# Alternative C: Diversified Recreation

## MANAGEMENT CONCEPT

Through an expanded range of visitor programs and recreation opportunities, the NPS would strive to meet both current and changing visitor needs. Expanded outreach efforts would develop a more visible identity for the monument. These actions would enhance appreciation for the unique resources protected at Lava Beds and improve understanding of the monument's role in a regional setting.

## VISITOR EXPERIENCE

The NPS would expand outreach to the travel and tourism industry to maintain or increase visitation and in turn raise the regional profile of Lava Beds National Monument. Diversified recreational opportunities would be provided throughout the monument (e.g. biking, snowshoeing, caving seminars, annual events, adventure tours). The NPS would collaborate with the U.S. Forest Service on new recreational trail opportunities and would establish additional medium distance (1-3 mile) loop trails within the monument. The monument would offer a diversity of world-class lava tube caving experiences by offering caving seminars and specialized tours.

**Devils Homestead Flow,** *NPS Photo*

## FACILITIES

New facilities would be provided to accommodate the diversified recreational opportunities. The NPS would provide more opportunities for trails that are accessible to a wide range of user needs and abilities, including wheelchair accessibility. Diversified recreation trails would also be provided. For example, the NPS would explore appropriate trail opportunities for bicycles, horses, cross-country skiing, and snowshoeing.

To allow for more informal, dispersed exploration and recreation, the NPS would construct more 1- to 2-car pullouts along the main monument road. The monument would encourage bicycle use on the main monument road by providing bicycle facilities at appropriate locations.

Improvements to the campground would better accommodate groups and RVs (see management of specific areas for a description of proposed changes to the campground under this alternative). Primitive backcountry camping sites would be designated.

The monument would explore additional office space by considering leasing building space in local communities, co-locating with other agencies, constructing new buildings, or modifying existing buildings using sustainable practices.

## NATURAL RESOURCES

Natural resource management would remain largely the same as in alternative A. However, additional monitoring and assessment of sensitive resources would occur in high use visitor areas.

## CULTURAL RESOURCES

The monument would identify new opportunities for visitors to learn about historic resources and monument collections. Examples of new opportunities could include an overnight experience at the Schonchin Butte fire lookout or guided tours to other historic sites. New research and battle forensics would enhance interpretation and knowledge of Modoc War sites.

## SUSTAINABLE PARK OPERATIONS

The monument would reduce electrical energy use for monument operations through use of new technologies and/or changes in monument operations to reduce need. Pedestrian and bicycle visitor circulation would be encouraged throughout the monument.

## MANAGEMENT OF SPECIFIC AREAS

### *Petroglyph Point Unit*

A limited day-use facility and additional recreational opportunities such as wildlife viewing would be available at Petroglyph Point. The road through the Petroglyph Point unit would be realigned to the south

and paved. A group day-use facility would be located at Petroglyph Point. Improvements would include a small parking lot, vault toilets, a picnic area, and shade structures. The NPS would create a new loop trail system to access more areas of Petroglyph Point and provide a surfaced, accessible trail to the petroglyphs. A new protective fence that would allow for photography and wildlife passage would be constructed.

### *Cave Loop Road*

The Cave Loop Road area would feature a cave docent program to assist visitors with cave exploration and more rangers would also be available during peak visitation. New facilities would include vault toilets, and a foot trail around the Cave Loop Road to allow visitors to leave vehicles at the visitor center or campground. Areas along the Cave Loop Road impacted by social trails would be restored.

### *Campground*

The campground would be improved to better accommodate large vehicles by adding a new RV loop and reducing several campsites in the existing campground loops (with no net loss or gain in the total number of campsites). No hookups would be provided for the RV sites, but a new seasonal shower facility would be located in the campground.

## MANAGEMENT ZONING

The zoning maps on pp. 72-74 show how Lava Beds National Monument would be zoned in alternative C. (The management zones are described near the end of the "Introduction to the Alternatives" section). In alternative C, the majority of the monument would be included in the backcountry and interpretive backcountry zones. However, this alternative would have significantly more areas zoned as interpretive backcountry to provide more opportunities for new interpretive trails. Existing circulation patterns in the monument would be maintained; therefore, all primary roads are included in the developed zone. The developed zone would also include existing roads and visitor facilities such as overlooks, pullouts, the visitor center, the campground and new facilities at Petroglyph Point. The administrative zone would include monument headquarters, the housing area at Indian Well, and the maintenance area near Crescent Butte.

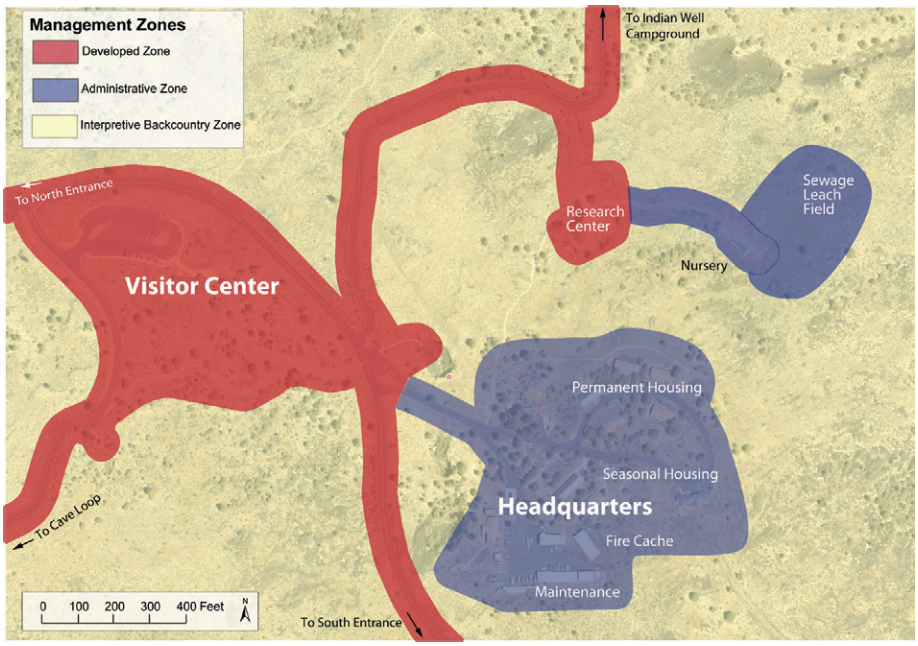
## USER CAPACITY

As described in the user capacity section later in this chapter, monument staff would monitor social and resource indicators, evaluate current conditions against standards, and take appropriate steps to ensure the monument's user capacity is not exceeded (see table 12 for the user indicators, standards, and management and monitoring strategies that would be followed under this alternative).

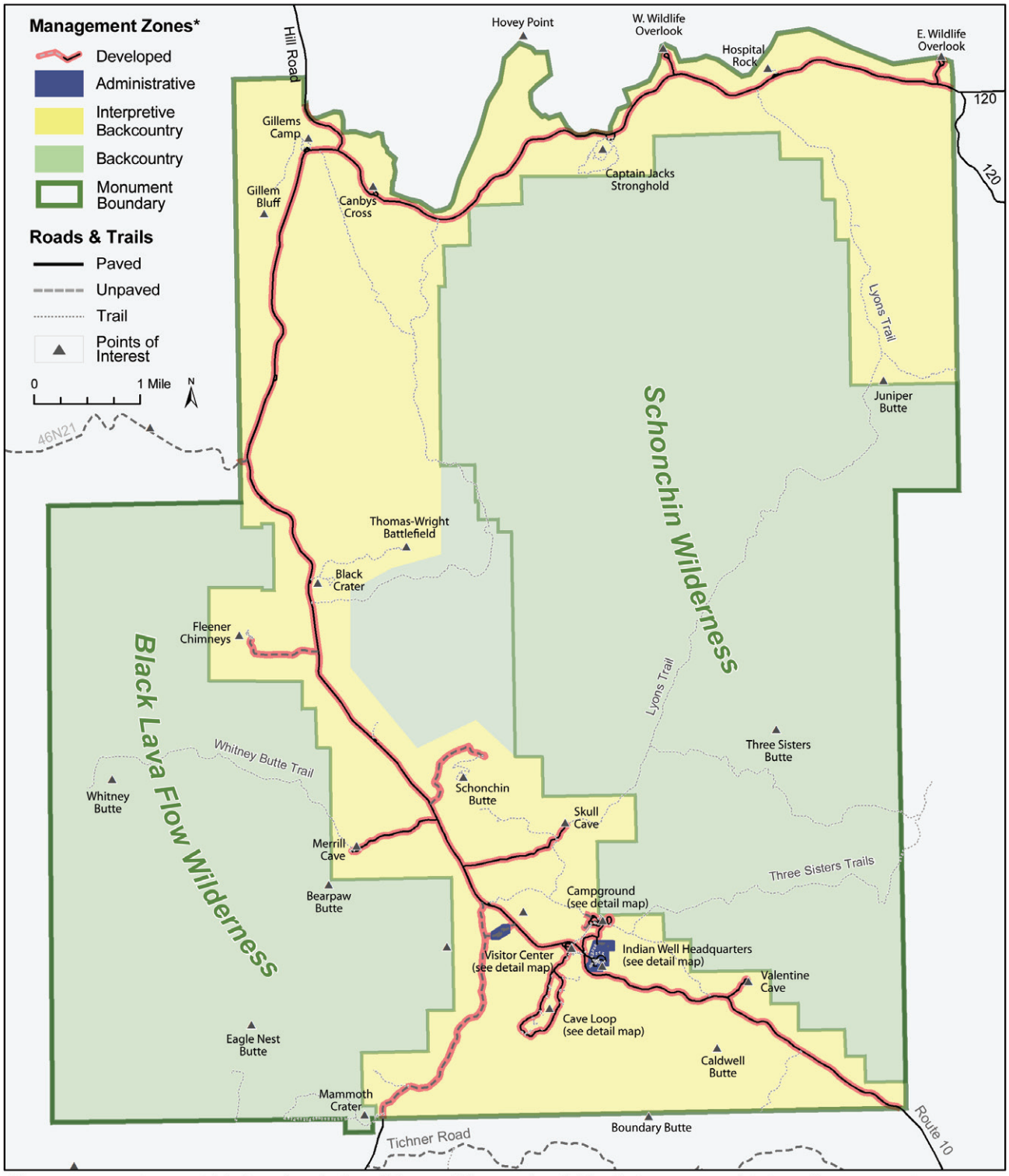
## BOUNDARY ADJUSTMENTS

No new boundary adjustments would be pursued in alternative C. The monument would focus on working with partners and sister agencies in managing of significant resources that are associated with the monument, primarily lava tube systems that start on U.S. Forest Service lands and cross into the monument. Many significant caves are found just south of the monument boundary and preservation of these resources would be based on coordination with the primary management agency.

## MAP 8: ALTERNATIVE C - INDIAN WELL HEADQUARTERS AND VISITOR CENTER

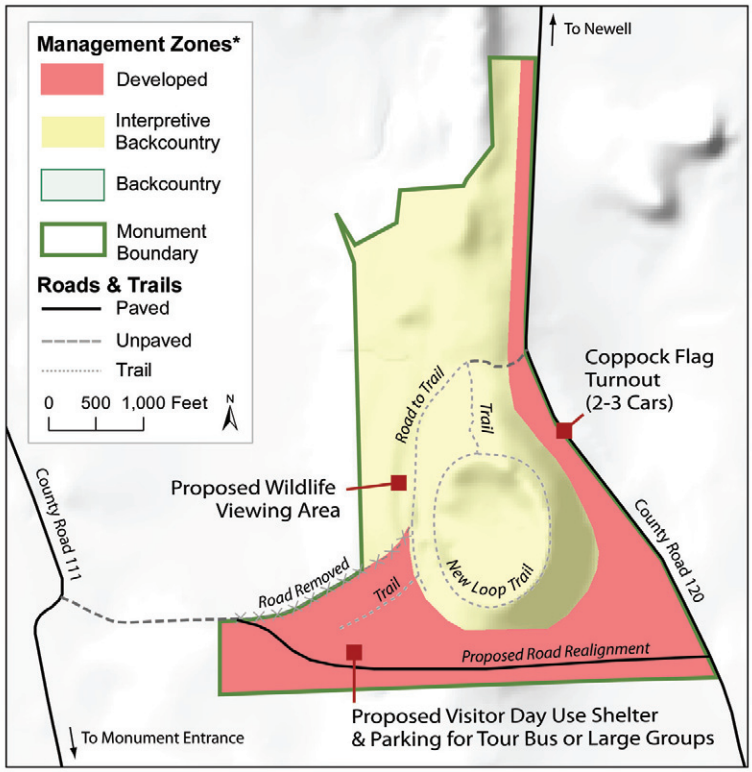


## MAP 9: ALTERNATIVE C ZONING - MAIN MONUMENT



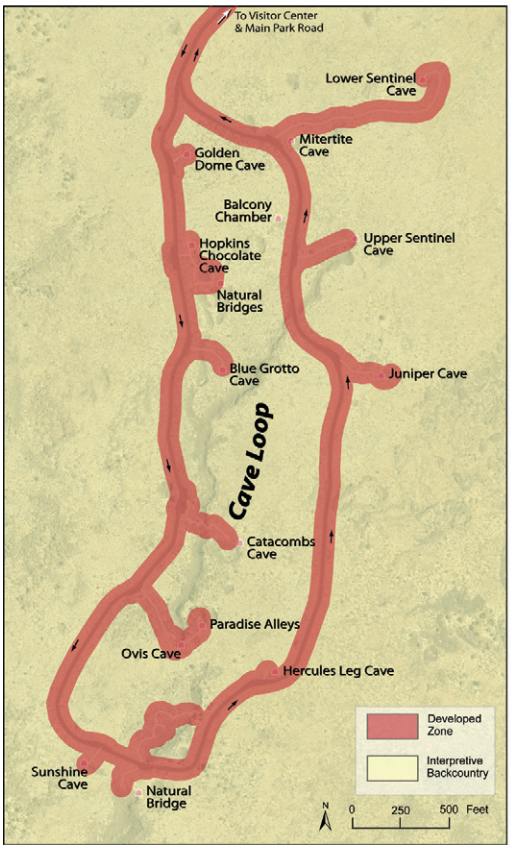

*See management zones table for a description of the conditions and activities that are appropriate to each mangement zone.

## MAP 10: ALTERNATIVE C - PETROGLYPH POINT




*See management zones table for a description of the conditions and activities that are appropriate to each mangement zone.

