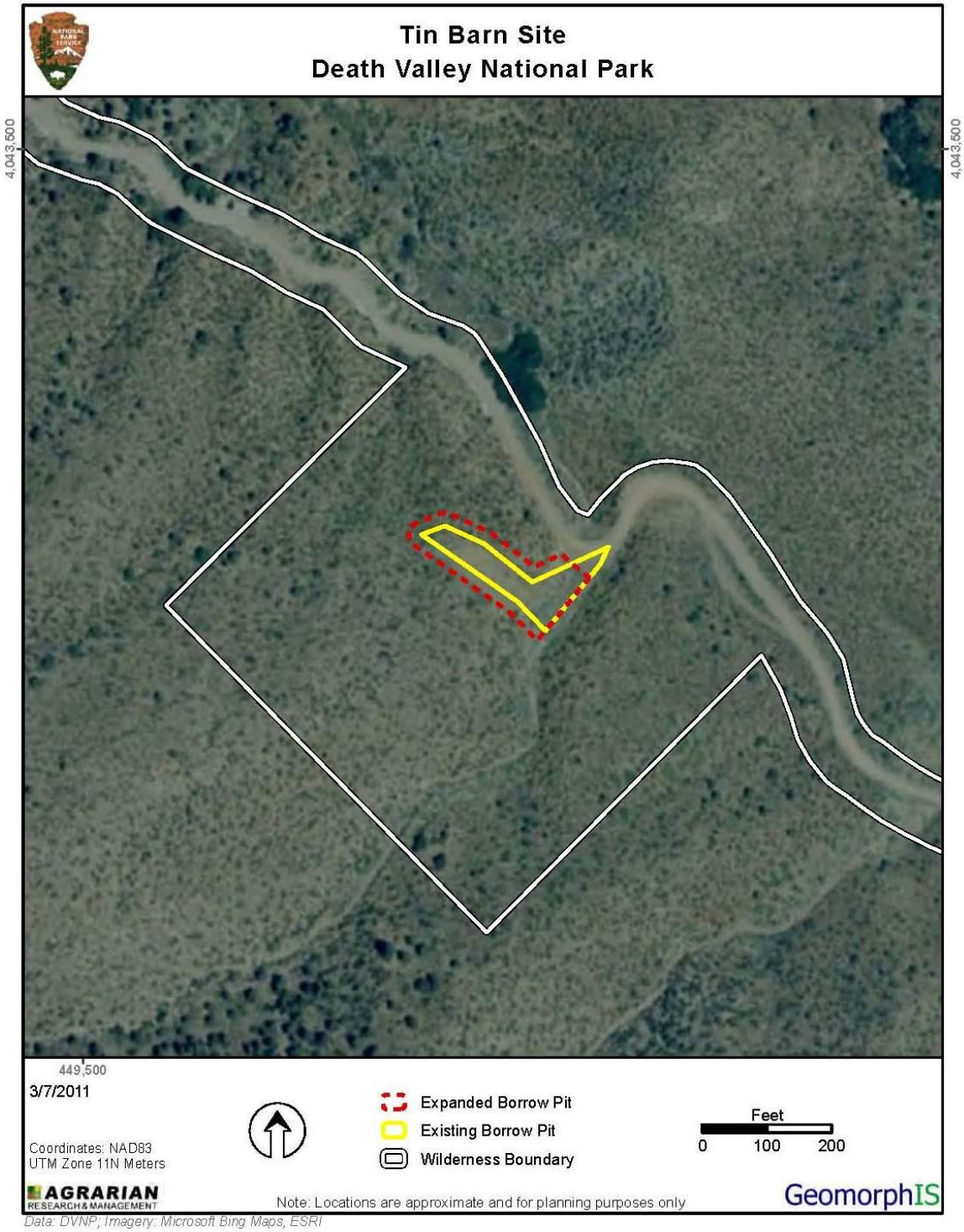
Map B- 3. Crusher borrow site boundaries



