

DES 93-10

**Draft
Environmental Impact Statement
General Management Plan
Development Concept Plan**

February 1993

**Timpanogos Cave
National Monument**



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Prepared by:
U.S. Department of Interior
National Park Service, Rocky Mountain Region
February 1993

**U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGION**

**Timpanogos Cave National Monument
Utah County, Utah
Draft Environmental Impact Statement for a General Management Plan and
Development Concept Plan**

The National Park Service has evaluated five alternatives for the future management, use, and development of Timpanogos Cave National Monument. These alternatives are designed to resolve existing issues while considering the management objectives as presented in the monument's *Statement for Management*. The alternatives represent a diverse range of options including (1) Proposed Plan - Maintain a full range of visitor and administrative services and facilities but relocate the majority of them outside the monument and implement a visitor transportation system, (2) Alternative A - Maintain a full range of visitor and administrative services but confine all development proposals to the area within the monument, (3) Alternative B (Minimum Action) - Limit development to the minimum essential for accommodating visitors to the cave and meeting administrative needs, (4) Alternative C (Mothball/Caretaker) - Until adequate funding becomes available to move facilities outside the monument, vacate and secure access to all structures and permit access to the cave only for qualified research purposes. Another local federal or state agency would be responsible for overseeing the area under a memorandum of agreement, and (5) Alternative D (no action) - Under this alternative, existing facilities and management actions would remain unchanged.

The environmental consequences of the proposed action and other alternatives are fully disclosed in this draft environmental impact statement. Also included are the results of the public involvement and consultation/coordination that have been conducted thus far.

Address Comments to:

Superintendent
Timpanogos Cave National Monument
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SUMMARY

This plan was initiated to fulfill the legal requirements as mandated by section 604 of Public Law 95-625 and is in compliance with NPS management policies, applicable legislation, and executive requirements. The purpose of this Draft Environmental Impact Statement/General Management Plan/Development Concept Plan is to identify and assess the various management alternatives and associated potential environmental impacts relative to monument operations, visitor use and access, natural and cultural resource management, and general development at Timpanogos Cave National Monument. In developing these alternatives, special attention was focused on the management objectives of the monument and current issues as presented in the "Purpose and Need for the Plan" section of this document.

As a part of the National Park Service in-house and public involvement evaluations, a number of issues were identified for resolution. The issues involved visitor and employee safety, circulation and congestion of vehicles and pedestrians, floodplain, geologic hazards, avalanches, facility needs relative to administrative and maintenance operations, housing, natural and cultural resource management impacts, and interpretation.

PROPOSED ACTION AND ALTERNATIVES

A proposed plan of action and four other alternatives, including a no-action alternative have been analyzed.

Proposed Plan

The overall intent of the proposed action would be to manage the monument as a day-use area, giving special attention to resolving the life, health, safety issues associated with the geologic and avalanche hazard zones, floodplain, probable maximum flooding, and conflicts between vehicles and pedestrians. The proposed plan would give priority to replacing the temporary trailer that was installed shortly after the visitor/administrative facilities were destroyed by fire in 1991.

Under the proposed plan, the National Park Service (NPS) would work toward moving the majority of the visitor/administrative contact facilities out of the monument and out of the American Fork Canyon in view of the hazards referenced above and lack of suitable space available for developing facilities. Upon approval of the proposed plan, the NPS would work closely with the U. S. Forest Service (USFS) in exploring alternatives for a joint facility as well as explore specific site locations outside the monument that would only involve the NPS.

The visitor/administrative needs associated with the proposed plan would require constructing an approximately 2,900 square-foot facility on a site outside the monument. The new facility would also accommodate the Natural History Association functions. This facility would be supported by parking to accommodate employees and visitors who would be required to use a mandatory transportation system between the visitor/administrative center and the cave trailhead. The NPS would continue to use the temporary trailer until funding was made available to construct the new visitor/administrative facility. It was also determined that the existing concession operation was not necessary or appropriate and would be discontinued for the reasons stated under the "Proposed Plan" section of this document.

The proposal also calls for constructing a new maintenance area and parking facilities outside the American Fork Canyon. The interior building space needed for this function would total approximately 2,839 square feet. This facility would be supported by parking for ten regular and two oversized vehicles. This facility, as well as the proposed new visitor/administrative facility, would be evaluated as a possible function to be combined with the U.S. Forest Service facilities.

After removal of the temporary visitor center from the trailhead area, the visitor shuttle bus staging area and supporting facilities (ticket kiosk, rest rooms, shelters, and shuttle parking) would be constructed. The shuttle area would also include eight parking spaces for NPS staff and an emergency vehicle. The construction of the shuttle staging area would also require an adjustment in the alignment of Utah Highway 92 and the removal of all 91 existing visitor parking facilities excluding those associated with the picnic area.

The picnic area would be retained for public use. A pedestrian trail would be constructed between the picnic area and the historic district. Approximately ten walk-in picnic units would be constructed along the new trail system, which would extend into the historic district.

Residences 8 and 9 would be razed and residence 2 would no longer be used for residential purposes. All employees would be required to obtain their own housing in the surrounding communities, where there is a suitable market for such needs. The site would be used to construct five parking spaces for NPS employees and to construct a storage facility for the specialized trail maintenance tractor.

With the transfer of facilities outside the monument, and the lack of justification for continuing to maintain four historic structures (stone rest room (building 126), stone ticket booth, and two cold cellars), they would be razed and their sites restored to a natural condition. The historic cave rest room (HS-127) would be retained and continue to be used as a rest room. Historic residence 2 would also be retained and used for its value as an interpretive/increment weather facility with rest rooms. This would complement the concept of extending the picnic area trail into the area surrounding residence 2. The historic bridge

in the same area would also be maintained as part of the pedestrian trail system. Interpretation would focus on the history and development of the area.

Development is scheduled to take place in three phases, details of which are provided in the "Development Concept/Cost" section of the proposed plan. Based on the National Park Service 1991 Class "C" cost estimating guide, a gross cost of \$4,863,000 would be required to accomplish those items identified for phase I construction, \$1,531,000 for phase II and \$660,000 for phase III. Total gross development cost for the proposed plan would be \$7,054,000. This alternative would require a total of 21.2 full time equivalents (FTE), an increase of 7.2 FTEs. The annual operating and maintenance (O&M) costs associated with this proposal would be \$699,000, an increase of approximately \$250,000 over existing O&M costs.

Alternative A

Alternative A provides for retaining all essential services and facilities within the monument. The alternative calls for elimination of the concession facilities, residences 8 and 9, and the picnic area, with the exception of the 25-car parking area; retention of the maintenance facilities and all historic structures, with the continued adaptive use of the historic rest rooms and stone ticket booth. Under this alternative, a new visitor/administrative facility would be built on the same site as the temporary trailer, and would include facilities to accommodate the Natural History Association functions. Additional parking for visitors (20 spaces) and NPS employees (16 spaces) would be constructed in the vicinity of the visitor center. A pedestrian trail would be built between the picnic parking area and the new visitor center, to accommodate overflow parking needs. A pedestrian barrier would be built to keep visitors out of the area adjacent to the riverbank across from the visitor center. The eroded stream bank would then be rehabilitated to its natural condition. Implementation of this alternative would require 19 FTEs, an increase of 5 FTEs, with an annual operation and maintenance cost of \$674,982, an increase of approximately \$225,000 over existing O&M costs. Development and rehabilitation costs for this alternative are estimated to be \$5,290,000.