## MAP 11: ALTERNATIVE C - CAVE LOOP




## MAP 12: ALTERNATIVE C - CAMPGROUND LOOP

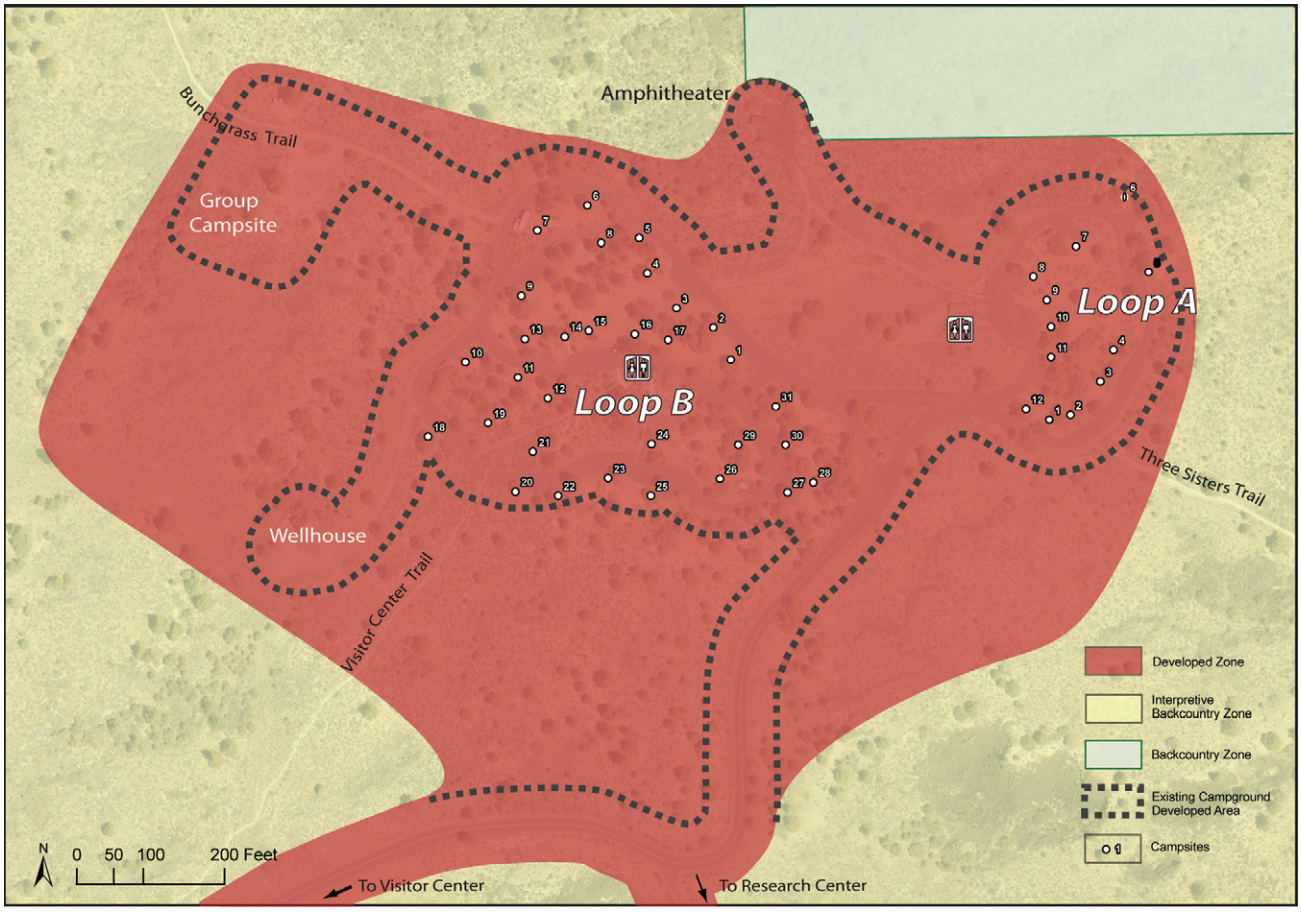


**TABLE 8: MANAGEMENT ACTIONS FOR ALTERNATIVE C**

| MANAGEMENT ACTIONS FOR ALTERNATIVE C | |
|---|---|
| **NATURAL RESOURCES** | |
| GEOLOGIC PROCESSES AND FEATURES | Cave action plans would be developed for caves that may receive increased use on cave loop. The cave management plan would specify classes of caves where such recreation would be appropriate. |
| VIEWSHEDS/VISUAL QUALITY | Same as Alternative A |
| DARK NIGHT SKIES | Same as Alternative A |
| ECOLOGICAL COMMUNITIES | Same as Alternative A |
| FIRE MANAGEMENT | Same as Alternative A |
| WILDERNESS | Same as Alternative A |
| **CULTURAL RESOURCES** | |
| ARCHEOLOGY | Same as Alternative A |
| ETHNOGRAPHIC RESOURCES | Same as Alternative A |
| HISTORIC STRUCTURES | The monument would identify new opportunities for visitors to access historic structures (e.g. opportunities for an overnight experience at the Schonchin Butte fire lookout, and/or tours to other historic sites while protecting resources).<br>The monument would investigate providing interpretive experiences that allow visitors a broader understanding of the Modoc War (e.g. specialized tours of fortifications, or tours that include sites outside the monument). |
| CULTURAL LANDSCAPES | The Modoc War cultural landscape would be actively restored to 19th century battlefield conditions.<br>New research and battle forensics would enhance interpretation and knowledge of the Modoc War sites. |
| MUSEUM COLLECTIONS | Visitors would have greater access and new ways to view monument collections (e.g. electronic museum tours, new/rotating displays in the visitor center). |
| **VISITOR EXPERIENCE** | |
| RECREATION | The monument would increase outreach efforts to encourage more visitation.<br>Diversified recreational opportunities would be provided throughout the monument (e.g. biking, snowshoeing, annual events).<br>More information and resources for recreational users would be provided throughout the monument.<br>The NPS would increase opportunities for a broad variety of adventure and specialized tours.<br>The NPS would collaborate with the U.S. Forest Service on new recreational opportunities (e.g. trail connections, joint management of trails for horses and bicycles, and winter sports such as cross-country skiing, and snowshoeing).<br>The monument would offer a diversity of world-class lava tube caving experiences by offering caving seminars and specialized tours. |

## MANAGEMENT ACTIONS FOR ALTERNATIVE C

| | |
|---|---|
| INTERPRETATION AND EDUCATION | **INTERPRETATION:**<br><br>Interpretive information would be provided about expanded recreation opportunities.<br><br>Interpretive media would be created for groups and commercial tours.<br><br>Additional interpretation of Civilian Conservation Corps-era monument features would be provided.<br><br>The monument would investigate providing interpretive experiences that allow visitors a broader understanding of the Modoc War (e.g. specialized tours of fortifications, or tours that include sites outside the monument).<br><br>Collaborative efforts to expand interpretation would include:<br>• Collaborating with the U.S. Fish and Wildlife Service to provide guided bird watching tours along Tule Lake.<br>• Collaborating with the U.S. Forest Service to interpret geology and Modoc War sites near Tichnor Road.<br><br>**EDUCATION AND OUTREACH:**<br>The research center use would be expanded to include recreation seminars (e.g. caving, winter activities).<br><br>An Artist-in-the-Park program would be established using the Research Center as a base.<br><br>Public archeology programs and archeology workshops would be held at the monument. |
| **FACILITIES AND OPERATIONS** | |
| VISITOR CENTER | Same as Alternative A |
| RESEARCH CENTER | Same as Alternative A |
| ROADS | If Forest Service Route 10 continues to receive inadequate or no funding for project work and remains in poor condition, the NPS would encourage visitors to enter and exit the monument via Medicine Lake Road and the paved and better maintained northern routes.<br><br>Lyons Trail (outside of backcountry areas) would be maintained for administrative vehicle use, and interpreted as a historic Civilian Conservation Corps-era entrance to the monument.<br><br>Powerline road would be closed to administrative vehicle use and portions may be used for trails.<br><br>The Medicine Lake Road would be realigned and paved (within the monument).<br><br>The NPS would remove and revegetate the West Wildlife Overlook and access road and encourage visitor use of the remaining East Wildlife Overlook.<br><br>The monument would encourage bicycle use on roads. Bicycle facilities will be provided at appropriate locations.<br><br>The monument would construct more one to two-car pullouts to allow for informal, dispersed exploration/recreation (approximately every 1-½ mile). |

| MANAGEMENT ACTIONS FOR ALTERNATIVE C | |
|---|---|
| TRAILS AND TRAILHEADS | The monument would provide more opportunities for trails that are accessible to a wide range of user needs and abilities, including wheelchair accessibility. Areas with the best potential for ADA accessibility include trails to Hospital Rock, the first quarter-mile of Captain Jacks Stronghold, Gillems Camp, and Petroglyph Point<br><br>The monument would establish additional medium distance (1-3 mile) loop trails. Areas for potential new trails include Gillems Bluff, Thomas Wright/Black Crater, Whitney Butte, a smaller Three Sisters, and Eagle Nest Butte/Big Nasty/Mammoth Crater.<br><br>A new foot trail would be constructed around Cave Loop Road to encourage visitors to leave vehicles at the visitor center or campground.<br><br>The monument would explore new trail opportunities for bicycles, horses, cross-country skiing, and snowshoeing.<br><br>The monument would complete a trail management plan. |
| BOUNDARY ADJUSTMENTS | The monument's current boundary would be maintained. |
| PARTNERSHIPS AND REGIONAL COOPERATION | The monument would expand outreach to the travel and tourism industry to maintain or increase visitation and in turn raise the regional profile of Lava Beds National Monument.<br><br>The monument would collaborate with the U.S. Forest Service on new recreational opportunities (e.g. trail connections, joint management of trails for horses and bicycles, and winter sports such as cross-country skiing and snowshoeing). |
| RESEARCH | Same as Alternative A |
| COMMERCIAL SERVICES | The Lava Beds Natural History Association would continue to function as a cooperating association for the monument.<br><br>The monument would continue to authorize the concession contract for visitor convenience items which is currently held by the Lava Beds Natural History Association (NHA). The concession contract currently held by the NHA would also focus on providing items that would accommodate recreational users (e.g. trail guides, knee-pads for caving).<br><br>Limited seasonal food and drink service in the vicinity of the visitor center would be assessed for commercial feasibility.<br><br>The monument would consider allowing commercial interpretive tours consistent with this general management plan and NPS service-wide policies. |
| PARK OPERATIONS AND SUSTAINABILITY | The NPS would seek to offset the monument's total electrical use. This offset could be accomplished by installing grid tied alternate electrical generation equipment (e.g. photovoltaic panels and bird/bat safe wind turbines).<br><br>The monument would consider leasing or co-locating with other agencies outside the monument before considering new construction or modification of existing buildings inside of the monument for new office space |
| SAFETY AND LAW ENFORCEMENT | The monument would provide more formal ranger presence in the interpretive backcountry/developed zones to address increased visitation and use.<br><br>More safety and preparedness information would be increased for interpretive backcountry/developed zone visitors. |

## MANAGEMENT ACTIONS FOR ALTERNATIVE C

| | |
|---|---|
| **STAFFING**<br><br>*Terms used<br><br>**Permanent Staff:** An appointment or hire to a federal position that has no time limit established with it<br><br>**Term Staff:** Nonpermanent appointment expected to last longer than one year, but less than four years<br><br>**GS:** General Schedule payscale | Additional staffing would include:<br><br>6 Permanent Staff: (1electrician, 1 resource management specialist, 2 law enforcement, 2 maintenance positions)<br><br>2 Term Staff: (1biological science tech, 1 physical science tech)<br><br>7 Part-time/Seasonal:(4 interpreters, 3 resource management technicians)<br><br>Recommended increase in CURRENT permanent GS level for the following: Convert current GS-09 Physical Scientist to full performance GS-11 Physical Scientist. |
| **AREA-SPECIFIC ACTIONS** | |
| **PETROGLYPH POINT** | A large group day-use facility would be located at Petroglyph Point (including a small parking area, vault toilets, trails, picnic area, and shade structures).<br><br>The monument would provide a wildlife viewing area for observing raptors and other wildlife.<br><br>The monument would create a new loop trail system for Petroglyph Point. A surfaced, accessible trail to the petroglyphs would be provided.<br><br>A new protective fence that would allow for photography and wildlife passage would be constructed at Petroglyph Point.<br><br>The road through Petroglyph Point would be realigned to the south and paved. The existing road would be removed and revegetated. |
| **CAVE LOOP ROAD** | A foot trail would be provided around Cave Loop to encourage visitors to leave vehicles at visitor center or Campground. Areas along the Cave Loop impacted by social trails would be restored.<br><br>Increased monitoring of cave resources would occur to preserve non-renewable features. This would require additional resource management staff to monitor impacts from current visitor use.<br><br>More rangers would be present at the cave loop during peak visitation.<br><br>A cave docent program would be established.<br><br>Vault toilets would be located along the Cave Loop Road. |
| **CAMPGROUND** | The campground would be improved to better accommodate large RVs by adding a new loop for recreational vehicles. The monument would reduce other campsites in the existing campground loops (with no net loss or gain in the total number of campsites). No hookups would be provided for recreational vehicles.<br><br>The campground would be improved to better accommodate groups.<br><br>To encourage longer visitor stays, one or two new coin operated and limited time shower buildings would be constructed in the campground. |

## ESTIMATED COSTS

Cost estimates for alternative C are identified below in Table 9. The cost estimates, in 2008 dollars, shown here are not for budgetary purposes; they are only intended to show a very general relative comparison of costs between the alternatives. A discussion of the development of the costs and a comparison between the alternatives is included after the description of the alternatives.

The implementation of the approved plan will depend on future funding. The approval of this plan does not guarantee that the funding and staffing needed to implement the plan will be forthcoming. Full implementation of the actions in the approved General Management Plan could be many years in the future.

### *One-Time Capital Costs*

Alternative C would consist of the improvements to facilities and structures described previously in the alternative. The estimated one-time capital cost in 2008 dollars is approximately $11,200,000. One-time capital costs include trails, interpretive materials, road improvements, facility improvements, changes to monument operations to reduce energy use, and collection of oral histories.

### *Staffing Requirements*

Implementation of alternative C would require additional staffing to support increased monitoring and invasive species control efforts, new recreational programming, and additional maintenance needs at Petroglyph Point. Two full-time staff and four seasonal positions would be added to the Resource Protection and Visitor Services Division. Two full-time visitor protection staff positions would be required to ensure visitor safety and resource protection through increased roving and visitor contacts. The four seasonal interpreters would conduct outreach, guided tours, and expanded interpretive efforts within the monument and at surrounding sites.