Map B- 4. Ubehebe borrow site boundaries



Map B- 5. Camp borrow site boundaries



Map B- 6. Tin Barn borrow site boundaries

APPENDIX C – SITE PHOTOS

Photo C- 1. Road condition near Tin Barn borrow site

Photo C- 2. Road condition between Camp and Ubehebe borrow sites

Photo C- 3. Road condition at dip between Camp and Tin Barn borrow sites

Photo C- 4. Road condition near Ubehebe borrow site

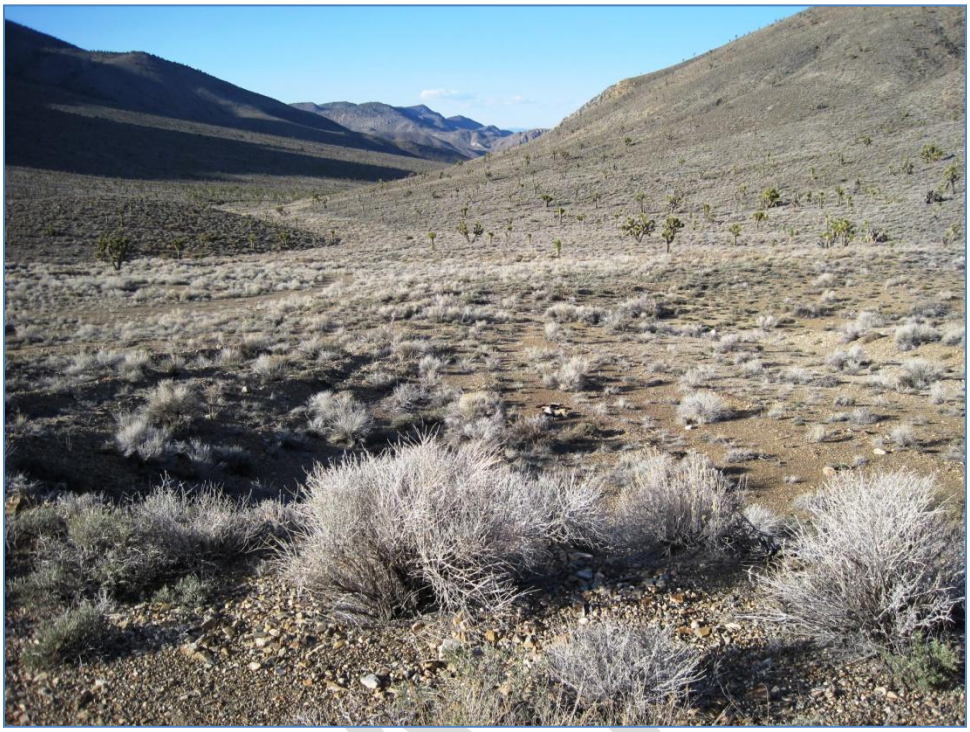


Photo C- 5. Cowhorn borrow site

Photo C- 6. Waucoba borrow site

Photo C- 7. Crusher borrow site

Photo C- 8. Ubehebe borrow site

Photo C- 9. Camp borrow site

Photo C- 10. Tin Barn borrow site

Photo C- 11. Corral borrow site

Photo C- 12. Lee Flat borrow site

APPENDIX D – GRAVEL REQUIREMENTS AND SUPPLY

Definitions and Conversions:		
yd = yard	ft = foot	sqyd / ac = 4,840
sqyd = square yard	mi = mile	yd / mi = 1,760
cuyd = cubic yard	ac = acre	

Table D-1. Saline Valley Road gravel applications

	Depth (ft)	Depth (yd)	No. of Appli-cations	Total Depth (yd)
Applied Gravel "Lift"	0.25	0.083	2	0.17

Table D-2. Saline Valley Road gravel requirements (within Park boundaries)

From	To	Section Distance (mi)	Section Distance (yd)	Avg. Road Width (yd)	Total Depth (yd)	Gravel Volume (cuyd)
Waucoba-SV Rd	Waucoba Site	12.08	21,261	6.67	0.17	23,623
Waucoba Site	Crusher Site	29.51	51,938	6.67	0.17	57,708
Crusher Site	Ubehebe Site	5.81	10,226	6.67	0.17	11,362
Ubehebe Site	Camp Site	3.21	5,650	6.67	0.17	6,277
Camp Site	Tin Barn Site	4.14	7,286	6.67	0.17	8,096
Tin Barn Site	Corral Site	2.69	4,734	6.67	0.17	5,260
Corral Site	Lee Flat Site	4.11	7,234	6.67	0.17	8,037
Lee Flat Site	Hwy 190	9.75	17,160	6.67	0.17	19,06
		71.30	125,488			139,431

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Table D-3. Estimated gravel volume previously excavated from borrow pits