Alternative B

Alternative B represents the minimum action needed to provide visitor access to the cave and meet the minimum related administrative needs. This alternative calls for moving the ticket sales and visitor contact facility outside the monument, into a joint facility with the U.S. Forest Service or some other government entity. This alternative also calls for elimination of the picnic area (excluding the parking area), residences 8 and 9, and the temporary visitor center. All historic structures would be retained and adaptively used as described in the "Proposed Actions and Alternatives" section of this document. The maintenance area would be retained in its current location and an additional seven parking spaces to accommodate employees would be constructed adjacent to the existing maintenance area parking lot. The maintenance operation would continue to use those

historic structures currently being used for storage purposes. Historic residence 2 would be adaptively used for administrative purposes. A ticket kiosk, rest rooms and drinking fountain would be built in the vicinity of the temporary visitor contact facility. An additional 28 parking spaces would be built in the vicinity, to accommodate visitors and NPS employees. A pedestrian barrier would be built to keep visitors out of the area adjacent to the riverbank across from the visitor center. The eroded stream bank would then be rehabilitated to its natural condition. Implementation of this alternative would require 19 FTEs and an annual operation and maintenance cost of \$674,982. Development and rehabilitation costs for this alternative are estimated to be \$1,057,000.

Alternative C

Alternative C recommends vacating and securing access to all structures and the cave, and permitting access to the cave only for qualified scientific interest, which is consistent with the legislative purpose for establishing the monument. Under this alternative, another local federal or state agency would administer the area under a memorandum of agreement with the National Park Service. Implementation of this alternative would require the equivalent of .3 FTEs on the part of the administering agency. An annual operation and maintenance cost amounting to \$15,000 would be needed to compensate the administering government agency for the administrative costs incurred under the terms of the memorandum of agreement. This would represent a decrease of \$434,000 from existing O&M costs. The one-time development and rehabilitation cost (closure of the area and routine maintenance) for this alternative are estimated to be \$30,000.

Alternative D

Alternative D (no action) would continue existing programs, development, and trends requiring 14 FTEs and an annual operating budget of about \$449,200.

IMPACTS

Impact areas selected to analyze the potential consequences of the proposed action and the four other alternatives include water resources, floodplain, wetlands, geology, soils, vegetation, wildlife, threatened and endangered species, air quality, archeological, historical and ethnographic resources, visitor use, socioeconomic data, other agencies, management and operations, and cumulative impacts.

Proposed Plan

Implementation of the proposed plan, which calls for relocating visitor and administrative facilities outside the monument and discontinuing the concession operation, would also result in moving people from the geologic hazard areas and the 100- and 500-year floodplains. This would, in turn, significantly reduce the current threat to human life. The relocation of the visitor and administrative facilities along with the implementation of a

visitor transportation system would also resolve the conflicts between pedestrians and vehicles and resulting major congestion problems. This alternative would also enable the National Park Service to better regulate access to the cave trail, thereby eliminating the problem of visitors arriving too early and congregating in hazardous rockfall areas. The proposed plan would also resolve the current pedestrian impacts to the soils and vegetation between the American Fork River and the visitor center parking area. The curatorial storage area would also be removed from the 100- and 500-year floodplains under the proposed plan. The historic residence (building 2) would be converted and used as an interpretive and inclement weather structure for visitors picnicking or hiking in the historic district, effectively preserving a historic structure. Under this alternative, the stone rest room (HS-127), stone ticket booth, and two cold cellars (all historic structures) would be removed. All other historic properties would be retained.

Alternatives A, B, and D

Alternatives A, B, and D would continue to encourage occupation of the geologic hazard zones and the 100- and 500-year floodplains. This would continue to represent a threat to human safety, health, and well-being. There would continue to be major conflicts between pedestrians and vehicles, which would continue to present major congestion problems. Under alternatives A, B, and D, all of the historic structures, with the exception of the two cold cellars, would be retained and adaptively used. Under alternatives A and B, pedestrian barriers would be constructed between the visitor center parking lot and the American Fork River, thereby eliminating the pedestrian impact to the soils and vegetation. Under alternative D, (no action), none of the issues identified within this document would be resolved.

Alternative C

Alternative C (mothball/caretaker) would permit access to the cave only for qualified scientific purposes that are consistent with the significance of the cave, as spelled out in the legislation that established the monument. This alternative would no longer permit the general public to access the cave for general pleasure. All structures and facilities such as the picnic area, residences, temporary visitor center, maintenance center, and historic structures would be vacated and secured. The area would be patrolled and routinely inspected for vandalism and the need for repair and rehabilitation work, under a memorandum of agreement with another agency. For a brief overview of the impacts associated with each alternative, refer to table 9, "Impacts of the Proposed Action and Alternatives."

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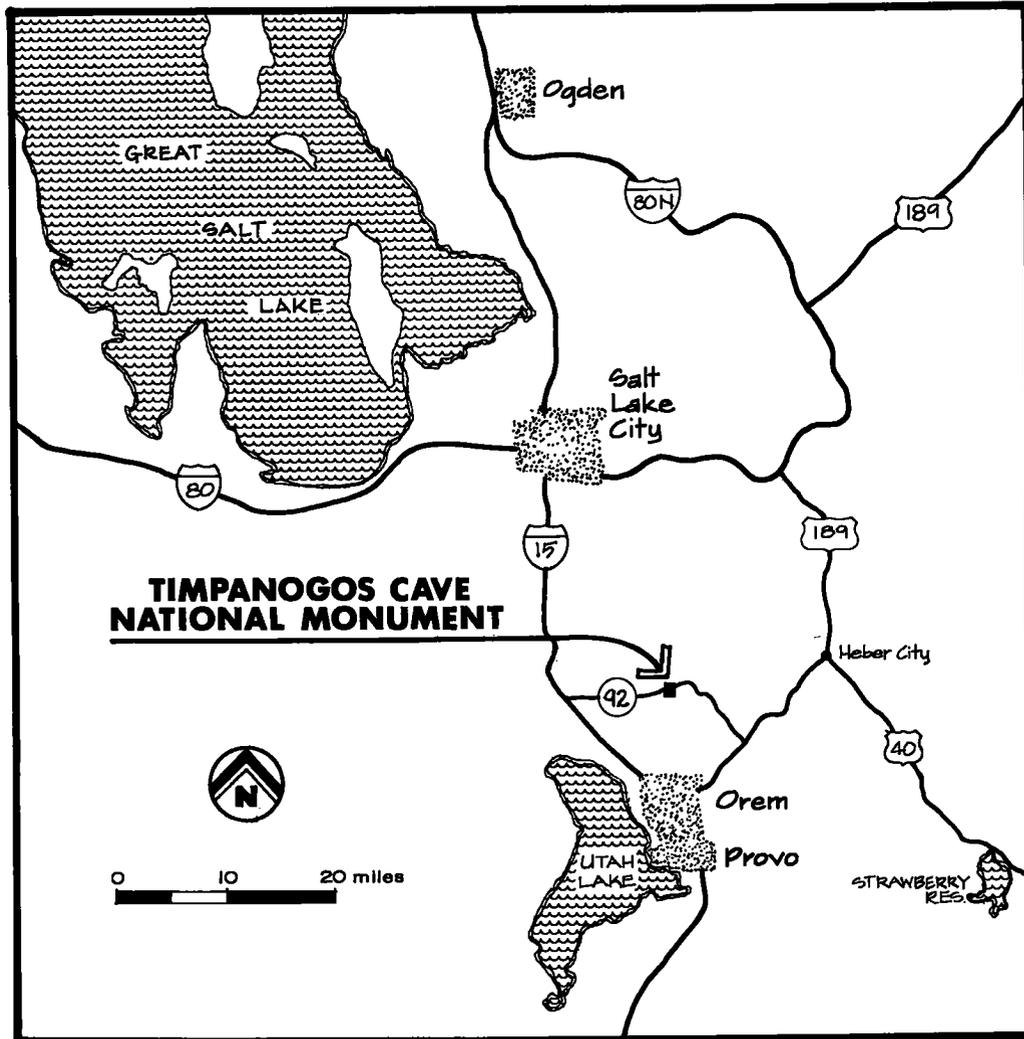
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Vicinity Map