Expanded recreational opportunities proposed in alternative C would require three new-full-time and three new part-time positions in the Resource Management Division to ensure that sensitive resources are not harmed. One resource management specialist, a biological science technologist, and a physical scientist technologist would be required for expanded monitoring and restoration efforts. A full performance physical scientist would be required for enhanced cave management and restoration activities. Three seasonal resource management technicians would be required to implement specific monitoring and restoration projects.

The Maintenance Division would require three new full-time positions. Two positions would be needed to maintain the new facilities at Petroglyph Point, new trails, and other day use areas. A third maintenance position would be necessary to oversee and maintain new sustainable technologies that would be installed to achieve the monument's goal for reducing its carbon footprint.

Proposed new staffing includes:

*Six Full-time Permanent Staff Positions*

- One alternative energy specialist (electrician)
- One resource management specialist
- Two visitor protection (law enforcement position)
- Two maintenance positions

*Two Term Staff Positions*

- One biological science tech
- One physical science tech

*Additional part-time/seasonal staff positions under Alternative C:*

- Four interpreters
- Three resource management technicians

### *Annual Operating Costs*

This alternative would be implemented with the current staffing levels plus 8 full-time equivalent staff (FTEs) for law enforcement, restoration and resource management, maintenance and interpretation (One FTE is one person working 40 hours per week for one year, or the equivalent) and 7 seasonal staff for interpretation and resource management. These additional positions would add approximately $839,000 to the operating base for alternative C. Additional administrative costs for potential leasing of new office space would be $14,400. The monument estimates that it would have additional annual cost savings of $35,000 upon installation of new energy-saving technologies for monument electrical use. The total annual operating costs for alternative C would be approximiately $2,500,000 per year (in 2008 dollars).

**TABLE 9: SUMMARY OF COSTS FOR ALTERNATIVE C**

| SUMMARY OF COSTS FOR ALTERNATIVE C | |
|---|---|
| **ANNUAL OPERATING COSTS** | |
| Monument Operations | $1,701,000 |
| Additional Staff (8) FTE (7) Seasonal/Part-time | $839,000 |
| Oral History Collection | $15,000 |
| Law Enforcement | $8,400 |
| Annual Savings from On-site Renewable Energy | $-35,000 |
| Leased Office Space | $14,400 |
| **Total Annual Operating Costs** | **$2,542,800** |
| **ONE-TIME CAPITAL COSTS** | |
| Campground Improvements | $1,400,000 |
| Cave Loop Improvements (Trail and road improvement, vault toilets) | $121,000 |
| Collections Exhibits | $130,000 |
| Day Use Areas | $20,000 |
| Educational and Interpretive Materials | $30,000 |
| Main Road Improvements (additional pull-outs) | $150,000 |
| Medicine Lake Road Reconstruction and Paving | $3,900,000 |
| Modoc War Historic Landscape Restoration | $80,000 |
| Petroglyph Point Improvements<br>• Protective Fence ($72,000)<br>• Trails ($300,000)<br>• Picnic Area with Shade Structures ($75,000)<br>• Vault Toilet ($50,000)<br>• Road Realignment/Paving ($1,700,000)<br>• Parking ($500,000)<br>• Wildlife Viewing Area ($25,000) | $2,722,000 |
| Sustainable Park Operations (new energy systems) | $1,260,000 |
| Trails | $1,373,000 |
| **Total One-Time Capital Costs** | **$11,186,000** |

*All costs in FY08 dollars

**Pictograph,** *NPS Photo*

**TABLE 10: SUMMARY OF ALTERNATIVES**

| SUMMARY OF ALTERNATIVES | | |
|---|---|---|
| **Alternative A (No Action)** | **Alternative B (Preferred)** | **Alternative C** |
| **CONCEPT** | | |
| The no-action alternative provides a baseline for evaluating changes and impacts in other concepts | Lava Beds National Monument would promote and strengthen monument resource protection and restoration through enhanced stewardship, research, education, and inter-agency cooperation. | The monument would provide additional recreational and educational opportunities to meet both current and changing visitor needs and expectations. Outreach efforts would be expanded. |
| **NATURAL RESOURCES** | | |
| Natural resource management programs would continue primarily as they are with a focus on inventorying and monitoring, resource protection, preservation, mitigation, and applied research efforts. | An expanded geologic research program would establish Lava Beds National Monument as a center for research and technical assistance focused on lava tube caves.<br>The monument would establish a comprehensive monitoring program on geologic resources throughout the monument.<br>An increased emphasis would be placed on the restoration and protection of sensitive species.<br>The monument would expand comprehensive restoration efforts for native habitat<br>The monument would increase regional coordination and technical assistance opportunities for ecological restoration, viewshed and dark night sky protection, and cave research and management. | Management of natural resources would primarily be the same as alternative A.<br>The monument would conduct additional monitoring and assessment of sensitive resources in high visitor use areas, including development of cave action plans for high-use caves along Cave Loop Road. |
| **CULTURAL RESOURCES** | | |
| The monument would document cultural resources and collections.<br>The monument's ability to identify, inventory, conduct research and document significant cultural resources would continue to be limited by staffing constraints. | The monument would expand regional research and outreach programs related to cultural resources.<br>The monument would increase efforts to collect local oral histories.<br>The public would have greater access to library and museum collections.<br>New research would investigate the impacts of climate change on cultural resources.<br>Modoc War conservation studies would facilitate fortification preservation and restoration.<br>Treatment of cultural landscapes would be implemented from additional research results. | The monument would encourage greater public access to historic structures and monument collections.<br>The Modoc War cultural landscape would be actively restored to 19th century battlefield conditions. |

## SUMMARY OF ALTERNATIVES

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **INTERPRETATION AND EDUCATION** | | |
| The monument's education program would continue to provide curriculum-based education programs both on-site and in the classroom throughout the year.<br><br>The education program would continue to produce education materials for teachers to use on their own in the classroom.<br><br>The monument would continue to provide personal services such as guided tours, talks, and roving interpreters as staffing permits.<br><br>The monument would continue to provide a variety of important non-personal services such as waysides, website content, etc. | The monument would expand interpretive topics and new opportunities would be explored both within and outside the monument at sites related to the park purpose and significance, including collaborative opportunities with tribes, regional parks, and schools.<br><br>The monument would coordinate with the U.S. Fish and Wildlife Service and U.S. Forest Service to provide tours or interpretation on adjoining lands.<br><br>Opportunities would be provided for public involvement in research and restoration activities.<br><br>The monument would expand use of the visitor and research centers for teachers, students, researchers, and the public. | The monument would establish an Artist-in-the-Park program.<br><br>The monument would coordinate with the U.S. Fish and Wildlife Service and U.S. Forest Service to provide tours or interpretation on adjoining lands.<br><br>Expanded interpretive information would include media for groups and commercial tours. |
| **RECREATION** | | |
| The monument would continue to provide programs, maintain its trail system, and to hold annual events.<br><br>The monument would make incremental improvements to improve visitor accessibility. | Expanded hiking opportunities would be provided.<br><br>The monument would expand visitor accessibility, including accessible trails and an improved virtual cave experience.<br><br>New recreational opportunities would be explored such as designated backcountry camping sites, winter recreation, day use areas for large groups, and conversion of the West Wildlife Overlook to an event area.<br><br>The monument would encourage more opportunities for commercial tours.<br><br>Bicycling would be encouraged on monument roads. | The monument would increase outreach efforts to encourage more visitation, including raising the regional profile of Lava Beds National Monument within the travel and tourism industry.<br><br>Expanded hiking opportunities would be provided.<br><br>The monument would expand visitor accessibility.<br><br>A greater diversity of recreation opportunities would be provided (e.g. biking, snowshoeing, caving seminars, annual events, and adventure and other specialized tours).<br><br>The monument would provide increased involvement for commercial tours.<br><br>The research center would be expanded to accommodate recreation seminars. |
| **MONUMENT OPERATIONS** | | |
| Incremental improvements in energy efficiency would be made over time. | The monument would strive to offset its total energy use through changes in monument operations and new technologies, including electricity and motor vehicle fuel use. | The monument would strive to offset its total electricity usage through changes in monument operations and new technologies. |

## SUMMARY OF ALTERNATIVES

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **FACILITIES AND ROADS** | | |
| Existing facilities and roads would remain and continue to be maintained. | A seasonally staffed contact station, education area, and day-use facilities would be located at Petroglyph Point.<br><br>The campground would be redesigned to improve the experience for groups, tent campers and RVs.<br><br>Improvements at Cave Loop Road would include a vault toilet and improved pedestrian/bicycle access.<br><br>The visitor center would be expanded to provide classroom opportunities and offices.<br><br>Additional laboratory space at the Research Center.<br><br>The NPS would explore leasing office space out of the monument for administrative functions.<br><br>The northern monument entrance roads would serve as the primary access points to the monument.<br><br>The wildlife overlooks and roads would be removed and revegetated. A portion of the West Wildlife Overlook would be used for events.<br><br>The road at Petroglyph Point would be realigned and remain unpaved.<br><br>Official vehicle access on portions of Lyons Trail would be maintained. Natural processes would reclaim portions of Lyons Trail and the Powerline administrative road. | A limited day-use facility would be located at Petroglyph Point.<br><br>The monument would expand the campground to better accommodate groups and RVs.<br><br>Improvements at Cave Loop Road would include a vault toilet and pedestrian/bicycle access.<br><br>The NPS would explore leasing office space out of the monument for administrative functions<br><br>The northern monument entrance roads would serve as the primary access points to the monument.<br><br>Medicine Lake Road (within the monument) would be realigned and paved.<br><br>The West Wildlife Overlook and access road would be removed.<br><br>The road at Petroglyph Point would be realigned and paved.<br><br>Lyons Trail would be maintained for administrative use and interpreted as the historic entrance to the monument. Powerline administrative road would be converted to trail use or reclaimed by natural processes. |
| **COST COMPARISON** | | |
| ANNUAL OPERATING COSTS | | |
| **$1,701,000** | **$2,505,200** | **$2,542,800** |
| STAFF (FULL TIME EQUIVALENT) | | |
| **22.3** | **29.8** | **30.3** |
| ONE-TIME CAPITAL COSTS | | |
| **$0** | **$9,099,000** | **$11,186,000** |

### TABLE 11: SUMMARY OF IMPACTS

The following discussion summarizes impacts of all alternatives considered, in accordance with the National Environmental Policy Act. The full analysis of impacts is included in Chapter 5, "Environmental Consequences."