Borrow Site	Area (acres)	Area (sqyd)	Est. Avg. Excavation Depth (yards)	Est. Avg. Excavation Volume (cuyd)
Cowhorn	5.10	24,673	1.0	24,673
Waucoba	1.04	5,055	2.0	10,111
Crusher	1.25	6,036	1.3	7,846
Ubehebe	2.41	11,683	1.3	15,188
Camp	1.78	8,597	0.3	2,579
Tin Barn	0.30	1,472	2.7	3,975
Corral	0.68	3,297	0.7	2,308
Lee Flat	2.76	13,363	1.3	17,372
Total	15.33			84,052

Table D-4. Estimated gravel volume to be excavated from existing pits

Borrow Site	Area (acres)	Area (sqyd)	Avg. Excavation Depth (yards)	Avg. Excavation Volume (cuyd)
Cowhorn	5.10	24,673	2.6	64,149
Waucoba	1.04	5,055	2.6	13,144
Crusher	1.25	6,036	2.6	15,693
Ubehebe	2.41	11,683	2.6	30,376
Camp	1.78	8,597	2.6	22,351
Tin Barn	0.30	1,472	0.3	442
	11.88	57,516		146,154

Table D-5. Estimated gravel volume to be excavated from expanded pits

Borrow Site	Area (acres)	Area (sqyd)	Avg. Excavation Depth (yards)	Avg. Excavation Volume (cuyd)
Cowhorn	6.67	32,294	1.0	32,294
Waucoba	8.91	43,145	1.0	43,145
Crusher	11.82	57,195	1.0	57,195
Ubehebe	9.12	44,121	1.0	44,121
Camp	3.73	18,077	1.0	18,077
Tin Barn	0.52	2,522	0.3	757
	40.78	197,354		195,589

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APPENDIX E – MITIGATION MEASURES

Both of the Death Valley National Park (DVNP), Saline Valley Road Borrow Sites proposed action alternatives require mitigation measures to reduce potential adverse environmental impacts. The following mitigation measures are meant to be applied to each of the six borrow sites individually and independently, and incorporated into the site operations and reclamation plans prepared by Inyo County. The mitigation measures are based on ones used for a prior gravel management plan approved by DVNP (NPS 2007).

Initial Reclamation Activities

For each site, initial site reclamation will commence and be complete within 12 months after plan approval. These activities will initiate reclamation at the earliest possible time, and minimize erosion and off-site sediment discharge during the extraction phase. Surface water flow from the drainages that enter the site will be diverted through the site and into the existing drainages. Soils and vegetation outside of the approved site boundary will not be disturbed.

The following reclamation activities will be implemented at each site:

Sediment Basin: In order to retain eroded sediment on the site, an open sediment basin will be constructed at the lower end of the operations area.

External Drainage Control: A drainage ditch will be installed along the upper end of the pit to direct off-site drainage flows away from the extraction operations and into the existing drainages, thus minimizing on-site erosion.

Internal Drainage Control: A drainage ditch or berm will be installed upslope of the existing pit to direct internal flows away from the extraction operations and into the open sediment basin.

Reclamation of Unpaved Road: Any unpaved roads that enter the material site will be reclaimed. Reclamation will consist of ripping or decompaction of the surface, re-contouring as required, vertical mulching, and revegetation to National Park Service (NPS)-approved standards.

Operations-Phase Reclamation Activities

Reclamation treatments, such as the sediment basin, drainage ditches, and material berms that are installed during the initial site reclamation will be maintained during the operations phase.

Pit slopes for the operations phase and the final reclaimed site will not be steeper than 3:1 (H:V, height to vertical distance) or 18°. The angle of repose of the loose stockpile material on the site will be approximately 32°. This angle can be considered to be representative of the angle of internal friction of the native gravelly-sand materials. For the final 3:1 (H:V) pit slopes, a static factor of safety of 1.9 is calculated. Thus, slopes will be stable at the proposed angle under static conditions. Cut-slopes at 3:1 (H:V) in native material should be grossly stable during seismic events.

During operations, the site will be maintained in an orderly, workman-like manner. The temporary screening plant and other equipment will be removed from the site within 60 days following termination of activity.

Final Reclamation Activities

Reclamation treatments such as re-soiling and revegetation will be installed when final slopes are present. Once all reclamation treatments have been implemented, those treatments will be monitored until performance standards have been met. The monitoring plan is designed to evaluate site-specific criteria for slope stability, erosion and sediment control, and re-soiling and revegetation.

The following discussion sets forth minimum site criteria, or performance standards, for the various aspects of site reclamation. A qualified individual or group of individuals, agreed upon by Inyo County and the National Park Service, will conduct monitoring of reclamation performance standards.