Timpanogos Cave National Monument

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PURPOSE AND NEED FOR THE PLAN

The purpose of the Draft Environmental Impact Statement/General Management Plan/Development Concept Plan (EIS/GMP/DCP) is to identify and assess alternatives for establishing the overall direction for management and use of the monument. The alternatives presented in this document are based on the management objectives as spelled out in the monument's *Statement For Management* and seek to resolve those issues identified below. This document also serves as a vehicle for soliciting public involvement in planning for the future management of public lands.

PARK PURPOSE AND MANAGEMENT OBJECTIVES

President Warren G. Harding, by Proclamation No. 1540, dated October 14, 1922, under the authority of the Act of June 8, 1906, (Stat. 225), established Timpanogos Cave National Monument. The series of three limestone caves was placed under jurisdiction of the U.S. Forest Service to be protected for its "unusual scientific interest and importance." Executive Order No. 6166, dated June 10, 1933, placed all national monuments under the jurisdiction of the U.S. Department of the Interior, and transfer of Timpanogos Cave to the National Park Service occurred on July 1, 1934. Under provision of the National Park Service Organic Act of 1916, the area is to be managed in a manner that will conserve the natural and cultural resources and provide for public use and enjoyment. Detailed descriptions of the monument's location and environment are presented in the "Affected Environment" section of this document.

The following management objectives were developed as a basis for preparing planning documents, formulating alternatives, and analyzing potential impacts to park operations.

- To provide opportunities for visitors to safely enjoy and gain an understanding and appreciation of the natural processes that form the Timpanogos Cave system.
- To manage natural resources to maintain the natural setting surrounding the cave and complement adjacent wilderness areas managed by the U.S. Forest Service.
- To insure that management and development of the monument balances with preservation and protection of cultural and natural resources, with efforts to provide for visitor enjoyment and to accommodate administrative needs and obligations.

LEGISLATIVE AND ADMINISTRATIVE CONSTRAINTS

There have been no significant boundary changes since establishment of the monument in 1922. However, a subsequent survey (1945) determined that the boundary as marked on the ground did not coincide with the diagram that formed part of the 1922 proclamation. Therefore, the description of the boundary was changed to conform with the physical boundary, by presidential proclamation 3458, dated March 27, 1962.

A limited four-year concessions permit was issued to Mr. and Mrs. Carl Wagner for a food and souvenir concession. This contract will expire on December 31, 1993. The concession operates approximately five months per year (May through September). The concession operation is west of, and adjacent to, the temporary visitor contact facility.

An electric services agreement dated February 18, 1955, exists with Utah Power and Light Company. Utah Power and Light assumes maintenance responsibility for a government-built line and agrees to furnish electrical service to the monument.

On April 1, 1966, a contract was issued for reconstruction of the system by Utah Power and Light Company, who has agreed to work with the monument in minimizing the visual impact of the facilities.

A permit was issued January 1, 1978, to Mountain States Telephone Company for the right-of-way for telephone transmission lines. This permit expires on December 31, 1997.

Highway 92 through the monument is maintained by the Utah Department of Transportation. The right-of-way (width of pavement) for the roadway is 25 feet.

A List of Classified Structures Inventory was carried out in November 1975. A National Register nomination was submitted in February 1982 for the Timpanogos Cave Historical District, which was placed on the National Register October 13, 1982.

In 1975, a thorough archeological survey was conducted of the canyon bottom, focusing on the campground, housing area, and the few remaining undeveloped portions of the monument. The area around the trail to the caves and large boulders and cliffs at the base of the canyon walls were also inspected. One site was documented - an isolated, small, red anthropomorph pictograph. This site is on the cliff face that bounds the backyard of one of the employee houses. The area below the rock art was leveled and filled during construction, obliterating any archeological materials or features that may have been associated with the pictograph. Because of the isolated nature of this rock art and lack of associated features, this site may not meet the criteria for listing on the National Register of Historic Places. However, until such a formal determination is made, the site will be

protected. The sheerness of the canyon walls, which are too steep to climb unassisted; repeated flooding of the canyon floor, all of which is within the 100- and 500-year floodplains; and the intensity of NPS development substantially reduce the probability of significant archeological features remaining in the area.

ISSUES

Cultural Resources

Based on a June 1982 report from the U.S. Army Corps of Engineers, the maintenance building that provides for curatorial storage is within the 100- and 500-year floodplain of the American Fork River. According to NPS procedures, curatorial storage should not be located within these floodplain areas.

Operations, Visitor Use and Interpretation

On February 3, 1991, a fire destroyed the administrative offices, information and ticket sales area, Natural History Association sales area, museum, auditorium, rest rooms, furnace room, and tool storage portions of the visitor/administrative center. The only portion that was not destroyed by the fire was the concession sales area and the adjacent covered terrace area. In order to accommodate visitors by the beginning of the 1991 visitor-use season, park staff removed the fire debris and placed a very temporary, prefabricated unit on the same site. This unit, which primarily serves as the main visitor contact facility, lacks sufficient space to properly accommodate visitors. Because the structure was intended to fill only an emergency need, less than minimum space was provided to accommodate current use levels and administrative needs.

Administrative functions displaced by the fire are being temporarily performed from a structure outside the monument, which is being leased from Utah Power and Light Company. Ingress and egress to this site from Utah Highway 92 present some serious safety problems. There is not adequate space to establish safe turning radiuses and a blind curve to the east creates an unacceptable sight distance problem.

The Timpanogos Cave visitor center is the first facility that the public comes in contact with as they enter the American Fork Canyon. The American Fork Canyon is the gateway to a vast recreation resource represented by Timpanogos Cave National Monument, the Uinta National Forest, and Utah Highway 92, which has been designated the Alpine Scenic Loop. The visitor demand for cave tours, which frequently exceeds the carrying capacity of the parking facilities, and visitors who stop at the visitor center for information unrelated to the monument cause many major congestion problems.