| SUMMARY OF IMPACTS | | |
|---|---|---|
| **Alternative A (No Action)** | **Alternative B (Preferred)** | **Alternative C** |
| **EFFECTS ON NATURAL RESOURCES** | | |
| **AIR QUALITY** | | |
| Minor, short-term, adverse impacts on the monument's air quality from operations and visitor use.<br><br>Short-term, minor adverse effects on air quality from wildfire (unplanned ignitions) and the use of prescribed fire (planned ignitions).<br><br>Cumulative impacts associated with population growth and energy demands would contribute minor adverse impacts to air quality.<br><br>No impairment of the monument's resources or values. | Long-term, negligible to minor, beneficial effects on monument air quality from alternative energy generation and increased educational and collaborative efforts between the monument and neighboring communities.<br><br>As in alternative A, short-term, minor adverse effects on air quality from wildfire (unplanned ignitions) and the use of prescribed fire (planned ignitions).<br><br>Negligible, beneficial cumulative effects on the monument's air quality.<br><br>No impairment of the monument's resources or values. | Long-term, negligible, beneficial effects on monument air quality from alternative energy.<br><br>More visitors could lead to increased vehicle use and negligible to minor, adverse impacts on monument air quality.<br><br>As in alternative A, wildfire (unplanned ignitions) and the use of prescribed fire (planned ignitions) would have short-term, minor, adverse effects on air quality.<br><br>Negligible to minor, beneficial cumulative effects on the monument's air quality.<br><br>No impairment of the monument's resources or values. |
| **SOUNDSCAPES** | | |
| Long-term, negligible, adverse impacts on soundscapes from monument operations and visitor use<br><br>Short-term, minor to moderate, adverse impacts from visitors and vehicles in high use areas.<br><br>Short-term, minor to moderate, adverse impacts on soundscapes in backcountry areas from outside influences.<br><br>Minor, adverse cumulative impacts on the area's soundscape from external activities such as overhead airplane traffic, freight transport, agricultural activities, and recreational vehicle noise from national forest lands.<br><br>No impairment of the monument's resources or values. | Long-term, negligible beneficial effects on soundscape resources from the promotion of bicycle use and walking, and increased visitor education.<br><br>Short-term, minor to moderate, adverse impacts on soundscapes in localized areas as a result of construction activity for new facility development.<br><br>Petroglyph Point development would have an overall beneficial impact on soundscapes, primarily from the realignment of the current access road.<br><br>Minor, adverse cumulative impacts on soundscape resources, although alternative B would add small beneficial and adverse increments in localized areas to the overall cumulative impact.<br><br>No impairment of the monument's resources or values. | Long-term, negligible beneficial effects on soundscape resources from the promotion of bicycle use and walking.<br><br>Long-term, minor to moderate, adverse impacts on soundscapes from proposed development at Indian Well campground and along the main road shoulders.<br><br>Short-term, minor to moderate, adverse impacts on soundscapes in localized areas as a result of construction activity for new facility development.<br><br>Petroglyph Point development would have an overall beneficial impact on soundscapes, primarily from the realignment and paving of the current access road.<br><br>Minor, adverse cumulative impacts on soundscape resources, although alternative C would add small beneficial and adverse increments in localized areas to the overall cumulative impact.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **DARK NIGHT SKIES** | | |
| Alternative A would have no long-term, adverse impact on the monument's dark night skies from monument operations and visitor use.<br><br>Minor to moderate, adverse cumulative impacts on dark night skies would result from future growth and development in surrounding communities.<br><br>No impairment of the monument's resources or values. | Long-term, negligible to minor, adverse impacts on dark night skies from the expansion of facilities. These impacts may be mitigated depending on the outside lighting design, and the types of fixtures used.<br><br>Collaborative efforts between the monument and neighboring communities could improve the quality of dark night skies having a negligible to moderate, beneficial cumulative effect on dark night skies.<br><br>No impairment of the monument's resources or values. | Same as Alternative B, except there would be minor to moderate, adverse cumulative impacts from future growth and development in surrounding communities.<br><br>No impairment of the monument's resources or values. |
| **VIEWSHEDS / VISUAL RESOURCES** | | |
| Minor to moderate, long-term, adverse impacts on visual resources from visible infrastructure both inside and outside of the monument.<br><br>Short-term, negligible to minor, adverse impacts on the monument's viewsheds as result of fires.<br><br>Minor to moderate, long-term, beneficial effects on the monument's viewsheds from regional cooperation to improve air quality.<br><br>Minor to moderate, cumulative adverse impacts on visual resources from regional air pollution sources.<br><br>No impairment of the monument's resources or values. | Moderate, long-term, beneficial effects on visual resources from facility improvements and habitat restoration.<br><br>New facilities at Petroglyph Point and improvements at the campground would improve the visual quality at these sites. Such development would have an overall, minor, adverse impact on broader monument viewsheds.<br><br>Minor to moderate, long-term, beneficial effects on viewing experiences within the monument by providing additional opportunities for visitors to experience monument landscapes.<br><br>Long-term, negligible to minor, adverse impact on monument viewsheds from the addition of sustainable technologies such as photovoltaic panels or small wind turbines.<br><br>Short-term, minor, adverse impacts from construction activities associated with facilities and habitat restoration.<br><br>Minor cumulative adverse impacts on visual resources when combined with the beneficial and adverse impacts of alternative B.<br><br>No impairment of the monument's resources or values. | Minor to moderate, long-term, beneficial effects on the monument's viewsheds from regional cooperation to improve air quality.<br><br>New facilities at Petroglyph Point and improvements at the campground would improve the visual quality at these sites. Such development would have an overall, minor to moderate, adverse impact on broader monument viewsheds.<br><br>Moderate, long-term, beneficial effects on viewing experiences within the monument by providing additional opportunities for visitors to experience monument landscapes. Such development would have an overall, minor, adverse impact on broader monument viewsheds.<br><br>Long-term, negligible to minor, adverse impact on monument viewsheds from the addition of sustainable technologies such as photovoltaic panels or small wind turbines.<br><br>Short-term, minor, adverse impacts from construction activities.<br><br>Minor to moderate, cumulative adverse impacts on visual resources from regional air pollution sources.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **CAVE RESOURCES** | | |
| Long-term, minor to moderate, adverse impacts on cave resources would occur in local areas due to current visitor use levels and the potential for increased visitor use levels.<br><br>Long-term, minor, beneficial effects on cave resources from mitigation measures such as education and restoration.<br><br>Long-term, negligible to moderate, adverse cumulative effects on cave resources, primarily from past disturbance and use. Alternative A's contribution to these impacts would be relatively small.<br><br>No impairment of the monument's resources or values. | Long-term, negligible to minor, adverse impacts on cave resources as a result of improved access to monument resources either through trail development or increased interpretation and visitor tours. The monument would take appropriate steps to mitigate initial impacts monitor use of backcountry caves.<br><br>Long-term, minor to moderate, adverse impacts on cave resources from visitor use in localized areas within the developed and interpretive backcountry zones.<br><br>Management actions such as education and outreach, enhanced protection measures, and improved monitoring and research related to caves would provide beneficial effects.<br><br>Cumulative impacts would be the same as alternative A. The adverse and beneficial impacts of alternative B's contribution to these impacts would be small.<br><br>No impairment of the monument's resources or values. | Long-term, minor, adverse impacts on cave resources from improved access through trail development or increased recreational opportunities. The monument would take appropriate steps to mitigate initial impacts and monitor use of backcountry caves.<br><br>Long-term, minor to moderate, adverse impacts on cave resources from visitor use in localized areas within the developed and interpretive backcountry zones.<br><br>Cumulative impacts would be the same as alternative A. Alternative C would make a modest contribution to these effects, primarily from new caving opportunities and new visitor facilities.<br><br>No impairment of the monument's resources or values. |
| **GEOLOGIC RESOURCES** | | |
| Long-term, moderate, adverse, impacts on the monument's geologic resources as a result of visitor use in certain visitor use areas. Negligible, adverse impacts on geologic features in the backcountry and wilderness areas.<br><br>Minor to moderate, adverse cumulative effects on geologic resources, primarily from past management practices and infrastructure developments. Alternative A actions are not expected to contribute to these impacts.<br><br>No impairment of the monument's resources or values. | Long-term, minor, adverse impacts would occur due to new visitor facilities and increased visitor use in localized areas such as along trails and inside caves. However, a potential increase in backcountry use where features are pristine with relatively few visits could receive localized, moderate to major, adverse impacts. The monument would take appropriate steps to mitigate initial impacts and monitor use.<br><br>Moderate, long-term, beneficial effects from expanded restoration efforts and through establishing and monitoring user capacity indicators and standards to prevent geologic feature degradation.<br><br>Minor to moderate, adverse cumulative effects on geologic resources, primarily from past management practices and infrastructure developments. Alternative B actions would add a very small increment to this overall cumulative impact.<br><br>No impairment of the monument's resources or values. | Long-term, minor, adverse impacts would occur due to new visitor facilities and increased visitor use in localized areas such as along trails and inside caves. However, a potential increase in backcountry use where features are pristine with relatively few visits could receive localized, moderate to major, adverse impacts. The monument would take appropriate steps to mitigate initial impacts and monitor use.<br><br>Minor to moderate, long-term, beneficial effects through establishing and monitoring user capacity indicators and standards to prevent geologic feature degradation.<br><br>Minor to moderate, adverse cumulative effects on geologic resources, primarily from past management practices and development. Alternative C actions would add a very small increment to this overall cumulative impact.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **SOILS** | | |
| Most of the monument's soils would not be affected by the actions in alternative A.<br><br>Long-term, minor, adverse impacts on soils from compaction and disturbance due to increased visitor use in localized areas such as along trails and in caves. Impacts could be moderate in some highly used areas.<br><br>Long-term, minor to moderate, adverse cumulative impacts on area soils from past grazing practices and infrastructure improvements. The actions in alternative A would contribute a very small increment to the overall impact<br><br>No impairment of the monument's resources or values. | Most of the monument's soils would not be affected by actions in alternative B.<br><br>Long-term, minor, adverse impacts on soils as result of construction projects and compaction and disturbance associated with increased visitor use in localized areas such as along trails and inside caves.<br><br>Negligible, long term, beneficial effects from the establishment of monitoring and user capacity indicators and standards.<br><br>Long-term, minor to moderate, adverse cumulative impact on area soils. Alternative B actions would contribute a very small increment to the overall impact.<br><br>No impairment of the monument's resources or values. | Impacts are similar to alternative B. |
| **VEGETATION** | | |
| Long-term, minor, adverse impacts would occur in local areas due to current visitor use levels and the potential for increased visitor use<br><br>The spread of nonnative plants would have moderate to major, long-term, adverse impacts on native vegetation in the northern half of the monument.<br><br>Long-term, moderate, beneficial impact in local areas would occur from continuing efforts to control nonnative species.<br><br>Minor to moderate, long-term, adverse cumulative impacts on native vegetation, primarily from human activities such as agricultural operations, grazing, construction, and other developments. Alternative A would add moderate beneficial increments to this cumulative impact.<br><br>No impairment of the monument's resources or values. | Vegetation in most areas of the monument would not be affected by alternative B.<br><br>Localized minor to moderate, adverse impact on native vegetation from visitor use in alternative B.<br><br>Long-term, negligible to minor, adverse impacts would occur in local areas due to proposed new developments and continued administrative vehicle access on 3.8 miles of the Lyons Road.<br><br>The spread of nonnative plants would have minor to moderate, long-term, adverse impacts on native vegetation.<br><br>Long-term, minor to moderate beneficial effects from efforts to restore grassland sagebrush steppe vegetation, and establish and monitor user capacity indicators and standards<br><br>Minor to moderate, long-term, adverse cumulative impacts on native vegetation. Alternative B would add both moderate beneficial and small adverse increments to this overall cumulative impact.<br><br>No impairment of the monument's resources or values. | Long-term, minor to moderate, adverse impacts on native vegetation in localized areas due to proposed new developments and increased visitor presence.<br><br>The spread of nonnative plants would have minor to moderate, long-term, adverse impacts on native vegetation.<br><br>Long-term, minor to moderate, beneficial effects from efforts to restore native plant communities, remove administrative vehicle access, and the establishment of user capacity indicators and standards.<br><br>Minor to moderate, long-term, adverse cumulative impacts on the area's native vegetation. Alternative C would add both small beneficial and moderate adverse increments to this overall cumulative impact.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **WILDLIFE AND WILDLIFE HABITAT** | | |
| Most wildlife in the monument would not change as a result of alternative A actions.<br><br>Long-term, negligible, adverse impacts on wildlife would continue to occur in localized areas due to continuing visitor use of the monument.<br><br>Minor to moderate, long-term, beneficial impacts on some wildlife populations from continuing efforts to prevent the spread of western juniper and control the spread of nonnative species.<br><br>Long-term, minor to moderate, adverse cumulative impacts on the area's wildlife populations and habitats, primarily from actions outside the monument such as fire suppression and human activities, such as the draining of Tule Lake, farming, ranching, and road development. Alternative A would contribute only a small beneficial increment and a very small adverse increment to these impacts.<br><br>No impairment of the monument's resources or values. | Minor to moderate, short-term and long-term effects on the monument's wildlife dependent upon design and placement outside of sensitive habitats, from the construction of new facilities and trails.<br><br>Proposed developments at Petroglyph Point could have the potential to impact feeding areas for local birds of prey that breed at the point. On the other hand, moving existing road, parking and trailhead from sensitive resources would benefit wildlife.<br><br>Long-term, negligible, adverse impacts would continue to occur in localized areas due to continuing visitor use of the monument.<br><br>Long-term, beneficial impacts on some wildlife populations due to expanded vegetation restoration efforts, the addition of lands in Petroglyph Point, and the closure and restoration of Powerline road.<br><br>Long-term, minor to moderate, adverse cumulative impact on the area's wildlife populations and habitats. Alternative B would contribute only a small beneficial increment and a very small adverse increment to this impact.<br><br>No impairment of the monument's resources or values. | Minor to moderate, long-term, adverse impact on the monument's wildlife, dependent upon design and placement outside of sensitive habitats, from the construction of new facilities and trails.<br><br>Proposed developments at Petroglyph Point could have the potential to impact feeding areas for local birds of prey that breed at the point. On the other hand, moving existing road, parking and trailhead from sensitive resources would benefit wildlife.<br><br>Long-term, negligible, adverse impacts would continue to occur in localized areas due to continuing visitor use.<br><br>Moderate adverse impacts on wildlife due to collisions and increased disturbance from Medicine Lake Road improvements.<br><br>Long-term, beneficial impacts on some wildlife populations due to vegetation restoration efforts, the addition of lands at Petroglyph point, and the closure of Powerline administrative road.<br><br>Long-term, minor to moderate, adverse cumulative impact on the area's wildlife populations and habitats. Alternative C would contribute only a small beneficial increment and a very small adverse increment to this impact.<br><br>No impairment of resources or values. |
| **THREATENED AND ENDANGERED SPECIES** | | |
| Alternative A would be expected to have no long-term adverse impacts on the monument's threatened and endangered species from monument operations and visitor use.<br><br>Long-term, minor to moderate, adverse impacts on special status species from continued administrative access to Fern Cave.<br><br>Long-term, minor, adverse cumulative impact on the area's rare and sensitive species.<br><br>No impairment of the monument's resources or values. | Long-term, minor to moderate, adverse impacts on threatened and endangered species, primarily due to potential impacts of new trail systems and visitor access to these habitats.<br><br>Long-term, minor, adverse cumulative impact on the area's rare and sensitive species from past and future impacts. Alternative B's proposed developments would likely be a small part of the cumulative impacts<br><br>No impairment of the monument's resources or values. | Long-term, minor to moderate, adverse impact on threatened and endangered species, due to potential impacts of new trail systems and visitor access to these habitats and from improvements to Medicine Lake Road.<br><br>Long-term, minor, adverse cumulative impact on the area's rare and sensitive species from past and future impacts. Alternative C's proposed developments would likely be a small part of the cumulative impacts<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **EFFECTS ON CULTURAL RESOURCES** | | |
| **ARCHEOLOGY** | | |
| Since no new development is planned, the likelihood of adverse impacts from construction on archeological resources is unlikely.<br><br>Negligible to moderate cumulative impacts have been incurred from past development, staffing constraints and natural processes. Alternative A would not actively contribute to the adverse cumulative impacts.<br><br>No impairment of the monument's resources or values. | Alternative B would generally benefit the preservation and interpretation of archeology sites and associated collections despite the increase in new construction.<br><br>No adverse impacts to archeological resources are anticipated, yet without professional oversight, long-term adverse impacts could be negligible to minor.<br><br>Cumulative impacts would be negligible to minor, and adverse. However alternative B would not contribute to this adverse impact.<br><br>No impairment of the monument's resources or values. | The overall impacts on archeological resources from proposed development projects and new visitor experiences would be long-term, minor, and adverse.<br><br>Cumulative impacts would be negligible to minor and adverse. However, alternative C would not contribute to the adverse cumulative impact.<br><br>No impairment of the monument's resources or values. |
| **ETHNOGRAPHIC RESOURCES** | | |
| No impacts to ethnographic resources are anticipated from actions in alternative A.<br><br>Minor, adverse cumulative impacts on ethnographic resources, primarily from the loss of these resources over time due to past development and administrative/maintenance operations, increasing visitor use, and a loss of resources from activities outside of the monument. Alternative A would not contribute to the cumulative effects.<br><br>No impairment of the monument's resources or values. | Overall, alternative B would have beneficial effects on ethnographic resources from the increased emphasis on cultural resource research and preservation.<br><br>Localized, minor, adverse impacts on ethnographic resources from site construction at places of significance to tribes. Increased in collaboration with the tribes for interpretive programs and anthropological research would ensure that development design is sensitive to resources important to affiliated groups.<br><br>Minor, adverse cumulative adverse impacts on ethnographic resources. Alternative B would not contribute to the cumulative effects.<br><br>No impairment of the monument's resources or values. | Localized, minor to moderate, adverse impacts on ethnographic resources from site construction at places of significance to tribes, particularly at Petroglyph Point. Full consultation with tribes would ensure important sites retain integrity and would also improve the quality of ethnographic data available to the monument staff.<br><br>Minor, adverse cumulative adverse impacts on ethnographic resources. Alternative C's contribution would be small.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **CULTURAL LANDSCAPES, HISTORIC BUILDINGS AND STRUCTURES** | | |
| Long-term, negligible to minor adverse effects (no adverse effect) on historic buildings, structures, and cultural landscapes due to staffing constraints that limit the monument's ability to identify, inventory, conduct research, and document cultural resource significance.<br><br>Long-term, minor to moderate, cumulative adverse effect on the integrity of the Modoc War cultural landscape as result of natural processes and loss associated with past development in the monument. Alternative A would not contribute to the adverse cumulative impact.<br><br>No impairment of the monument's resources or values. | Long-term, negligible to minor, adverse impacts (no adverse effect) on the historic character and setting of the locale from proposed development such as accessible trails.<br><br>Long-term, minor to moderate, cumulative adverse effect on the integrity of the Modoc War cultural landscape as result of natural processes and loss associated with past development in the monument. Alternative B would not contribute to the adverse cumulative impact.<br><br>No impairment of the monument's resources or values. | Long-term, negligible to minor, adverse impacts (no adverse effect) on the historic character and setting of the locale from proposed development such as accessible trails.<br><br>Long-term, minor to moderate, beneficial effects on historic structures from enhanced awareness by the public of historic preservation and stewardship.<br><br>Long-term, minor to moderate, cumulative adverse effect on the integrity of the Modoc War cultural landscape as result of natural processes and loss associated with past development in the monument. Alternative C would not contribute to the adverse cumulative impact.<br><br>No impairment of the monument's resources or values. |
| **MUSEUM COLLECTIONS** | | |
| Long-term, minor adverse impacts would result from environmental controls that do not meet current NPS standards for museum collections.<br><br>Minor, cumulative adverse impacts on museum collections would occur, primarily due to the lack of an on-site professional curator over the course of time could result in processing and data gaps that could hinder future research efforts. Alternative A's contribution to these impacts would be small.<br><br>No impairment of the monument's resources or values. | Long-term, minor, beneficial effects on museum collections as a result of increased research and educational outreach.<br><br>Negligible to minor, adverse cumulative impacts on museum collections. Alternative B's beneficial effects would contribute a modest amount to the overall cumulative effects.<br><br>No impairment of the monument's resources or values. | Long-term, minor to moderate, adverse impacts from increased compliance activity associated with trail and facility development and increased collection use for interpretation.<br><br>Minor, adverse cumulative impacts on museum collections. Alternative C's contribution to these impacts would be small.<br><br>No impairment of the monument's resources or values. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **WILDERNESS** | | |
| **WILDERNESS CHARACTER** | | |
| Negligible to minor, long-term, adverse impact on the monument's wilderness resources from monument operations and visitor use.<br><br>Long-term, negligible to minor, adverse cumulative impacts on certain wilderness values that center on natural quiet from sounds outside of the monument including air traffic, freight trains, and agricultural activities.<br><br>No impairment of the monument's resources or values. | Beneficial effects of unknown intensity on wilderness resources, due the promotion of bicycle use between monument attractions and reduced visibility of monument facilities from wilderness areas.<br><br>Long-term, minor to moderate, adverse impacts on the monument's wilderness resources due to the increased potential for noise associated with activities outside of the monument.<br><br>Long-term, negligible to minor, adverse cumulative impacts on wilderness. Alternative B would add small beneficial and adverse increments to the overall area cumulative impact.<br><br>No impairment of the monument's resources or values. | Beneficial effects of unknown intensity on wilderness resources, primarily due to the promotion of walking and bicycle use.<br><br>Long-term, minor adverse impacts on the monument's wilderness resources due to the increased trail developments proposed for the wilderness and the increased potential for noise associated with activities outside of the monument.<br><br>Long-term, negligible to minor, adverse cumulative impacts on wilderness. Alternative C would add small beneficial and adverse increments to the overall area cumulative impact.<br><br>No impairment of the monument's resources or values. |
| **EFFECTS ON VISITOR OPPORTUNITIES** | | |
| **VISITOR USE AND EXPERIENCE** | | |
| Long- term, negligible to minor, adverse impacts on the visitor experience due to continued deficiencies in in current visitor facilities such as the trail system.<br><br>Long-term, moderate, adverse impacts as a result of continued deficiencies in visitor facilities at Petroglyph Point.<br><br>Directing visitors to use the northern entry routes as the primary entrances to the monument would have a minor to moderate, long term, beneficial effect on the visitor experience.<br><br>Minor to moderate, adverse cumulative impacts, primarily from deficiencies in visitor facilities, changing visitor needs, and limited staffing. Alternative A's contribution would be relatively small. | Long-term, moderate to major, beneficial effects on the visitor experience from new facilities, enhancing visitor access, and offering new recreational opportunities.<br><br>Short-term, minor, adverse effects on the visitor experience at Petroglyph Point due to temporary closures and construction activities.<br><br>Directing visitors to use the northern entry routes as the primary entrances to the monument would have a minor to moderate, long term, beneficial effect on the visitor experience.<br><br>The beneficial effects of alternative B would contribute moderate benefits to cumulative effects on the visitor experience. | Long-term, moderate to major, beneficial effects on the visitor experience from new facilities, enhancing visitor access, and offering new recreational opportunities.<br><br>Short-term, minor, adverse effects on the visitor experience at Petroglyph Point due to temporary closures and construction activities.<br><br>Short term, minor, adverse impacts such as noise and increased conflict between user groups.<br><br>Directing visitors to use the northern entry routes as the primary entrances to the monument would have a minor to moderate, long term, beneficial effect on the visitor experience.<br><br>Negligible to moderate, cumulative beneficial effects on the visitor experience. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **INTERPRETATION AND EDUCATION** | | |
| Long-term, minor to moderate, adverse impacts on visitor interpretive and educational opportunities as a result of staffing constraints that would limit the amount of interpretive and educational programs provided over time.<br><br>Long-term, minor, adverse impacts on educational opportunities for school children as a result of staffing constraints.<br><br>Long-term, negligible to minor, beneficial effects on regional interpretive and educational opportunities.<br><br>Minor to moderate, adverse cumulative impacts on education and interpretation as a result of staffing and programmatic constraints. | Long-term, moderate to major, beneficial effects on the ability of visitors to learn about and understand monument resources as a result of expanded interpreted topics and visitor facilities that better accommodate educational programming.<br><br>Long-term, major, beneficial effects on educational opportunities for school groups and researchers.<br><br>Moderate to major, beneficial cumulative effects on educational and interpretive opportunities as a result of increased coordination of educational programming and interpretive planning with the adjoining land management agencies, schools, and community organizations. Alternative B's contribution would be substantial. | Long-term, minor to moderate, beneficial effects on the ability of visitors to learn about and understand monument resources as a result of expanded interpreted topics and visitor facilities that better accommodate educational programming.<br><br>Long-term, negligible to minor, beneficial effects on educational opportunities for school groups and researchers.<br><br>Negligible to moderate, beneficial effects to cumulative effects on educational and interpretive opportunities as a result of the increased coordination with schools, and community organizations. Alternative C's contribution would be substantial. |
| **ACCESS AND TRANSPORTATION** | | |
| Minor, long-term benefits on access and circulation within the monument as a result of improvements to monument roads, sidewalks, and parking areas over time.<br><br>Moderate, cumulative adverse impacts on monument access from the south as a result of deteriorating conditions on Forest Service Route 10. | Long-term, moderate benefits on access and circulation at the monument as a result of improved trail systems, accessibility, and road access.<br><br>New facilities at Petroglyph Point would improve access, parking, and trail accessibility. On-site seasonal staffing would provide better visitor orientation for visitors arriving from the northeast.<br><br>Cumulative minor beneficial effects on overall access to the monument as result of the beneficial effects from the actions of alternative B such as improved orientation at Petroglyph Point and improvements to Medicine Lake Road. | Long-term, moderate benefits on access and transportation at the monument as a result of direct actions to improve trail systems, accessibility, and road access to the monument.<br><br>New facilities at Petroglyph Point would improve access, parking, and trail accessibility at this site.<br><br>Medicine Lake Road realignment and paving would improve access from the south.<br><br>Cumulative minor to moderate, beneficial effects on access to the monument as result of the beneficial effects from the actions of alternative C such as such as improved orientation at Petroglyph Point and improvements to Medicine Lake Road. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **EFFECTS ON MONUMENT MANAGEMENT** | | |
| **MONUMENT OPERATIONS** | | |
| Long-term, moderate adverse impacts on monument operations as a result of inadequate funding and staffing.<br><br>Cumulative minor beneficial impacts over time, primarily from ongoing maintenance and replacement of existing facilities. | Long-term, moderate beneficial effects on monument operations as a result of actions to expand staff, encourage interagency and interdivisional cooperation, improve operations and security at Petroglyph Point, and offset total energy use through the use of new technologies.<br><br>Cumulative, moderate to major, beneficial effects on monument operations. | Long-term, minor to moderate, beneficial effects on monument operations as a result of actions to expand staff, encourage interagency cooperation, improve operations at Petroglyph Point, and offset electrical energy use through the use of new technologies.<br><br>Cumulative, minor to moderate, beneficial effects on monument operations. |
| **CARBON FOOTPRINT** | | |
| The beneficial effects on the monument's current carbon footprint would likely be minor, as reduction of the carbon footprint would continue to compete with other management priorities.<br><br>Because the region's goal of operational neutrality requires early and significant action, the incremental and ad hoc action proposed under alternative A would result in an adverse moderate impact by delaying actions adequate to achieve the region's goal.<br><br>Actions outside of the monument would have a negligible effect on the monument's ability to reduce its carbon footprint. | Long-term, major beneficial effect on the monument's operational carbon footprint as well as the region's stated goal of operational carbon neutrality as a result of mitigation, and offsetting of the monument's operational carbon emissions.<br><br>Cumulative impacts would be the same as alternative A. | Long-term, major beneficial effect on the monument's operational carbon footprint as well as the region's stated goal of operational carbon neutrality as a result of mitigation, as a result of the elimination of carbon emissions for electricity use.<br><br>Cumulative impacts would be the same as alternative A. |