Once the reclamation activities have been completed, monitoring activities will commence and will continue until the NPS is satisfied that performance standards have been met. Reporting of the progress of reclamation will be relayed to the NPS on an annual basis. This annual report will, at a minimum, consist of the name and credentials of the investigator(s), a summary, the date of the visit(s), the methods and materials used, the data collected, an analysis of the data and performance standards, and any suggested remedial measures. Site maintenance and monitoring will continue until the NPS deems the reclamation complete.

Topography and Drainage

The final site configuration will, in general, be a circular or rectangular-shaped pit-type excavation into the surface, not greater than 20 feet deep, with side slopes no steeper than 3:1 (H:V). All non-native materials within the pit will be removed and disposed of in an appropriate off-site location. The entry to the access road will be blocked and the road will be reshaped and reclaimed to blend with the surrounding topography. Topsoil and vegetative debris (termed "duff") and fines will be applied to this landform, straw will be crimped or punched into the surface where needed, and a native seed mixture will be incorporated into the site.

The sedimentation basin near the downslope side of each pit will remain in place during pit operation. As indicated in the operations plan section, this impoundment will likely keep all in-pit drainage on site, even when peak precipitation events occur. Therefore, on-site surface runoff will pond in this basin and percolate into the ground. Following successful revegetation, which will likely happen within five years after implementation, the site will no longer be prone to erosion and these structures will no longer be maintained. The grade stabilization structures will be monitored and maintained until the NPS deems reclamation complete.

Performance Standards

No pit slope shall be steeper than 3:1 (H:V), which has been determined to exceed the slope stability standard for this material for static and grossly stable under pseudostatic conditions. Only the sediment basin will have steeper slopes at 2:1(H:V), which will be stable under static conditions.

Maintenance and Monitoring

All slopes will be assessed during annual monitoring to ensure that they are stable. If excess slope erosion is observed, or failures noted, as discussed in the performance standards section, the appropriate remedial measures will be implemented. All pit slopes will be no greater than 3:1 (H:V), except for the slope of the open sediment basin.

Soils

The topsoil is defined as the upper six inches of the native surface. The native topsoil of these sites is typically sandy with a large amount of coarse fraction (gravel and larger) material on the surface. The topsoil also contains native seeds and soil microorganisms. While a portion of the topsoil (the larger fraction) is part of the minerals being extracted from the sites, the upper six inches will be treated as an reclamation resource and salvaged rather than as a commodity and removed from the site.

Duff is defined as the topsoil and vegetative material. Prior to operations, within the area of existing disturbance, the top six inches of the native surface and all existing vegetative material will be scraped off the operations area and stored in the stockpile areas or windrowed at the top of the excavation. The topsoil will be treated with an NPS-approved weed-killing herbicide prior to excavation, and the stockpiled soil will be periodically treated with herbicide to prevent weed growth.

The vegetation can be either harvested and stockpiled separately; scraped at the same time as the surface material and stockpiled together; or chopped, broken, or chipped and mixed into the topsoil. Any vegetative debris that measures more than one-half foot in any dimension will be stockpiled separately from the topsoil.

Native surface materials will be stored in the stockpile areas or windrowed at the top of the excavation area and will be kept separate from processing and sedimentation pond fines. Native topsoil will be spread on the slopes first and the remaining, if any, spread on the pit bottom. All other areas will receive processing and sedimentation fines. These fines will be stockpiled separately from the topsoil and will be placed in the stockpile area delineated on the site plans.

Prior to spreading the growth media, all compacted areas will be decompacted (ripped or diced) to facilitate root growth. The topsoil that was stockpiled or windrowed on the side of the pit will then be respread to a depth of 6 inches over the disturbed slopes and roughened to form a variety of microsites. Rough grading, imprinting, or other suitable method can accomplish this. Re-seeding will immediately follow the spreading and roughening of the growth media. Any woody debris that was stockpiled separately will then be distributed over the site in a random manner.

Performance standards and maintenance and monitoring are discussed with erosion and sediment control, below.

Vegetation

Revegetation treatments of the site will strive to achieve visual integration with the surrounding vegetation, control surface erosion, and provide wildlife habitat values. Seeding of the site will take place during the fall, between late October and December.

Reestablishment of vegetation on each site will be somewhat limited due to the droughty nature of the soil. At some sites, the coarse fragments (gravel) present on the surface of the alluvial fans provide protection from wind and water erosion. Therefore, the goal of revegetation of these sites will be to reestablish components of the native plant community, thereby providing habitat values and integrating the site visually with the surrounding areas. Erosion control can be accomplished using the native coarse-grained soils and salvaged vegetative debris (the combination of which is termed “duff”).