The current layout of the parking facilities in relation to the temporary visitor/administrative center and Utah Highway 92 further compounds the congestion problem and creates severe safety problems between pedestrians and vehicles. This safety problem is further compounded by Utah Highway 92, a relatively narrow, winding road with inadequate shoulders, which enters the parking area from the west on a blind curve. Even though flashing lights have been installed on the highway at both ends of the parking area, speeds along the road remain excessive and accidents involving pedestrians and vehicles continue to occur.

Considering the scale and number of issues to be resolved, and the wide range of potential alternatives, there is also a need to reassess visitor orientation and interpretation needs. Therefore, an interpretive plan will be prepared as a separate effort following the completion of the final general management plan and development concept plan.

Concessions Operation

The Concessions Policy Act requires that concession developments be "limited to those that are necessary and appropriate for public use and enjoyment of the national park area in which they are located and that are consistent to the highest practicable degree with the preservation and conservation of the areas." (79 Stat. 969; 16 U.S.C. 20). The environmental impact statement will evaluate the necessity and appropriateness of a concession operation in each alternative. The term of the current concession permit expires December 31, 1993.

Natural Resources

Uncontrolled pedestrian use between the visitor center parking area and the American Fork River has resulted in significant impacts to the riparian zone. The impacts, which include the loss of soil and vegetation, open the riverbank area to greater erosional impacts during periods of high water. The aesthetic values along the river have been degraded, and the exposed root systems of trees present safety problems.

A geologic investigation of the developed areas within the monument was conducted in the summer of 1991. The results of the survey indicated that ". . . the visitor/administrative and residential areas are high risk sites. The potential of avalanche and freeze-thaw fragments demolishing the structures from above coupled with the undercutting of the river from below establishes a severe condition." Such conditions pose a significant threat to the safety, health, and well-being of visitors and employees. Over the years there have been documented cases of boulders penetrating the roof of the visitor center, striking vehicles in the parking area, and causing minor to serious bodily injury to numerous visitors.

Based on a June 1982 report from the U.S. Army Corps of Engineers, all of the structures within the monument, except residence 8, are in the 100- and 500-year floodplain of the American Fork River. In accordance with Executive Order 11988, practical alternatives for removing such development from the floodplain must be considered.

The Tibble Fork Dam, Silver Lake Flat Dam, and Silver Lake Dam, are upstream from Timpanogos Cave National Monument, within the National Forest. In January 1992, the first two referenced dams were identified by the Utah Department of Natural Resources as having a "high" hazard classification. The latter dam was classified as a "low" hazard structure. These classifications have nothing to do with the actual structural quality of the dams, but reflect the ". . . probability of causing loss of human life or extensive economic loss including damage to critical public utilities . . ." if a dam failure should occur. In January 1992, the Soil Conservation Service completed a report that identified the flooding condition that would occur within the monument should the two "high" hazard dams fail. In a 10,000 cubic feet-per-second (cfs) stream flow condition, a failure of the two "high" hazard dams would place water approximately 6½ feet deep in the visitor center. Under a 35,000 cfs stream flow condition, water would be approximately 18½ feet deep in the visitor center. Although there is no record of flash flooding within the monument, the extremely narrow and steep walled canyon coupled with the gradient of the stream and unusually intense rainfall and melting snows could possibly create flash flood conditions. Currently, there is no flood emergency warning system installed anywhere in the canyon.

Internal and External Influences

There are no critical adjacent land issues affecting the monument at this time. The surrounding U.S. Forest Service lands are a part of the legislatively designated Mount Timpanogos Wilderness Area and Lone Peak Wilderness. The U.S. Forest Service has, however, informally expressed an interest in developing a joint visitor/administrative facility outside the American Fork Canyon. Their facilities are now situated in Pleasant Grove, Utah, which is a small community outside the boundary of the national forest. These facilities are in an extremely out-of-the-way location for visitors using national forest lands. Due to the extreme congestion problem, growing demands within the national forest, and the need to provide better information and orientation services prior to visitors entering the canyon, the USFS will be looking at alternatives for resolving these issues. Considering the common interest and needs of both agencies, this planning effort should document the concept of each agency working together in resolving such issues.

In 1987, a cooperative effort was undertaken between the U.S. Forest Service, Utah County, and the cities of Highland and American Fork. Its purpose was to prepare a comprehensive recreational and open space master plan for the American Fork River Corridor, from its source at Silver Lake Flat Reservoir, to its terminus at Utah Lake. This corridor included

Timpanogos Cave National Monument - EIS, GMP, DCP

Timpanogos Cave National Monument. The impetus for the planning study " . . . has been the desire to meet the demands of the recreation-seeking public while accommodating possibilities for growth and vitality within the American Fork Community." Interest in this project has been temporarily diverted to another connecting corridor within the region.

PROPOSED ACTION AND ALTERNATIVES

Following is a detailed description of the various alternatives, their development priorities and costs, and a listing of the future plans and studies that would be needed to support each alternative as well as respond to various resource management needs.

PROPOSED PLAN

General Management and Development Theme (Move Primary Services and Facilities Outside the Monument)

In recognition of the absence of developable sites that are not affected by floodplain, avalanches, geologic hazard zones, potential impacts of upstream dam failures, and extreme periods of freezing, this alternative is designed to provide a full range of visitor and administrative facilities outside the monument and limit developments within the canyon to those determined to be the minimum essential for accommodating visitors. However, this alternative is designed to take advantage of the existing picnic area and certain historic resources for their interpretive value, with full recognition of floodplain areas and the need to provide adequate warning systems. This alternative calls for eliminating any development that involves overnight accommodations in view of the natural hazards referenced above. This alternative is also designed to reduce impacts on the fragile river corridor soils and vegetation and eliminate the severe conflict between vehicles traveling Highway 92 and those visitors who must walk across the highway to the existing visitor center and cave resources.

The basic services and facilities and general management direction proposed in this alternative are identified in the following subsections of this alternative. Information pertaining to the design concept, spatial requirements, and associated costs is presented in the section titled "Development Concept Plan/Cost."

Land Use And Management

For general management purposes, the monument is divided into four zones, including natural, historic, development, and special use (see Management Zoning map). These zones represent the type of management that will be emphasized on the lands within the monument.