## SUMMARY OF IMPACTS

| Alternative A (No Action) | Alternative B (Preferred) | Alternative C |
|---|---|---|
| **EFFECTS ON SOCIOECONOMICS** | | |
| **SOCIOECONOMICS** | | |
| Long-term, negligible to minor, adverse socioeconomic impacts from the possible reduction in monument visitation from a lack of appropriate facilities or activities available to older or ethnically more diverse potential visitors.<br><br>When considered in concert with the socioeconomic affects of other recreation and tourism sites in the area, the continuation of current management practices would have little to no cumulative effects. | Long-term, moderate, beneficial effects on local and regional from improvements to visitor services, facilities, and experiences that would make the monument a more desirable destination and improve revenues from the tourism sector of the local and regional economy.<br><br>Moderate, localized adverse impacts may occur on small businesses in the Tionesta area as a result of directing visitors to access the monument primarily over the paved and better maintained northern entrance roads.<br><br>Minor to moderate, beneficial cumulative effects on the local and regional economy. | Long-term and negligible to minor beneficial socioeconomic effects as a result of improvements in the visitor experience and correlated visitation totals.<br><br>Long-term, adverse effect on socioeconomic resources if other land uses such as livestock grazing are impacted by expanded recreational opportunities at the monument.<br><br>Moderate, localized adverse impacts may occur on small businesses in the Tionesta area as a result of directing visitors to access the monument primarily over the paved and better maintained northern entrance roads.<br><br>Negligible to minor, beneficial cumulative effects as a result of new recreational activities that would attract some new visitation, including users interested in activities such as equestrian travel and mountain biking. |
| **SECTION 106 SUMMARY** | | |
| Section 106 of the National Historic Preservation Act (16 USC 470 e seq.) requires (1) that federal agencies consider the effect of their projects on historic properties (including archeological resources) eligible for the National Register of Historic Places, and (2) that agencies give the Advisory Council on Historic Preservation and the state historic preservation office an opportunity to comment on projects.<br><br>As required by section 110 of the National Historic Preservation Act, federal land management agencies survey cultural resources on lands under their jurisdiction and evaluate these resources by applying criteria for the National Register of Historic Places. A number of surveys, inventories, and studies have been completed or are ongoing, and further resource evaluation and documentation will continue in the monument.<br><br>At this time, there is not enough information to make a determination of effect consistent with section 106 of the National Historic Preservation Act for the actions related to ethnographic resources, archeological resources, and museum collections. Actions that have the potential to effect resources eligible for or listed on the National Register of Historic Places will be incorporated into a programmatic agreement that is tied to the general management plan. The programmatic agreement would identify proposed actions for which further section 106 consultation is required, such as any ground disturbing construction activities associated with new trail development, building additions, and proposed facilities at Petroglyph Point. Table 22 in Chapter 6, "Consultation and Coordination" includes a full list of future section 106 compliance required for GMP implementation.<br><br>In the interim, no historic properties would be inalterably changed without consultation with the state historic preservation office and the Advisory Council on Historic Preservation, as appropriate. Archeological sites will be protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable and when disturbance is unavoidable appropriate treatment would follow in consultation with the California State Historic Preservation Office and the Klamath Tribes.<br><br>Copies of this GMP/environmental assessment have been distributed to affected/concerned Native American Tribes, the California State Historic Preservation Office, and the Advisory Council on Historic Preservation for review and comment related to compliance with section 106 of the National Historic Preservation Act. | | |

# User Capacity

### INTRODUCTION

General management plans for national park system units must address user capacity management. The National Park Service (NPS) defines user capacity as the type and extent of use that can be accommodated while sustaining the quality of a park unit's resources and visitor experiences consistent with the park unit's purpose.

User capacity management involves establishing desired conditions, monitoring, and taking actions to ensure the park unit's values are protected. The premise is that with any visitor use comes some level of impact that must be accepted; therefore, it is the responsibility of the National Park Service to decide what level of impact is acceptable and what management actions are needed to keep impacts within acceptable limits.

Instead of just tracking and controlling the number of visitors, NPS staff manages the levels, types, and patterns of visitor use as needed to preserve the condition of the resources and quality of the visitor experience. The monitoring component of this process helps NPS staff evaluate the effectiveness of management actions and provides a basis for informed adaptive management of visitor use.

The foundation for user capacity decision making is the qualitative descriptions of desired resource conditions, visitor experience opportunities, and general levels of development and management described in the management zones. Based on these desired conditions, indicators and standards are identified. An indicator is a measurable variable that can be used to track changes in resource and social conditions related to human activity, so that existing conditions can be compared to desired conditions. A standard is the minimum acceptable condition for an indicator.

User capacity decision making is a continuous process; decisions are adjusted based on monitoring the indicators and standards. Management actions are taken to minimize impacts when needed. The indicators and standards included in this management plan would generally not change in the future. However, as monitoring of the monument's conditions continues, managers may decide to modify, add, or delete indicators if better ways are found to measure important changes in resource and social conditions. Information on the NPS monitoring efforts, related visitor use management actions, and any changes to the indicators and standards would be available to the public.