Natural revegetation will occur throughout the life of the materials pit. Moreover, only some areas of the sites will be used, leaving other areas to revegetate naturally. Inyo County Road Department will not be able to assess the sites for reclamation until the use of the pits has been completed. Final reclamation will, therefore, take place after Inyo County has completed its use of the sites.

As mentioned above, after respreading the fines the areas will be roughened to form a variety of microsites; this can be accomplished by "track walking" the site or by imprinting. The growth media will be prepared to provide a firm but not overly compacted seedbed.

Many plant species are comprised of local ecotypes that are highly adapted to the local climate and edaphic conditions. The plants that will have the best chance of survival on a site are those ecotypes that are growing on (or near) that site. Besides the problem of purchasing a less adaptive ecotype, one could also cause genetic contamination of the local ecotype through interbreeding with an introduced ecotype. The results of interbreeding between commercial non-local and wild local native stock can be adverse and permanent. The best policy is to collect the material from on or near the site. Therefore, plant materials will be obtained from the same region as the materials site.

The following seed mix is proposed for use on all areas. Changes to this seed mix will only be allowed with concurrence of the NPS.

Seeding rates are given in pounds of pure live seed (PLS) per acre and are based on the percent purity and germination rates. Percent PLS can be calculated from commercial or custom collected seed by using the following formula:

$$\frac{\% \text{ PLS} = \% \text{ pure seed} \times \% \text{ germination}}{100}$$

If seed conforming to the requirements for purity or germination is not readily available, seed not conforming to these requirements may be used provided that the application rate for such seed is increased to compensate for the lower PLS. The seed application rate can be adjusted based on the preceding formula to compensate for germination or purity below or above that specified.

Over most of the site, the seed will be broadcast and then mixed into the top half-inch of substrate by either raking or dragging a chain across the seedbed, or using another suitable method. For areas that are treated with gravel mulch, the seed mix will be broadcast, either dry or hydrologically, onto the site prior to the application of the gravel mulch.

Prior to respreading processed and sedimentation fines, a soil analysis shall be required to determine the presence or absence of elements essential for plant growth. The soil analysis of the fines will be compared to a soil analysis of the native topsoil. If the soil analysis suggests that fertility levels or soil constituents are inadequate to successfully implement the revegetation program, a balanced, slow-release fertilizer, at a rate not to exceed 100 pounds per acre, or other soil amendments, may be incorporated into the fines.

Native plant species tend to be slow germinators; in the interim, the re-soiled growth media will be subjected to erosion. In areas that receive native topsoil, the native vegetative debris in the topsoil will serve as mulch. For slopes and for areas that do not receive native topsoil, the exposed fines will be

treated with gravel mulch. Gravel, ranging in size from one-half inch to 6 inches, will be spread on the exposed fines at a rate that will provide not less than 20 percent coverage and not more than 50 percent coverage. Straw mulch will not be used on these sites because it may attract burros or other herbivores to the newly revegetated area, thereby increasing herbivory impacts.

The species selections for the borrow pits will be native to the area and drought-tolerant. Therefore, irrigation should not be needed and is not recommended for these sites. Irrigation would only serve to increase growth of weed species, thereby increasing the competitive advantage of the weedy, exotic species. Irrigation will only be considered as part of the remedial measures.

Performance Standards

The following performance standards will be applied to each phase of reclamation. Shrub cover and plant density will be similar to the surrounding, undisturbed sites. A cover, density, and species-richness standard will be used for the sites based on the proposed end uses of open space and wildlife habitat.

All phases of reclamation will achieve a minimum average of four perennial species and six individual perennial species per 100 square feet, and a minimum canopy coverage equivalent to the surrounding, undisturbed area. The standards are based on the expected results five years after implementation. Areas found to be below these standards will be evaluated as set forth under maintenance and monitoring, below.

Maintenance and Monitoring

Revegetation of the sites will be monitored for a minimum of five years following reclamation of each borrow site. Monitoring activities following the completion of the initial reclamation will take place during the peak flowering season, approximately May. Once the monitoring date is set following these initial reclamation activities, monitoring of the site during the later phase will occur within two weeks of that original date. This scheme will assure that the data will be comparable over time.