28 27



feet 0 200 400 600
meters 0 50 100 150

Boundary Map

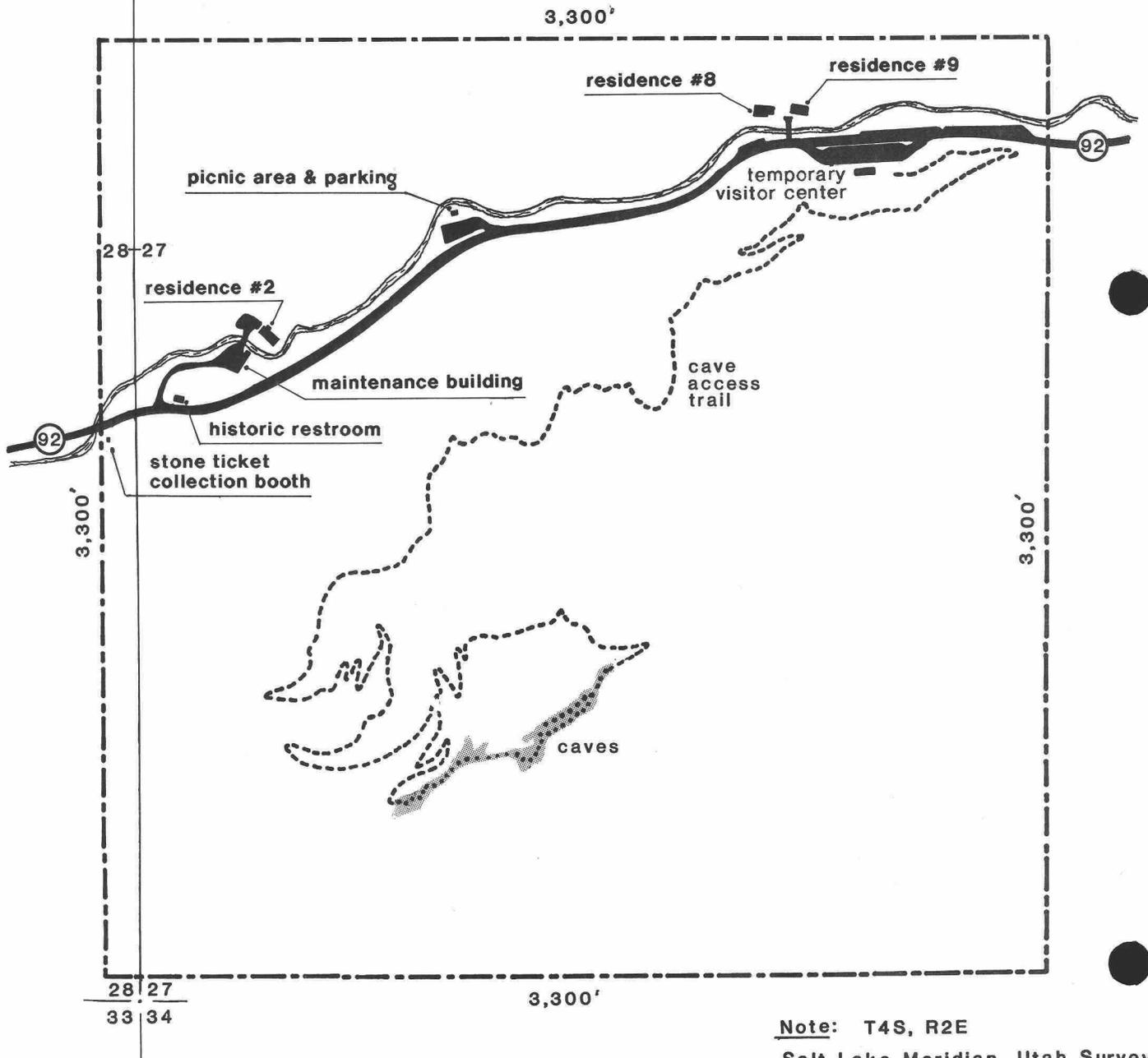
Timpanogos Cave National Monument Utah

United States Department of the Interior
National Park Service

LONE PEAK WILDERNESS AREA

UINTA NATIONAL FOREST

Forest . . . Service . . . South . . . Wilderness . . . Boundary



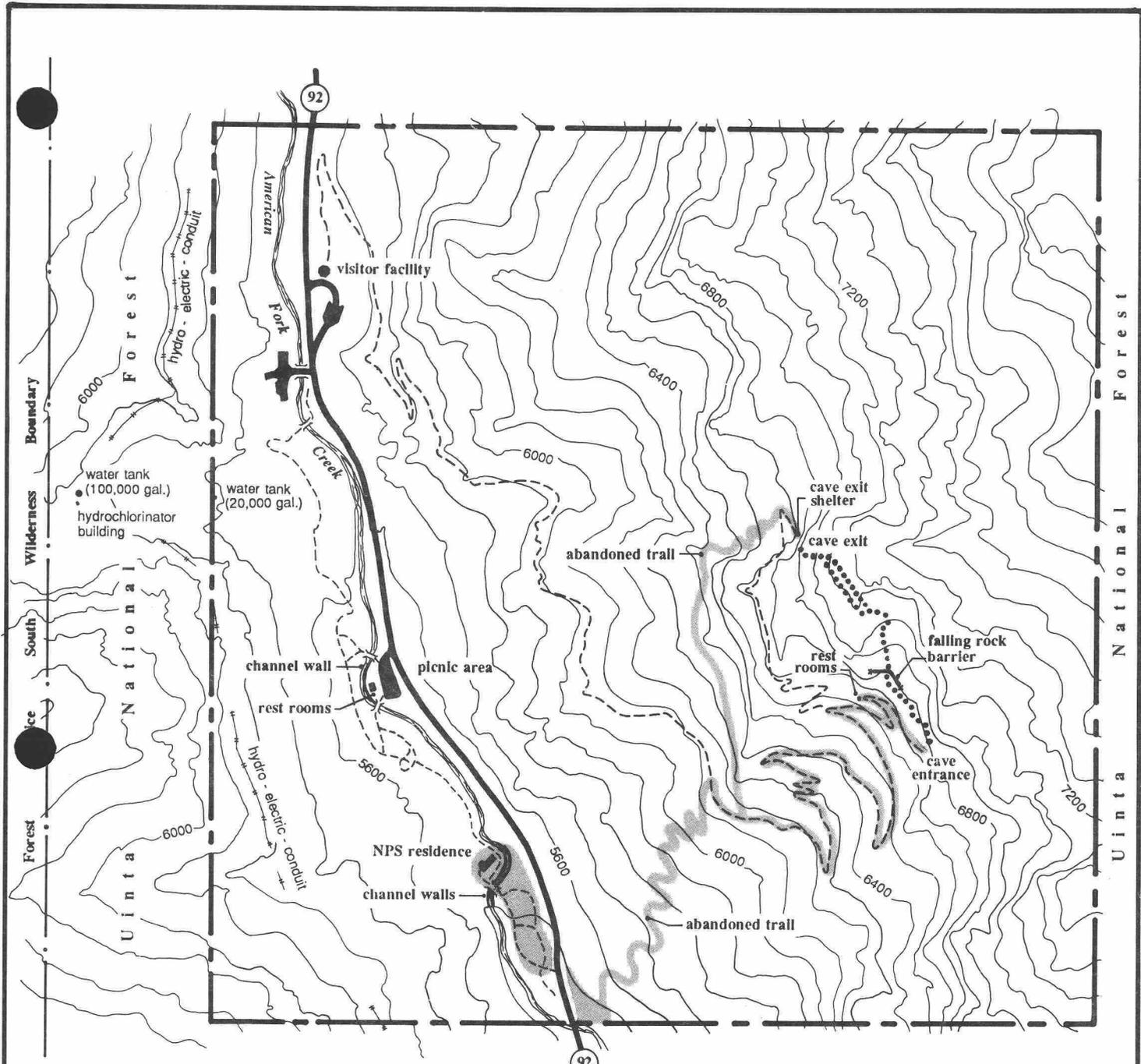
Note: T4S, R2E

Salt Lake Meridian, Utah Survey

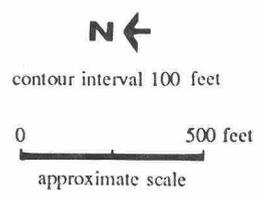
UINTA NATIONAL FOREST

ON MICROFILM

153 | 80.017-B
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-  monument boundary
-  trail
-  cave trail
-  natural zone-238 acres
-  outstanding natural feature subzone (underground)
-  development zone-7 acres
-  historic zone-4 acres
-  special use zone-1 acre



Proposed Management Zoning
Timpanogos Cave National Monument
 United States Department of the Interior · National Park Service

153 | 80,028
 DEC 92 | RMRO

ON MICROFILM

The natural zone (approximately 238 acres) would be managed to conserve the natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Facilities in this zone would be limited to those that have little effect on scenic quality and natural processes. Examples of facilities typical of the natural zone include foot trails, signs, and trailside information displays. Within the natural zone are two subzones - outstanding natural feature subzone and natural environment subzone. The cave feature, which possesses unusual intrinsic value and significance, would represent the outstanding natural feature subzone. The remainder of the natural zone would be managed as a natural environment subzone.