This general management plan addresses user capacity in the following ways:

- The management zones described earlier in this chapter provide the basis for managing user capacity. Each zone prescribes desired resource conditions, visitor experiences, and recreational opportunities for different areas of the monument. The zones also prescribe the types and levels of developments necessary to support these conditions, experiences, and opportunities. This element of the framework is the most important to long-term user capacity management because it directs the National Park Service on ways to best protect resources and visitor experiences while offering a diversity of visitor opportunities.

- User capacity provides a description of the monument's most pressing use-related resource and visitor experience concerns, existing and potential, given the monument's purpose, desired conditions, and the vulnerability of specific resources and values. This helps NPS managers focus limited resources on the most significant indicators.

- Indicators and standards are identified that will be monitored in the future to determine if desired conditions are deteriorating due to unacceptable impacts from visitor use.

- Potential monitoring strategies are provided to protect resource conditions from unacceptable impacts.

- Representative examples of management strategies to avoid or minimize unacceptable impacts from visitor use are identified.

### PRIORITY INDICATORS AND STANDARDS

Table 12 describes the user capacity indicators, standards, monitoring and management strategies for Lava Beds National Monument. This information was developed after careful consideration of key aspects of desired resource conditions and visitor experiences, public scoping information, relevant research studies, staff management experience and other monument data sources. The planning team considered many

potential issues and related indicators that would identify impacts of concern, but those described below were considered the most salient given the importance and vulnerability of the resource or visitor experience affected by visitor use.

The priority resource indicators selected for Lava Beds National Monument are associated with the disturbance of, and damage to, cave and surface geologic features, sensitive wildlife, and archeological sites. In addition, significant changes in visitor use to the backcountry and wilderness areas of the monument was also identified as a priority resource indicator given the potential for impacts to sensitive resources in areas that currently receive little to no visitor use. The condition of these resources are already being monitored in various forms, but the indicators identified below will help the monument staff track specific impacts due to visitor use.

### *Disturbance to Geologic Features*

Impacts to surface geologic features from off-trail visitor activities include disturbance to fragile cinder and spatter cones, the creation of informal trails to cave entrances and geologic features, and the alteration of natural landscapes by stacking rocks, taking pieces of geologic formations, or otherwise altering natural geologic features. These types of impacts can have significant effects on the integrity of non- renewable geologic resources and reduce the quality of other visitors' experiences. A 2008 condition assessment conducted by the NPS Geologic Resource Division identified existing visitor use related impacts to surface features at Fleener Chimneys, Black Crater and cave entrances/collapses (NPS 2008).

### *Visible Condition of Cave Features and Floors*

Among Lava Beds most cherished resources are the 28 lava tube caves that receive over 80,000 visits each year. The monument provides for a range of visitor opportunities in these unique environments, however, minimal supervision of cave visits has led to resource impacts. Lava tube caves contain primary geologic formations that developed during the formation of the cave. These features are non-renewable resources that cannot be restored or replaced. Past research and monitoring efforts by the monument and other NPS units have demonstrated that impacts to primary cave formations occur due to cave development and ongoing visitor use, particularly off-trail travel and depreciative visitor behaviors, such as vandalism, littering, and graffiti.

There is some question whether the current level of unsupervised cave visitation is sustainable. If visitor use increases, current management practices, such as cleaning, temporary closures, or restoration may be increased.

Research and monitoring has also demonstrated that visitation leads to the buildup of lint and litter inside of caves. Both lint and litter impact the low-energy ecosystems of caves, including rare macro-invertebrates that have adapted to these systems. In 2005, a biological inventory of cave macro-invertebrates in 29 caves identified over a dozen cave adapted macro-invertebrates of which approximately four are endemic to the monument and a single cave (NPS 2005a). Monument staff are currently working with the NPS Inventory and Monitoring Program of the Klamath Network to develop long-term monitoring protocols that will be used to evaluate the extent of lint and litter in caves and the related long-term effect on macro-invertebrates. In addition to lint and litter, human waste, glass and other debris also pose a safety and health threat to visitors.

### *Change in Sensitive Wildlife Species*

Since the 1980s, monument staff have focused efforts on monitoring and protecting vulnerable bat populations. The most sensitive bats include cave dependent species, such as Townsend's big-eared, pallid, and Mexican free-tailed bats. These species rely on caves for hibernation in winter and breeding in summer. Visitor use can disturb bat populations, potentially scaring bats away from favorable roost sites, causing the abandonment of young, or causing early, and potentially deadly, awakening from hibernation. Staff efforts to actively monitor bat populations have led to management strategies focused on maintaining viable bat populations. A single disturbance event has the potential to result in a significant population decline for colonies, and can lead to the extirpation of a species from the monument. New threats such as White Nose Syndrome and other diseases transported through visitor use activities could also result in impacts to bat populations.

### *Disturbance of Cultural Resources*

Visitor use impacts on archeological resources can be inadvertend or purposeful. For example, impacts to archeological sites include trampling, vandalism, and theft. Archeological sites include rock art, artifacts, battlefields, and stacked rock features.

These non-renewable resources represent critical links to Native American tribes and are an irreplaceable part of the monument's history. The monument is required to monitor all identified archeological sites and currently uses photo documentation and site mapping and assessments to assess visitor use impacts. Additionally, impacts to archeological sites can increase after wildland fires remove protective camouflaging vegetation. In response to these events, monument staff implement immediate, temporary protective actions to prevent resource degradation. For example, in 2008, the 5,500 acre Jack Fire led to the increased visibility of archeological sites throughout the monument. In this case, monument staff implemented strategies to protect archeological sites, which included increased monitoring, education, areas of restricted and/or regulated visitor access and enforcement.

### *Backcountry Use Patterns*

Visitor use of the monument's wilderness and backcountry areas is currently low, hence there has been no need for intensive visitor use management in these areas. Visitor use is not expected to significantly increase in the backcountry and wilderness, but an indicator to monitor change is needed. Trail registers, visitor counters and visitor surveys have been used for decades to track visitor use levels in the backcountry and wilderness. Advancements in new visitor counter technology will provide additional insight into use patterns over time. Any increase in visitor use will be used as an analog for a potential increase in backcountry and wilderness cave use, potential expansion of dispersed camping and an increase in the visitation to sensitive cultural, natural, and geologic sites within backcountry and wilderness.

### *Responsiveness to Educational and Interpretive Requests*

Given the sensitivity of resources in the monument and the desire to maintain visitor freedom to the greatest extent possible, education is an important management tool for protecting resources and providing high quality visitor experiences. As such, the monument staff's ability to respond to educational needs and requests was identified as a priority indicator to ensure a long term commitment to providing as many opportunities as possible both within and outside of the monument.

### *Use Conflicts*

Use conflicts, such as noise, crowding and depreciative visitor behaviors, were identified as a priority concern since these problems may affect visitors' ability to have high quality recreational experiences and can potentially also affect visitor health and safety. These concerns are already tracked to some degree through law enforcement incident reporting and the documentation of visitor complaints. The indicator below would increase the degree of systematic monitoring and assessment of this issue.

### *User Capacity Indicators and Standards*

The standards selected for each user capacity indicator listed in Table 12 were based on professional management judgment informed by the general management plan's desired conditions, the monument's baseline conditions for each indicator, relevant monument-specific and national research studies, and NPS guidelines and standards.

The monitoring and management strategies included in table 12 provide a general description of the range of considerations for future monitoring and visitor management related to each indicator. The implementation of any specific management actions that affect visitor use will comply with the National Environmental Policy Act, the National Historic Preservation Act, and other laws, regulations and policies as needed.

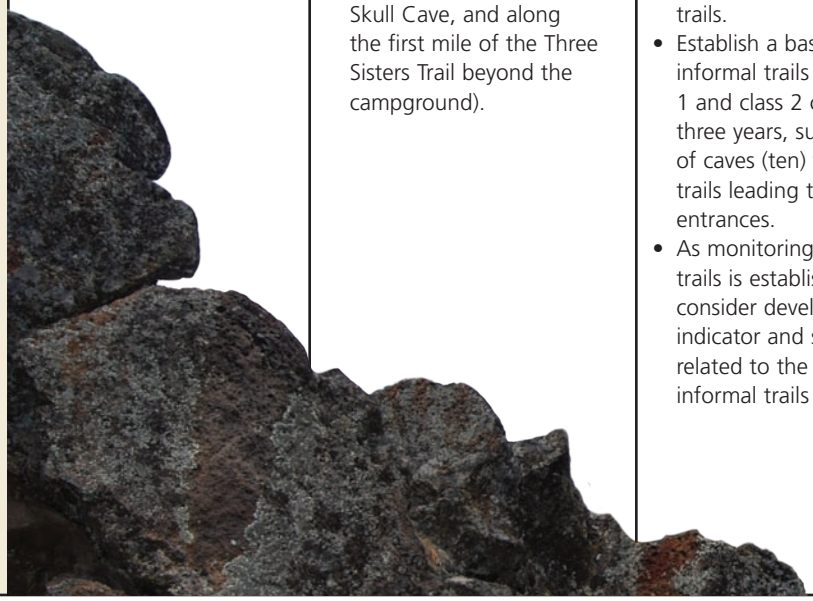
**Cave surveying,** *NPS Photo*

**TABLE 12: USER CAPACITY INDICATORS AND STANDARDS**

## USER CAPACITY INDICATORS AND STANDARDS

### DISTURBANCE TO GEOLOGICAL RESOURCES

| | USER CAPACITY INDICATORS | USER CAPACITY STANDARDS | RELATED MONITORING STRATEGIES | POTENTIAL MANAGEMENT STRATEGIES |
|---|---|---|---|---|
| THROUGHOUT THE MONUMENT | • Number of incidents resulting in a criminal violation and warnings related to geologic resources.<br>• Number of damaged geologic features.<br>• Number of informal trails (trails created by visitors accessing areas off the designated trail system) to primary geologic destination areas and class 1 and 2 cave entrances. | • No incidents resulting in criminal violations, and no more than four warnings annually.<br>• No new damage of geologic features (baseline values established once GMP is implemented). Damage of features includes impacts to lava texture, spatter cones, cinder cones, and basalt fields.<br>• No informal trails into primary geologic destination areas (Black Crater, Fleener Chimneys, Schonchin Butte, Captain Jacks Stronghold).<br>• No more than two informal trails to class 1 and class 2 cave entrances (i.e., 15 caves within the Cave Loop area, within the first mile of the Lyons Trail beyond Skull Cave, and along the first mile of the Three Sisters Trail beyond the campground). | • Continually evaluate law enforcement patrols as trends in incidents are identified.<br>• Weekly notification to management staff on documented violations and warnings (establish inter-divisional database or written record for long-term monitoring purposes).<br>• Every five years, photo survey geologic features (lava texture, basalt fields, spatter cones, cinder cones). Sixteen photo monitoring stations would be established.<br>• Every three years, conduct trail surveys at Black Crater, Fleener Chimneys, Schonchin Butte, Captain Jacks Stronghold to detect establishment of informal trails.<br>• Establish a base map of informal trails to 30 class 1 and class 2 caves. Every three years, survey a subset of caves (ten) for informal trails leading to cave entrances.<br>• As monitoring of informal trails is established, consider developing an indicator and standard related to the density of informal trails per area. | • Increase visitor contacts through roving activities of interpretive staff, natural resources staff, and volunteers.<br>• Increase education about the sensitivity of geologic resources and promote low impact visitor use practices through informal contacts in the visitor center and while roving, in formal interpretive and educational programming, and by other appropriate means.<br>• Increase inventory and monitoring efforts.<br>• Increase restoration and/or rehabilitation efforts.<br>• Increase/modify enforcement patrols and activities.<br>• Change site management techniques (e.g., fences, borders, barriers, sensors and monitoring devices).<br>• Better marking of established trail systems.<br>• Close areas to off-trail travel.<br>• Area or temporal closures to protect impacted sites.<br>• Evaluate realignment of trails to minimize the formation of social trails.<br>• Implement permit systems, group size limitations (including limiting group sizes on tours) or other visitor use access regulation techniques. |



## USER CAPACITY INDICATORS AND STANDARDS

### VISIBLE CONDITION OF CAVE FEATURES AND FLOORS

| | USER CAPACITY INDICATORS | USER CAPACITY STANDARDS | RELATED MONITORING STRATEGIES | POTENTIAL MANAGEMENT STRATEGIES |
|---|---|---|---|---|
| ALL CLASS 1 AND SELECT CLASS 2 CAVES | • Litter and/or lint detected in monitoring plots.<br>• Broken formations detected in monitoring plots. | • No more than 4 pieces of litter and/or lint intercept a line within an established 50 x 50 cm gridded monitoring plot (line every 5cm).**<br>• No more than 50% of plots have 4 or more pieces of litter.**<br>• No formation found broken within 50 x 50 cm monitoring plots.**<br><br>**Number of pieces of litter within gridded monitoring plots may be increased or decreased with the approval of the Cave Management Plan and I&M Klamath Network cave monitoring protocols – to be established by end of 2011. | • Establish gridded monitoring plots (depending on the size of a given cave) in all Class 1 and select Class 2 caves for the detection of litter.<br>• Use the 2008 Impact Monitoring Assessment of the monument's caves to select random plot locations in high traffic and low traffic areas.<br>• Monitoring plots (depending on size of cave) located in high traffic and low traffic areas will be established in all Class 1 and select Class 2 caves for the detection of broken features.<br>• Every plot will be cyclically revisited within a 3-5 year period.<br>• Monitoring protocol will be assessed and evaluated every 5 years (in a resource summary report), to evaluate the number of plots and acceptable amounts of litter.<br>• A GIS database of restoration efforts, lint removal, formation damage, and general cave conditions will be maintained to monitor long term trends in cave conditions and to correlate with cyclic monitoring plots.<br>• The cycle of monitoring and number of monitoring plots will be established and approved through the cave management plan and the I&M Klamath Network cave monitoring protocols. | • Increase visitor contacts through roving activities of interpretive staff, natural resources staff, and volunteers.<br>• Increase education about the sensitivity of geologic resources and promote low impact visitor use practices through informal contacts in the visitor center and while roving, in formal interpretive and educational programming, and by other appropriate means.<br>• Increase inventory and monitoring efforts.<br>• Increase restoration and/or rehabilitation efforts.<br>• Increase/modify enforcement patrols and activities.<br>• Change site management techniques (e.g., fences, borders, barriers, sensors and monitoring devices).<br>• Better marking of established trail systems.<br>• Close areas to off-trail travel.<br>• Area or temporal closures to protect impacted sites.<br>• Evaluate realignment of trails to minimize the formation of social trails.<br>• Implement permit systems, group size limitations (including limiting group sizes on tours) or other visitor use access regulation techniques. |