Revegetation monitoring will consist of quantitative and qualitative measurements. A minimum of 20 permanently marked, randomly placed plots (or the number of plots deemed necessary for a confidence level of 80 percent) of a minimum size of 100 square feet will be established within each area following the completion of reclaimed treatments. Within the plots, the species composition, shrub cover, and shrub density will be recorded on an NPS-approved form. If it appears that a site will not meet the performance standards set forth above, then the investigator shall suggest remedial measures.

Erosion and Sediment Control

Erosion and sediment control will be achieved by implementation of the previously described topography and drainage and revegetation plans. Reinforced drainage ditches and sedimentation basins will be constructed in conformance to the drainage plan. Re-soiling and re-seeding will be performed according to the revegetation plan.

Performance Standards

Soil erosion will be evaluated for each phase using the qualitative descriptors listed in table E-1. Areas within each reclaimed phase will be assigned one of the listed descriptors. Erosion and sediment control monitoring will be completed at the same time and frequency that the vegetation monitoring is done.

The results will be used to aid in identifying areas of potential failures and to determine if the use of remedial measures is required before problem areas cause widespread failures that could affect water quality.

Any area larger than 400 square feet within the reclaimed phase that receives an average evaluation score of Class 2 or higher, and that persists for more than two consecutive years, will be investigated. The investigator will determine the need for remedial measures. Areas receiving an average score of Class 3 or higher will receive treatment to correct the problem as described in the discussion on remedial measures. Any observable reason for failure will be noted and the appropriate remedial measure(s) suggested as part of the annual monitoring report.

Table E-1: Qualitative description of soil status

CLASS	DESCRIPTION
CLASS 1	No soil loss or erosion; topsoil layer intact, well-dispersed accumulation of litter from past year's growth plus smaller amounts of older litter.
CLASS 2	Soil movement slight and difficult to recognize; small deposits of soil in form of fans or cones at end of small gullies or fills, or as accumulations back of plant crowns or behind litter, litter not well-dispersed or no accumulation from past year's growth obvious.
CLASS 3	Soil movement or loss more noticeable; topsoil loss evident, with some plants on pedestals or in hummocks; rill marks evident, poorly dispersed litter and bare spots not protected by litter.
CLASS 4	Soil movement and loss readily recognizable; topsoil remnants with vertical sides and exposed plant roots, roots frequently exposed, litter in relatively small amounts and washed into erosion protected patches.
CLASS 5	Advanced erosion; active gullies, steep sidewalls on active gullies; well-developed erosion pavement on gravelly soils, litter mostly washed away.

Source: Stoddart, L.A.; Smith, A.D.; and Box, T.W. 1975. Range management, third edition. McGraw-Hill, New York, NY.

The sedimentation basin will be inspected following the season's first major storm event, defined as more than 0.5 inch of rain falling within a 24-hour period, or at a minimum annually. The basin will be cleaned out as needed to maintain a minimum storage capacity.

Maintenance and Monitoring

All erosion and sediment control structures will be maintained and monitored annually for as long as operations and reclamation continues. This shall be done to ensure that the failures of one or more structures do not apply additional and unplanned stress on other structures. If infilling or failure of a structure occurs, steps to repair the original structure will be taken. Infill structures shall be cleaned out without causing damage.

Death Valley National Park and Inyo County Road Department personnel will hold at least one inter-agency meeting annually. This forum will be used for both agencies to update each other on the Saline Valley Road maintenance and borrow site project and to discuss issues and concerns.

Public Safety

At each borrow site, the configuration of the disturbed lands will be the creation of a pit no greater than 20 feet deep with 3:1 (H:V) side slopes that will not pose a hazard to the public. Hazardous materials associated with operations and processing will be stored properly on site, and prior to reclamation will be disposed of properly off site. A locked gate may be installed at any sites deemed potentially hazardous to the public. During final reclamation, the gate will be replaced with boulders to reduce the visual impacts.

Visual

All rock structures that may be visible from the main road, specifically the grade control structures, will be of a color that blends with the surrounding substrate. This can be accomplished by either using rock of a yellowish-grey to light brown color or by using a rock staining compound to achieve a similar color. All rock structures visible from the main road will be of a similar color as the surrounding substrate on the road. If the emplaced rock contrasts with surroundings, then a rock staining compound will be used to achieve the desired color.

Reference:

NPS. 2007. Towne Pass material site #218, Environmental Assessment/Assessment of Effect. U.S. Department of the Interior, National Park Service, Death Valley National Park, California/Nevada. February 2007.

APPENDIX F – CONSULTATION AND PUBLIC SCOPING