The historic zone (approximately 4 acres) would be managed to preserve, protect, and interpret significant cultural resources.

The development zone (approximately 7 acres) would provide the necessary space for visitor and management facilities. Examples of facilities within this zone include picnic tables, rest rooms, buildings, parking areas, roadways, primary pedestrian trails and shelters, ticket collection kiosk, and 20,000-gallon water tank.

The special use zone (approximately 1 acre) would include those lands within the monument that are dedicated for utility corridors for use by Mountain States Telephone Company and Utah Power and Light Company.

Land Protection and Adjacent Lands

At this time, there is no rationale to support boundary adjustments, since adjacent lands are either managed as wilderness or in a manner so as to complement wilderness values and there are no apparent threats. The National Park Service will continue to coordinate with local land management agencies, particularly the U.S. Forest Service, in developing and implementing land management plans.

Cultural Resource Management

Alternatives for management and development of National Park Service areas must balance the preservation and protection of cultural resources, with efforts to provide for visitor enjoyment as well as accommodate administrative needs. In cases where retention of a historic structure cannot be justified, appropriate action will be taken to insure that such properties are properly inventoried and recorded. All such work will be coordinated with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP).

Programs for the preservation and protection of cultural resources currently within the monument have been developed and assessed in the park's draft resource management plan. Implementation is under way on certain elements within the plan. Following is a brief summary of the proposals from the draft resource management plan. More detailed information can be found in the draft plan.

- The Collections Management Plan for the park was completed in 1983 and is no longer valid. Security measures, collections maintenance duties, and environmental controls all need to be addressed. Both the collections management plan and the scope of collections statement would be completely revised.
- Preservation and maintenance levels and appropriate techniques are lacking for individual historic structures. The location and importance of all historic structures contributing to the historic district would be identified, as would the maintenance and treatment levels and techniques.
- An ethnographic overview and assessment of the monument will be conducted and if it is determined that a survey is needed, one will be completed. All work will be in accordance with NPS Management Policies (1988) and NPS-28.
- As of October 31, 1990, the museum collection has been inventoried and stored according to NPS standards. Under this alternative, a housekeeping plan to cover routine housekeeping and monitoring activities would be developed. To meet expansion needs of the collection, a larger storage area would be considered during planning for a new visitor center and administrative offices. Initial planning would include the production of a collection storage plan to fully address NPS collection storage requirements. An exhibit plan would also need to be prepared.
- As a part of the FY90 curatorial project, archival and library material was catalogued, maintained, and stored according to NPS standards. In the future, under this alternative, archival materials, including historical photographs available from the University of Utah and local residents such as James Manwill (grandson of cave discoverer) would be added to the park collections. Historic slides would be catalogued and stored with the museum collections. Equipment would be purchased for proper storage of historic slides and tapes. Oral histories surrounding cave discovery and early exploration would be added to park collections as they became available.
- The monument contains many examples of stone masonry dating to 1923. Many of these are along the cave trail and are subject to constant erosion, rockfall, and avalanches. Maintenance personnel routinely repair and reconstruct these walls. To

maintain their historical integrity (many of them are within the historic district), a plan incorporating photography and detailed record-keeping has been implemented. This masonry protection plan would be updated each year to include the latest masonry work completed. The plan also requires documentation of past masonry work -- information that could be available from former maintenance employees still living in the area.

- An administrative history of the park was completed in 1962 and needs to be updated. The administrative history would be completed as a special project employing a temporary employee or a graduate student.

Under the proposed plan and under all alternatives, properties on, or potentially eligible for listing on, the National Register of Historic places will be managed in accordance with the *Cultural Resource Management Guideline (NPS-28)*, the National Historic Preservation Act (16 USC 470 et seq.), and the *Secretary of the Interior's Standards and Guidelines*. In situations where a historic property has a potential for being impacted as a result of management decisions not discussed in this plan, the National Park Service will consult with the Utah State Historic Preservation Officer and the Advisory Council on Historic Preservation. Cultural resource management would emphasize maintenance, rehabilitation, and adaptive use of structures whenever practical.

Under this alternative the problems associated with the storage of curatorial resources within the 100- and 500-year floodplain would be resolved by incorporating appropriate storage facilities within the visitor/administrative facility to be built outside the monument.

Residence 2, currently used for residential purposes, would be retained for its interpretive value and used as described in the "Visitor Use And Interpretation" section below. The Stone Bridge would also be maintained and used for pedestrian and vehicular (maintenance) access. The stone rest room (building 126), stone building south of highway 92 (ticket booth), and two cold cellars would be removed and all disturbed areas restored to represent a natural condition. The impacts and mitigation associated with these actions are discussed in the "Environmental Consequences" section of this document.

The proposed action would not directly impact the one known archeological site within the monument - a Vernal Style, Fremont anthropomorph that probably dates somewhere between AD 1000 and 1200. However, prior to initiating any actions that could indirectly affect this rock art, such as removal of the employee housing, it would be redocumented on the most up-to-date Utah State archeological site form and a formal concurrence determination of eligibility sought with the Utah State Historic Preservation Officer.

It is presently unknown if the one known pictograph site carries ethnographic significance for tribal communities affiliated with the monument; therefore, the assumption should be to protect the site as potential ethnographic resources in need of additional documentation until members of these affiliated groups can be contacted and consulted. These consultation efforts should ascertain if there are other resources within the monument, including the cave, that are considered to be of ethnographic importance. Consultation efforts should be completed and documented prior to implementing the actions prescribed in the final general management plan.

The presence of cultural landscapes within the monument has not been established, therefore, an assessment must be completed and impacts documented prior to initiating any action that might jeopardize such resources. The need to initiate a cultural landscape assessment is identified below in the section titled "Future Plans and Studies."

Based on the proposals contained in this section, the cultural resource management section of the monument's resource management plan would need to be revised.

The "Affected Environment" chapter includes a discussion of historic structures, their materials, dates of construction and current use. The following table identifies the historic properties by name and building number, and the proposed use.

TABLE 1 PROPOSED USE OF HISTORIC STRUCTURES AND ASSOCIATED TIME PERIODS

Historic Structure/Building Number	Proposed Use	Time Period	Mitigation
1. Residence (HS-2)	Maintain and remodel for interpretive purposes	1941	
2. Bridge	Maintain in place and continue to use for vehicular and pedestrian access	1935 (circa)	
3. Cave Rest Room (HS-127)	Maintain in place and continue to use as a rest room	1939	
4. Rest Room (HS-126)	Remove from monument and restore site	1928	*
5. Storage Building (Ticket Booth)	Remove from monument and restore site	1922 (circa)	*
6. Two Cold Cellars	Remove from monument and restore site	1930s (circa)	*
7. Old Cave Trail	Maintain all portions currently being maintained	1920s	

*Record to Historic American Building Surveys (HABS). Also refer to "Cultural Resources Management" section in table 8.