**Cavers on Cave Loop,** *NPS Photo*

## USER CAPACITY INDICATORS AND STANDARDS

### CHANGE IN SENSITIVE WILDLIFE SPECIES POPULATIONS

| | USER CAPACITY INDICATORS | USER CAPACITY STANDARDS | RELATED MONITORING STRATEGIES | POTENTIAL MANAGEMENT STRATEGIES |
|---|---|---|---|---|
| THROUGHOUT THE MONUMENT | • Number of incidents resulting in a criminal violation and warnings per week connected to bat colonies.<br>• The number of individual Townsend's big-eared bats within the resident population.<br>• Changes in observable population numbers, frequency, or location of any wildlife species considered sensitive within the monument (for example, pica, marmots, sage grouse, other bats, and pronghorn). | • No incidents resulting in criminal violations, and no more than one warning per week.<br>• The winter population of Townsends big-eared bats does not fall below a total number of 500 individuals.<br>• Populations of sensitive wildlife species do not incur major change in reduction or location as determined by expert opinion and best available science. | • Weekly notification to management staff of documented violations and warnings.<br>• A total count of Townsend's big-eared bats will be completed once every winter. This schedule will be adjusted to once every two years if climate change effects and/ or other impacts are observed (reducing disturbance from monitoring).<br>• Sensitive wildlife species will be monitored in conjunction with periodic network inventory and monitoring, individual research, and through periodic monitoring conducted by the monument. | • Greater efforts towards increasing education on the sensitivity of bat populations.<br>• Increase in visitor contacts.<br>• Increase in inventory and monitoring efforts with respect to bat use areas.<br>• Increase enforcement patrols and activities.<br>• Change site management techniques (e.g., fences, borders, barriers, sensors, signage, and monitoring devices).<br>• Close areas to off-trail travel.<br>• Area and/or seasonal closures to protect bat populations.<br>• Better marking of cave closures.<br>• Implementation of increased and/or regular monitoring activities if sensitive species experience significant population changes within the monument or surrounding lands. |

### CHANGES IN BACKCOUNTRY USE PATTERNS

| | | | | |
|---|---|---|---|---|
| BACKCOUNTRY ZONE | • The number of visitors that travel beyond 0.25 miles from a trailhead. | • A 50 percent increase in the population of backcountry users. | • Use automated counters .25 mile from major trailheads to quantify the number of visitors into the back country.<br>• Monitoring protocol will be assessed and evaluated every five years (produce resource summary report), to evaluate backcountry use and related resource and social conditions.<br>• As baseline use levels are determined, this indicator and standard will be readjusted to establish a maximum use level for the backcountry and wilderness areas, if resource and social conditions dictate the necessity of that management strategy. | • Greater efforts towards increasing education on the sensitivity of back country resources.<br>• Promote low impact visitor use practices (Leave No Trace).<br>• Increase in inventory and monitoring efforts to better evaluate impacts associated with increased visitor use in the backcountry and wilderness areas of the monument (i.e, soundscape, solitude, trail erosion, garbage occurrence, dispersed camping, human waste).<br>• Restoration/ rehabilitation of affected areas.<br>• Increased visitor contacts.<br>• Change site management techniques (e.g., group size, campsites, equipment, sensors and monitoring devices).<br>• Better marking of established trail systems.<br>• Close areas to off-trail travel.<br>• Area and seasonal closures to prevent impacts.<br>• Implement permit systems or other visitor use access regulation techniques.<br>• Update the Wilderness Stewardship Plan to account for an increase in visitor use. |

| USER CAPACITY INDICATORS AND STANDARDS | | | | |
|---|---|---|---|---|
| **RESPONSIVENESS TO EDUCATIONAL AND INTERPRETIVE REQUESTS** | | | | |
| | **USER CAPACITY INDICATORS** | **USER CAPACITY STANDARDS** | **RELATED MONITORING STRATEGIES** | **POTENTIAL MANAGEMENT STRATEGIES** |
| DEVELOPED AND FRONTCOUNTRY ZONES | • Annual ratio of formal interpretive programs offered per visitor center visits. | • One program is provided per every 175 visitor center door counts. | • Continue current tracking of visitor center visits and interpretive program attendance.<br>• Analyze monthly statistics from previous year. | • Improve staff availability.<br>• Formally collect and analyze interpretive program requests.<br>• Improve program scheduling to maximize responsiveness to visitor needs. |
| **RESPONSIVENESS TO EDUCATIONAL AND INTERPRETIVE REQUESTS** | | | | |
| DEVELOPED AND FRONTCOUNTRY ZONES & OFF-SITE | • Annual percentage of requests fulfilled for educational programs and loans of educational materials related to monument interpretive themes. | • At least 80 percent of requests are fulfilled. | • Continue current tracking of requests and loans. | • Formally collect and analyze educational program requests.<br>• Increase staffing and/or volunteer capacity.<br>• Train teachers to provide monument programs.<br>• Provide more materials for teacher-directed programming.<br>• Analyze monthly statistics from previous year and improve program scheduling to maximize responsiveness to school needs and requests. |

### MONITORING EFFORTS

The monument staff will continue general monitoring of visitor use levels and patterns. In addition, the monument staff will begin monitoring these user capacity indicators. The rigor of monitoring (e.g., frequency of monitoring cycles, amount of geographic area monitored) of the indicators may vary considerably depending on how close existing conditions are to the standards. If the existing conditions are far from exceeding the standard, the rigor of monitoring may be less than if the existing conditions are close to or trending towards the standards.

In addition, the initial phases of monitoring for the indicators/standards defined above will help the monument's staff identify if any revisions are needed. The initial testing of the indicators and standards will determine if the indicators are accurately measuring the conditions of concern and that the standards truly represent the minimally acceptable condition of the indicator. Monument staff may decide to modify the indicators or standards and revise the monitoring program if better ways are found to measure changes caused by visitor use. Most of these types of changes should be made within the first several years of initiating monitoring. After this initial testing period of monitoring indicators and standards, adjustments should not occur unless there is a compelling reason. Finally, if use levels and patterns change appreciably, the monument staff may need to initiate additional monitoring of new indicators to ensure that desired conditions are protected. This iterative learning and refining process is the strength of the NPS user capacity management program, in that it can be adapted and improved as knowledge grows.

## USER CAPACITY INDICATORS AND STANDARDS

### DISTURBANCE OF CULTURAL RESOURCES

| | USER CAPACITY INDICATORS | USER CAPACITY STANDARDS | RELATED MONITORING STRATEGIES | POTENTIAL MANAGEMENT STRATEGIES |
|---|---|---|---|---|
| THROUGHOUT THE MONUMENT | • Number of incidents resulting in a criminal violation and warnings related to cultural resources.<br>• Number of new damage to archeological sites.<br>• Percent area of rock art (petroglyphs, pictographs, historic graffiti) lost resulting from human actions (not environmental factors) from the existing baselines.<br>• Number of informal trails to primary cultural resource destination areas. | • No incidents resulting in criminal violations, and no more than four warnings per year.<br>• No new damage to archeological sites from 2009 baseline survey. Damage of features include: soil compaction, theft of artifacts, vandalism, ground disturbance, nearby informal trail, rock wall collapse.<br>• No more than a 5% area of rock art lost from the existing baselines resulting from human actions.<br>• No informal trails to primary cultural resource destination areas. | • Law enforcement patrols as needed per trends in visitor impacts.<br>• Weekly notification to management staff of documented violations and warnings.<br>• Every five years, one-third of all known archeological sites and rock art sites are surveyed to detect disturbance.<br>• Every three years, informal trail surveys are conducted at primary cultural resource destination areas. | • Increase visitor contacts through roving activities of interpretive staff, natural resources staff, and volunteers.<br>• Increase education about the sensitivity of cultural resources and promote low impact visitor use practices through informal contacts in the visitor center and while roving, in formal interpretive and educational programming, and by other appropriate means.<br>• Increase in inventory and monitoring efforts.<br>• Increase in restoration and/or rehabilitation efforts.<br>• Increase/modify enforcement patrols and activities.<br>• Change site management techniques (e.g., fences, borders, barriers, sensors and monitoring devices).<br>• Better marking of established trail systems.<br>• Close areas to off-trail travel.<br>• Area closures to protect impacted archeological sites.<br>• Conduct further inventories of archeological sites that are within 0.25-mile of impacted sites.<br>• Implement permit systems, group size limitations (including limiting group sizes on tours) or other visitor access regulation techniques. |

### USE CONFLICTS

| | | | | |
|---|---|---|---|---|
| THROUGHOUT THE MONUMENT | • Number of visitor use conflicts recorded in the case incident system. | • Five similar visitor use conflicts within a three month period would trigger management actions beyond those of routine law enforcement. Two similar use conflicts impacting monument resources would trigger management review. | • Track use conflicts with the incident reporting system.<br>• Review each complaint as valid or invalid against established criteria to prevent multiple complaints on a single incident from prematurely triggering management review. | • Increased education regarding low impact practices and monument regulations.<br>• Formal analysis and management of groups or activities (including restrictions on group size or number, conflict studies, site-specific capacity studies – including specific caves).<br>• Contact local user groups.<br>• Avoid conflicts by planning times and locations of ranger-led programs. |

# Mitigation Measures for the Action Alternatives

Congress charged the National Park Service with managing the lands under its stewardship "…in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." (NPS Organic Act, 16 USC 1) As a result, NPS staff routinely evaluates and implements mitigation measures whenever conditions occur that could adversely affect the sustainability of national park system resources.

To ensure that implementation of the action alternatives protects unimpaired natural and cultural resources and the quality of the visitor experience, a consistent set of mitigation measures would be applied to actions proposed in this plan. The National Park Service would prepare appropriate environmental review (i.e., those required by the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and other relevant legislation) for these future actions.

As part of the environmental review, the National Park Service would avoid, minimize, and mitigate adverse impacts when practicable. The implementation of a compliance-monitoring program would be within the parameters of NEPA and NHPA compliance documents, etc. The compliance-monitoring program would oversee these mitigation measures and would include reporting protocols.

View of Mt. Shasta from Schonchin Butte,
*NPS Photo*

The following mitigation measures and best management practices would be applied to avoid or minimize potential impacts from implementation of the action alternatives.

## MITIGATION MEASURES COMMON TO ALL ALTERNATIVES

Mitigation measures are the practicable and appropriate methods that would be used under any alternative to avoid and/or minimize harm to monument natural and cultural resources, wilderness, visitors, and the visitor experience, and socioeconomic resources. These mitigation measures have been developed by using existing laws and regulations, best management practices, conservation measures, and other known techniques from past and present work in and around Lava Beds National Monument.

The general management plan provides a management framework for the monument. Within this broad context, the alternatives include the following measures that may be used to minimize potential impacts from the implementation of the alternatives. These measures would be applied to all alternatives, subject to funding and staffing levels. Additional mitigation would be identified as part of implementation planning and for individual projects to further minimize resource impacts.

## MANAGEMENT AND PROTECTION OF NATURAL RESOURCES

### *Air Quality*

- Implement a dust abatement program. Standard dust abatement measures could include the following elements: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate with native species.

- Minimize NPS vehicle emissions by using the best available technology whenever possible.

- Encourage the public and commercial tour companies to employ methods that reduce emissions.

- Employ sustainable designs that reduce energy demands, thus reducing pollutant production.

*Soundscapes / Natural Quiet*

- Implement standard noise abatement measures during monument operations, including: scheduling to minimize impacts in noise-sensitive areas, using the best available noise control techniques wherever feasible, using hydraulically or electrically powered impact tools when feasible, and locating stationary noise sources as far from sensitive uses as possible.

- Site and design facilities to minimize objectionable noise.

- Minimize idling of motors when power tools, equipment, and vehicles are not in use.

- Muffle above ambient noise whenever possible to reduce noise impacts.

*Night Skies (Lightscapes)*

- In developed and administrative zones, install energy-efficient lights equipped with timers and/or motion detectors so that light would only be provided when it is needed to move safely between locations.

- In developed and administrative zones, use low-impact lighting, such as diffused light bulbs, and techniques such as downlighting to prevent light spill and preserve the natural lightscape.

**Western rattlesnake,** *NPS Photo*

*Soils*

- Build new facilities on soils suitable for development. Minimize soil erosion by limiting the time that soil is left exposed and by applying other erosion control measures, such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies. Once work is completed, revegetate construction areas with appropriate native plants in a timely period.

*Vegetation*

- Monitor areas used by visitors (e.g., trails, campsites) for signs of native vegetation disturbance. Use public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers to control potential impacts on plants from erosion or social trails.

- Develop revegetation plans for disturbed areas and require the use of genetically appropriate native species. Revegetation plans should specify species to be used, seed/plant source, seed/plant mixes, site-specific restoration conditions, soil preparation, erosion control, ongoing maintenance and monitoring requirements, etc. Salvaged vegetation should be used to the extent possible.

- Continue to implement and improve the monument's existing program to remove and prevent the spread of nonnative species. Standard measures could include the following elements: use only weed-free materials for road and trail construction, repair, and maintenance; ensure equipment arrives on site free of mud or seed-bearing material; certify all seeds and straw material as weed-free; identify areas of noxious weeds pre-project; treat noxious weeds or noxious weed topsoil before construction (e.g., topsoil segregation, storage, herbicide treatment); when depositing ditch spoils along the roads, limit the movement of material to as close as possible to the excavation site; scrupulously and regularly clean areas that serve as introduction points for invasive plants (campgrounds, staging areas, maintenance areas, and corrals); revegetate with genetically appropriate native species; inspect rock and gravel sources to ensure these areas are free of noxious weed species; and monitor locations of ground-disturbing operations for at least three years following the completion of projects.

*Wildlife*

- Employ techniques to reduce impacts on wildlife, including visitor education programs, restrictions on visitor and monument activities, and law enforcement patrols.

- Implement a wildlife protection program. Standard measures would include project scheduling (season and/or time of day), project monitoring, erosion and sediment control, fencing or other means to protect sensitive resources adjacent to project areas, disposing of all food-related items or rubbish, salvaging topsoil, and revegetating.

- Monitor wildlife deaths from visitor and/ or management activities (e.g. road kill) and implement appropriate management actions in response.

*Special Status Species*

Mitigation actions would occur during normal park operations as well as before, during, and after projects to minimize immediate and long-term impacts on rare, threatened, and endangered species. These actions may vary by project area, and additional mitigation measures may be added depending on the action and location. Many of the measures listed for vegetation, wildlife, and water resources would also benefit rare, threatened, and endangered species by helping to preserve habitat.

- Conduct surveys for rare, threatened, and endangered species as warranted.

- Locate and design facilities/actions/ operations to avoid or minimize the removal of rare, threatened, and endangered species habitat. If avoidance is infeasible, minimize and compensate for adverse effects as appropriate and in consultation with the appropriate resource agencies.