Natural Resource Management

Protection and preservation of the natural environment to ensure ecosystem integrity while providing for visitor enjoyment would be the principal consideration of park managers. Programs for the study and protection of natural resources have been developed and assessed in the park's draft resource management plan. Implementation is under way on certain elements within the plan; however, additional funding would be essential to complete some of the ongoing and recommended program needs. Following is a brief summary of the proposals from the draft resource management plan. More detailed information can be found in the draft plan.

- Several developments have taken place in the cave system during the past 50 years that may significantly affect cave hydrology. These include pumping water from cave lakes for use elsewhere and to protect the cave trail and lighting systems, connecting the three caves with tunnels in the late 1930s, and taking increasing numbers of visitors through the caves. A cave hydrology study was begun in December 1989 to define the cave hydrologic system and determine the effects of these developments. The cave hydrology study would be completed to establish hydrographs for the entire cave system, to define the cave watershed, to determine the chemical composition of water flowing through the cave system, and to develop a monitoring program for cave water quality and quantity.
- Results of the cave hydrology study to date show that certain locations in the cave system are indicative of potential long-term change, and water quantity and quality sampling must be continued at these locations. Stage recorders are used to monitor cave lake levels so a continuous record is available. A pH meter with additional electrodes for monitoring parameters such as dissolved oxygen has been purchased so that the park can monitor conditions regularly. Six temperature and relative humidity sensors are in place so the cave would have a more complete and continuous record of temperatures and relative humidity. These parameters have to date been very good indicators of some of the effects of heavy visitation on the cave system. Phase I has been implemented. Phase II is being implemented with additional photomonitoring, cave cleaning, and guidelines for visitation and restoration projects.
- Natural air flow in the Timpanogos Cave system was significantly altered in the late 1930s when the caves were connected with two human-made tunnels and natural entrances were sealed with masonry. Data gathered to date show that some parts of the cave system are much drier than they would have been prior to tunnel construction. Natural air flow and cave climate has been substantially restored by putting doors in the tunnels and reconstructing natural entrances. Masonry has been

replaced with metal grates that allow passage of animals, as would have occurred prior to cave discovery.

- Water rights exist for a greater stream flow than the American Fork River can provide during most of the summer season, and the points of diversion for these rights are upstream from the monument. The river could theoretically be dry for several months, and the park has no way of protecting instream flows. Monitoring equipment should be purchased and sampling conducted in the American Fork River so that aquatic ecosystems, riparian habitat, and endangered species can be clearly identified. Showing that these systems depend on historic flow characteristics in the river could protect instream flows through the monument. A hydrology study and outline of subsequent monitoring would be completed, as would a water resource management plan for the American Fork River and the entire park.
- Heavy visitor use has resulted in extreme soil compaction, especially in Swinging Bridge picnic area and across the highway from the former visitor center. This has resulted in almost complete loss of ground cover vegetation and erosion severe enough to expose tree roots in many places. This problem is being addressed by the GMP process.
- One of the objectives of the current hydrology study is to quantify the effects of water development and increasing visitation on the cave system. While the study would be able to establish changes in the hydrologic system, it cannot attempt to address potential effects on speleothems. This should be addressed as a separate issue. Monitoring of drip rates and growth rates on one formation in Timpanogos Cave near what has been named the "Cascade of Energy" should continue, and more areas where flow rates, water chemistry, and speleothem growth rates can all be measured should be added as personnel become available to complete data collection.
- The geologic context in which the Timpanogos Cave system is found is the most conducive to cave formation in American Fork Canyon. It is possible that additional caves exist in the Deseret Limestone layer. Caves have been found in other geologic layers along the Wasatch Front and even nearby in American Fork Canyon, making a thorough reconnaissance of the monument necessary. The known cave system was first mapped in 1974, but the project did not include all passages in the cave. The entire cave system is now mapped so that it can be digitized onto a Geographic Information System. An inventory of cave resources was also completed at the same time the entire cave was being mapped.
- Along the cave trail, short cutting of the switchbacks especially on the upper section is causing loss of vegetation and considerable soil erosion as well as greatly increased

rockfall danger. Short cutting should be prevented by planting of trees and shrubs or by using fallen trees. Stone walls can be built to eliminate off-trail travel.

- There is a need to determine that the collection of waste water and solids below the historic bathroom near the entrance to the cave system is not adversely affecting any as yet undiscovered karst features within the monument. A replacement system should be sought that is easily maintained and that does not threaten other park resources.
- The monument used to be above observable effects of air pollution during inversions, but now it is occasionally affected by them. Air pollution may directly affect biota and geologic resources or cause indirect affects through degraded groundwater or acid precipitation. Monitoring and establishment of baseline information is critical. Since the cave system depends upon a delicate balance of water chemistry, effects of air pollution on these resources could be quite profound. A research program to determine how air pollution and acid precipitation affect park resources should be implemented.
- Detailed information on the cave system has never been available to management. A Geographic Information System for resource management both on the surface and in the cave system should be implemented to include all phases of cave use and monitoring. A GIS should also incorporate cultural resource issues, especially the List of Classified Structures and the Cultural Sites Inventory.
- The monument's fire management plan should be implemented.
- Hazardous tree identification, removal, and disposal is an ongoing resource management and maintenance activity. Hazardous trees would continue to be removed from areas of heavy visitor use.
- Natural rockfall throughout the park is a hazard to life and property. Rockfall containment, formation stability monitoring and hazard rock removal are ongoing resource management and maintenance activities. Native rock should be used for all rock wall construction and repair along the cave trail. Visitors would continue to be prohibited from collecting rocks. A geologic assessment/inventory of the part of American Fork Canyon within the monument boundaries should be completed.
- There is a variety of ecotones represented in the monument, but adequate baseline data are not available. After completion of a threatened and endangered species survey, other important species in the monument should be identified and protected.

Visitor Use and Interpretation

The monument would continue to be managed as a day-use area. The visitor center and appropriate parking would be relocated outside the American Fork River canyon west of the monument. Appropriate signing along Highway 92 east of the monument and west of the ultimate visitor center site will be a key factor in properly advising visitors as to the location of the ticket sales area and mandatory transportation system.

The visitor center would include space for the following functions: first-aid room, ticket sales for cave tours and transportation, information, audiovisual room, museum, general lobby, rest rooms, and an area to purchase maps, brochures, and general information on the surrounding region. Under this alternative, these visitor center-related functions as well as the administrative functions discussed in the following "Park Operations" section, would be combined in the same facility. The maintenance facilities would be housed in a separate structure. The following two tables provide a detailed breakdown of the space requirements for the visitor/administrative center and a separate maintenance center.