- Plan work in areas in or near suitable threatened and endangered bird habitat as late as possible in the summer/fall.

- Conduct work outside of critical periods for the specific species when possible.

- Develop and implement restoration and/ or monitoring plans as warranted. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.

- Implement measures to reduce adverse effects of nonnative plants and wildlife on rare, threatened, and endangered species.

- Carry out surveys and monitoring for special status species.

- Protect and preserve critical habitat features, such as nest trees, whenever possible.

### MANAGEMENT AND PROTECTION OF WILDERNESS VALUES

The monument's wilderness management plan provides more specific desired conditions for wilderness resources, visitor experiences, and management protocols. Monitoring would be conducted to ensure that conditions are meeting established standards and to determine if mitigation measures have been successful.

### MINIMUM REQUIREMENT PROCESS

The Wilderness Act directs that agencies administer wilderness to preserve the wilderness character. The purpose of the minimum requirement process is to reduce the effects of management on wilderness character and values. It provides a method for developing, evaluating, and selecting the actions that would be the least intrusive on wilderness character and values, while allowing the administration of the wilderness. The concept is applied to all management actions, programs, and activities within the monument that might affect wilderness and potential wilderness.

The minimum requirement concept is applied as a two-step process. The first step determines whether a proposed management action is appropriate and necessary for the administration of the area as wilderness and does not cause a significant impact to wilderness resources and character, in accordance with the Wilderness Act. The second step determines the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized. If the project is found to be appropriate and necessary, then the management method (tool or technique) is selected that would result in the least amount of impact to the wilderness resources and character.

The minimum requirement process provides a formalized method for developing alternative ways to address an issue, and to evaluate each alternative's effects on wilderness character and wilderness resources. The minimum requirement process assists NPS managers in determining the appropriate environmental compliance.

## MANAGEMENT AND PROTECTION OF CULTURAL RESOURCES

The protection of the monument's cultural resources is essential for understanding the past, present, and future relationship of people with monument resources and the expressions of our cultural heritage. The monument would pursue strategies to protect its cultural resources, including museum collections and archeological, historic, ethnographic, and archival resources, while encouraging visitors and employees to recognize and understand their value. The strategies would allow the integrity of the monument's cultural resources to be preserved unimpaired. They would also ensure that the monument is recognized and valued as an outstanding example of resource stewardship, conservation education and research, and public use.

Some of the monument's cultural resources are within designated wilderness. The Wilderness Act specifies that the designation of any areas of the park system as wilderness "shall in no manner lower the standards evolved for the use and preservation of" such unit of the park system under the various laws applicable to that unit (16 USC 1133(a)(3)). Thus, the laws pertaining to historic preservation also remain applicable within wilderness but must generally be administered to preserve the area's wilderness character. In accordance with NPS management policies, cultural resources that have been included in wilderness would be protected and maintained according to the pertinent laws and policies governing cultural resources, using management methods that are consistent with the preservation of wilderness character and values (6.3.8). These laws include the National Historic Preservation Act, the Archeological Resources Protection Act, the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act, and Executive Order 13007 that addresses government-to-government consultation.

Adverse impacts on properties listed in or determined eligible for listing in the National Register of Historic Places, would be avoided if possible. If adverse impacts could not be avoided, mitigation would be developed through a consultation process with all interested parties. In accordance with NPS management policies, proposed adverse effects would be evaluated to determine whether the proposed actions constitute impairment of significant fundamental park cultural resources.

### *Archeological Resources*

Archeological surveys would precede ground-disturbance required for new construction or removal of eligible historic properties. Known archeological resources would be avoided to the greatest extent possible. If national register-eligible or-listed archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and associated American Indian tribes.

If unknown archeological resources are discovered during project work, work in the immediate vicinity of the discovery would be halted until the resources could be identified, evaluated, and documented and an appropriate mitigation strategy could be developed, if necessary, in consultation with the state historic preservation office and associated American Indian tribes.

### *Historic Structures/Buildings*

All project work relating to historic structures/buildings would be conducted in accordance with the guidelines and recommendations of the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings. Typical mitigation measures for historic structures/buildings include measures to avoid adverse impacts, such as rehabilitation and adaptive reuse, designing new development to be compatible with surrounding historic properties, and screening new development from surrounding historic resources to minimize impacts on cultural landscapes and ethnographic resources.

Adaptive use is the best strategy to ensure that buildings remain in good condition. When not being adaptively used, the best approach for preserving these structures is regular preservation maintenance, which ensures that roofs and walls as well as supporting structural elements are maintained in a sound, weather-resistant condition. An example of adaptive use is using historic structures to house park operations.

Historic structures would be maintained or stabilized until appropriate maintenance could be undertaken. Benign neglect would not be considered an appropriate management strategy. No national register-listed or –eligible structure would be removed or allowed to decay naturally without prior review by park and region cultural resource specialists, including approval by the NPS regional director and consultation with

the state historic preservation office. Before a national register-listed or –eligible structure is removed, appropriate documentation recording the structure would be prepared in accordance with Section 110(b) of the National Historic Preservation Act, and the documentation would be submitted to the Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) or Historic American Landscape Survey (HALS) program.

Historic structures that have been included within wilderness would be protected and maintained according to the pertinent laws and policies governing cultural resources using management methods that are consistent with the preservation of wilderness character and values. Laws pertaining to historic preservation remain applicable within wilderness but must generally be administered to preserve the area's wilderness character (16 USC 1133 (a)(3)). The responsible decision-maker would include appropriate consideration of the application of the provisions of the Wilderness Act in analyses and decision-making concerning cultural resources.

### *Cultural Landscapes*

All project work relating to cultural landscapes would be conducted in accordance with the guidelines and recommendations of the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Typical mitigation measures for cultural landscapes include measures to avoid adverse impacts, such as designing new development to be compatible with surrounding historic properties and screening new development from surrounding cultural landscapes to minimize impacts on those landscapes. Adaptive use is the best strategy to ensure that landscapes remain in good condition.

### *Ethnographic Resources*

The National Park Service will continue to consult with federally recognized Native American tribes with treaty resources in the monument on a government-to-government basis to identify ethnographic resources and develop appropriate strategies to mitigate impacts on these resources. Such strategies could include continuing to provide access to traditional use or spiritual areas and screening new development from traditional use areas to minimize impacts on ethnographic resources. Consultations with American Indians linked by ties of kinship, culture, or history to park lands would address the inadvertent discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, and all provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

### *Museum Collections*

Mitigation measures related to museum collections consist of conservation of a collection through proper storage, handling, and exhibit of objects as specified in the NPS Museum Handbook and NPS Director's Order No. 24, NPS Museum Collections Management.

## SCENIC RESOURCES

Mitigation measures are designed to minimize human-made visual intrusions. These include the following:

- Where appropriate, use facilities such as boardwalks and fences to route people away from sensitive natural and cultural resources while still permitting access to important viewpoints.
- Design, site, and construct facilities to minimize adverse effects on natural and cultural resources and visual intrusion.
- Select colors and textures for built facilities that blend into the visual environment.
- Provide vegetative screening, where appropriate.

## SOCIOECONOMIC ENVIRONMENT

During the future planning and implementation of the approved general management plan for Lava Beds National Monument, the National Park Service would pursue partnerships with tribes, local communities, and county governments to further identify potential impacts and mitigating measures that would best serve the interests and concerns of both the National Park Service and the local communities.

## SUSTAINABLE DESIGN AND AESTHETICS

Sustainable practices would be used in the selection of building materials and sources and building location and sitting. Design standards specific to the monument would be developed in all repair, rehabilitation, and construction projects.

Projects would use sustainable practices and resources whenever practicable by recycling and reusing materials, by minimizing materials, by minimizing energy consumption during the project, and by minimizing energy consumption throughout the lifespan of the project.

## Environmentally Preferred Alternative

The environmentally preferable alternative is defined as "the alternative that will promote national environmental policy as expressed in Section 101 of the National Environmental Policy Act." Section 101 states that it is the continuing responsibility of the federal government to . . .

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

2. assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;

3. attain the widest range of beneficial uses of the environment without degradation, risk to heath or safety, or other undesirable and unintended consequences;

4. preserve important historic, cultural, and natural aspects of our national heritage; and maintain, wherever possible, an environment which supports diversity, and a variety of individual choices;

5. achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life's amenities; and

6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The Council of Environmental Quality states that the environmentally preferred alternative is "the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources (46 FR 18026 – 46 FR 18038)." According to the NPS NEPA Handbook (DO-12), through identification of the environmentally preferred alternative, the NPS decision-makers and the public are clearly faced with the relative merits of choices and must clearly state through the decision-making process the values and policies used in reaching final decisions.

The environmentally preferable alternative is alternative B, the NPS preferred alternative for Lava Beds National Monument. This alternative best satisfies the national environmental goals—it provides the highest level of protection of natural and cultural resources while concurrently providing for a wide range of neutral and beneficial uses of the environment. The preferred alternative maintains an environment that supports a diversity and variety of individual choices, and it integrates resource protection with an appropriate range of visitor uses and understanding.

The preferred alternative surpasses the other alternatives in realizing the full range of the Section 101 national environmental policy goals. The no-action alternative does not provide as much resource protection or visitor opportunities as the preferred alternative. In addition, the preferred alternative would significantly expand educational opportunities, research, and restoration of resources at the monument resulting in a better understanding of the monument's resources, thus better equipping the monument in fulfilling criteria 3, 4, and 5.

Alternative A, while accurately describing the current management direction and the best efforts of the staff, fails to satisfy the NEPA requirements outlined above when compared to alternatives B and C. A shortage of funding for staff, programs, facilities, and services limits the monument's ffectiveness in achieving criteria 4 and 6.

Alternative C would provide for more visitor use opportunities, but there also would be a higher potential for more impacts to natural resources in comparison with the preferred alternative. For example, while alternative C provides a considerable amount of new visitor opportunities, these opportunities have more potential for increased visitor use in sensitive areas of the monument such as Petroglyph Point and high use visitor caves. Alternative C does not provide nearly as many opportunities to enhance resources through restoration or to provide as many opportunities for improved understanding of resources from expanded research efforts. Thus, alternative C would not satisfy criterion

3 (attain the widest range of beneficial uses of the environment without degradation), criterion 4 (preserve important aspects of our national heritage), or criterion 6 (enhance the quality of renewable resources) as well as the preferred alternative satisfies these criteria.

## Actions/Alternatives Considered But Eliminated From Detailed Consideration

The planning team originally developed four preliminary alternatives for public review. These four alternatives were as follows:

- Concept A: Continue Current Management
- Concept B: Expanded Resource Preservation and Restoration
- Concept C: Diversified Recreation Opportunities
- Concept D: Interpretation and Education

The Choosing by Advantages method for identifying the preferred alternative resulted in the combination of alternative actions primarily from Alternatives B and D to create the preferred alternative. These actions best met the goals for the general management plan. Since most components from the former Alternatives B and D were included in the preferred alternative, these alternatives were ultimately dropped from consideration in the draft general management plan and environmental assessment.

### BOUNDARY ADJUSTMENTS CONSIDERED

Early in the alternatives development process the planning team explored boundary adjustments as is required by the National Parks and Recreation Act of 1978. One boundary adjustment considered but eliminated from detailed consideration was an expansion of the southern and southwestern boundary along Tichnor Road and Sand Butte. The advantages of this boundary adjustment included having a more 'comprehendible' management boundary along existing roads and providing seamless protection of the area's bald eagle winter roosts and caves resources which traverse both the national forest and the monument. Additionally, this boundary adjustment would have included the Sand Butte Modoc War site which would allow for expanded interpretation of Modoc War history at Lava Beds National Monument. Due to the complexity of ownership of this area (public and private lands) the NPS determined that cooperative resource management with the Forest Service was a superior management option to explore in the general management plan.

### CAVE ACCESS FOR PERSONS WITH DISABILITIES

The monument's lava tube caves have steep entries and typically require some physical challenge for entry and exploration. Twenty-five of the monument's caves have ladders, trails, and other features to assist visitor access to caves. While this provides opportunities for most visitors to access a cave, no cave is fully accessible to members of the public with certain disabilities.

Providing access compliant with the Americans with Disabilities Act (ADA) into a monument cave was analyzed for the GMP. All 25 caves with maintained trail facilities were visited by a landscape architect with extensive trail and rock work experience. Each cave was examined for the potential to alter and adapt so as to have accessible trail grades and surfaces. Nearly all of the caves were found to have extremely small openings to the surface with very limited space to accommodate any sort of switchback or ramp structure to drop from the surface to the cave floor level. The only exception was Skull Cave which has a large opening, but where the field of large boulders at the entry would have to be heavily modified to construct a more gradual trail and the impacts of that would be highly intrusive and would have an unacceptable impact on cave resources and conditions. At Mushpot Cave the idea of excavating a vertical shaft to install an elevator was considered. While that could be feasible, the slope of the lava tube (profile) is over 10%. Thus disabled users would encounter grades too steep to go anywhere once they exited an elevator.

In conclusion, it was felt that there is no potential to modify any of the caves with existing developed trails to provide a fully accessible route. The level of development and damage to cave resources necessary to such access would have an unacceptable impact on natural cave resources and conditions. This item was thus rejected from further consideration. The GMP explores other means of providing access to caves for all visitors such as offering improved and expanded virtual cave tours or providing cave exhibits.

### SOUTHEAST ENTRANCE ROAD (FOREST SERVICE ROUTE 10)

The NPS reassuming the maintenance responsibilities for the 9.9 mile long Southeast Entrance Road (Forest Service Route 10) outside the monument was also considered, as the majority of traffic on the road is going to or from the monument. The NPS maintained the road between 1965 and 1995 under an agreement with the Modoc National Forest. Given the large backlog of unmet facility maintenance needs within the monument and other national park units, taking on a new facility maintenance burden outside the monument likely would not be approved. Directing visitors to use the existing paved and better maintained northern entrance roads was seen as a more cost effective way of meeting visitor expectations of accessing the monument over reasonably maintained roads.

## Implementation of the General Management Plan

Once the general management planning process is completed, the selected alternative would become the new management plan for the monument and would be implemented in phases over 15–20 years. The monument's strategic plan, business plan, and annual work plans would help develop priorities that would determine how best to implement the plan.

Implementation of the actions and developments proposed within the management plan is dependent upon funding available at the time of need. The approval of this General Management Plan does not guarantee that the funding and staffing needed to implement the plan would be forthcoming.

In addition to funding, the implementation of any preferred alternative also could be affected by other factors. More detailed planning and environmental documentation may be completed, as appropriate, before some of the actions would be carried out.