TABLE 2 VISITOR/ADMINISTRATIVE CENTER SPACE REQUIREMENTS

Functions	Space Requirements in Square Feet
Auditorium	1,100
Museum	1,015
Natural History Association Sales and Display	360
Storage and Safe Area	115
Lobby/Ticket Sales/Information	1,360
Library/Interpretive Work Area	226
Reservation/Fee Office	140
Superintendent's Office	145
Chief Ranger's Office	140
Resource Management Office	140
Chief of Maintenance's Office	140
Other Administrative Staff (3)	390
Conference Room	200
Employee Rest Rooms	226
Visitor Rest Rooms	850
General Office Support (Files/Storage)	283
Mechanical Room	340
Transportation Office	140
First Aid Room	95
Lunch Room/Kitchen Area	170
Lockers/Ready Room/Supply	215
Curatorial Storage	<u>230</u>
Total Square Feet	8,020

requires maintenance. The need for two full-time operating buses is based on the assumption that the one-hour cave tours would continue to be restricted to a maximum of twenty people per tour, with six tours per hour (10 minutes apart). This would equate to an hourly theoretical maximum carrying capacity of 120 visitors per hour. The need for two buses is also based on the assumption that the bus round trip between the visitor transportation parking area and the trailhead shuttle stop would not exceed 20 minutes. The 20 minute time frame also allows time for loading and unloading of passengers.

The preliminary estimate for operating the transportation system, which includes capital cost, the equivalent of two full-time employees for operating the buses, supplies, oil, gas, and maintenance, is \$120,786 annually. This cost is based on a 7 percent interest amortized over a ten year period. To break even on such costs, a shuttle transportation fee of \$1.46 per person would need to be charged. This also assumes that existing average yearly visitation (82,517) would not decline due to the implementation of a mandatory transportation system. If the shuttle transportation system were to be operated as a concession, an additional increase in the shuttle system cost per person would be required to cover profit. This cost would be contingent upon contract negotiations. A more in depth transportation study is recommended prior to implementation of a transportation system.

Under this alternative, the picnic area would be retained, including rest rooms, parking, and trail systems. A new trail would be developed between the existing picnic area and the historic district. This trail would loop into the historic district, providing access to ten new walk-in picnic units and interpretive facilities within the historic district north of Highway 92. The trail and picnic units would also be placed in such a fashion as to complement the interpretation of the historic district and be accessible to people with disabilities.

Historic structure 2, currently used for residential purposes, would be retained for its interpretive value. It would be modified on the interior to provide rest rooms and serve as an inclement weather shelter for people visiting the historic district. Modifications would take into account the need to provide access for disabled persons. A portion of the interior would also be modified to interpret the historic district and related events and individuals.

The canyon view trail, as proposed in the 1983 *General Management Plan* would remain closed and dropped from further consideration.

There is currently no access for wheeled vehicles to the cave. The cave trail, which rises 1,065 feet in 1½ miles, does not meet current standards for wheeled access. The grades on the trail far exceed the standards set for wheelchairs, and there are no railings, platforms, crash barriers, or passing areas. Preliminary investigations into reconstructing the trail to meet standards estimated that realignment, if physically possible, could require addition of 426 resting areas and addition of ½-mile to the trail. Making the trail leading to the cave

accessible to wheelchairs would require demolishing the existing trail and reconstructing approximately 3 miles of new trail. In addition, access through the cave is limited by the narrowness of the underground trail, existing steep and narrow step systems, low and narrow natural passage ways, and uneven and slick surfaces. An engineering study and environmental assessment will be prepared to determine feasible alternatives and their impacts before a final decision is reached on providing wheeled access.

The cave and its trail are accessible to individuals with hearing and mental impairments, but those with vision impairments require special assistance to negotiate the steep and narrow step systems, low and narrow natural passage ways, and uneven and slick surfaces. Until a decision is reached on improving access, the monument staff will continue to make those improvements described in their August 27, 1991, report titled "Updated Self-Evaluation of Accessibility for Disabled Persons" currently on file in the park. Special emphasis will be placed on interpretive needs for those unable to access the cave in the update of the interpretive plan.

The interpretive developments within the new visitor center would place special emphasis on providing disabled persons with a full understanding and appreciation of cave resources, especially if the previously referenced engineering study determines that access to the cave for some or all disabled persons is not feasible. Special interpretive techniques (i.e., visual, captioned, scale models, etc.) would be employed to accommodate all forms of disabilities. In the interim the park will continue to explore new and creative ways to improve on its existing interpretive facilities oriented to meeting the needs and obligations in serving those with disabilities.

Under the proposed plan, the park would need to reevaluate its needs relative to interpretation. Contingent upon the outcome of future efforts to possibly combine facilities and services with other agencies outside the monument and possible interpretive opportunities related to the transportation system, the park would need to reevaluate the interpretive plan. The need for such planning is identified below in the section titled "Future Plans and Studies."

Concession Operation

Concession services would be discontinued in the monument. Considering that same services and facilities are available within 3.5 miles, or 5 minutes, of the monument, it is not unreasonable to expect visitors to depend on such services to meet their needs. Furthermore, since the visitor/administrative center is being relocated adjacent to surrounding communities, the need for concession services is further diminished. Therefore, under this alternative, it was determined that such facilities were not necessary or appropriate.

Park Operations

The administrative center and appropriate parking would be relocated outside the American Fork River canyon west of the monument near the same site as the visitor center facilities. The administrative center would include space for the superintendent's, chief ranger's, chief of maintenance's offices, offices for three administrative positions, fee collection and reservation office, library, interpreter's preparation room, resource management work space, lunch and ready room, conference room, general storage, ticket sales office, mechanical room, and curatorial storage and work space, Natural History Association Sales facilities (books, maps, etc., sales area), special locked storage area and small work space.

Those administrative services and facilities related to the transportation system would include the following items.

Location - Shuttle Stop in the Monument: Ticket collection kiosk at trailhead leading to the cave (tickets would not be sold at this location), secondary janitorial supply area, electronically controlled gates that only permit access to and from the cave trailhead parking area by authorized NPS and mass transportation vehicles, small storage structure for the special trail maintenance machine, parking large enough to accommodate eight NPS passenger vehicles associated with the cave activities and four NPS passenger vehicles associated with maintenance activities.

Location - Administrative Center Outside the Monument: Parking space large enough to accommodate 16 vehicles, which would include 14 NPS vehicles and 2 Natural History Association vehicles, and a structure for storing busses during the off-season (only if NPS operates the transportation).

A maintenance building with parking for approximately 12 vehicles (2 oversized) would be relocated outside the monument so that it is segregated physically and visually from the visitor/administrative center. The maintenance facility should be convenient to the visitor/administrative center. The space for the maintenance building would be the same as in the existing structure. The chief of maintenance's office and the curatorial storage area currently housed within the existing maintenance building would be relocated within the new administrative facility outside the monument. The existing maintenance building and paved access route would be removed and the sites restored to their natural condition.

Residences numbers 8 and 9 would be removed and the sites restored. The rationale for removing these structures is based on the need to consider practical alternatives for moving such facilities out of the 100-and 500-year floodplain, geologic hazard areas, and avalanche zones. With the structures offering no utilitarian or interpretive value, it would not be practical to maintain them. There are sufficient and reasonable opportunities in the

surrounding communities for employees to purchase or rent housing, as referenced in the "Affected Environment" section, "Socioeconomic Resource" subsection.

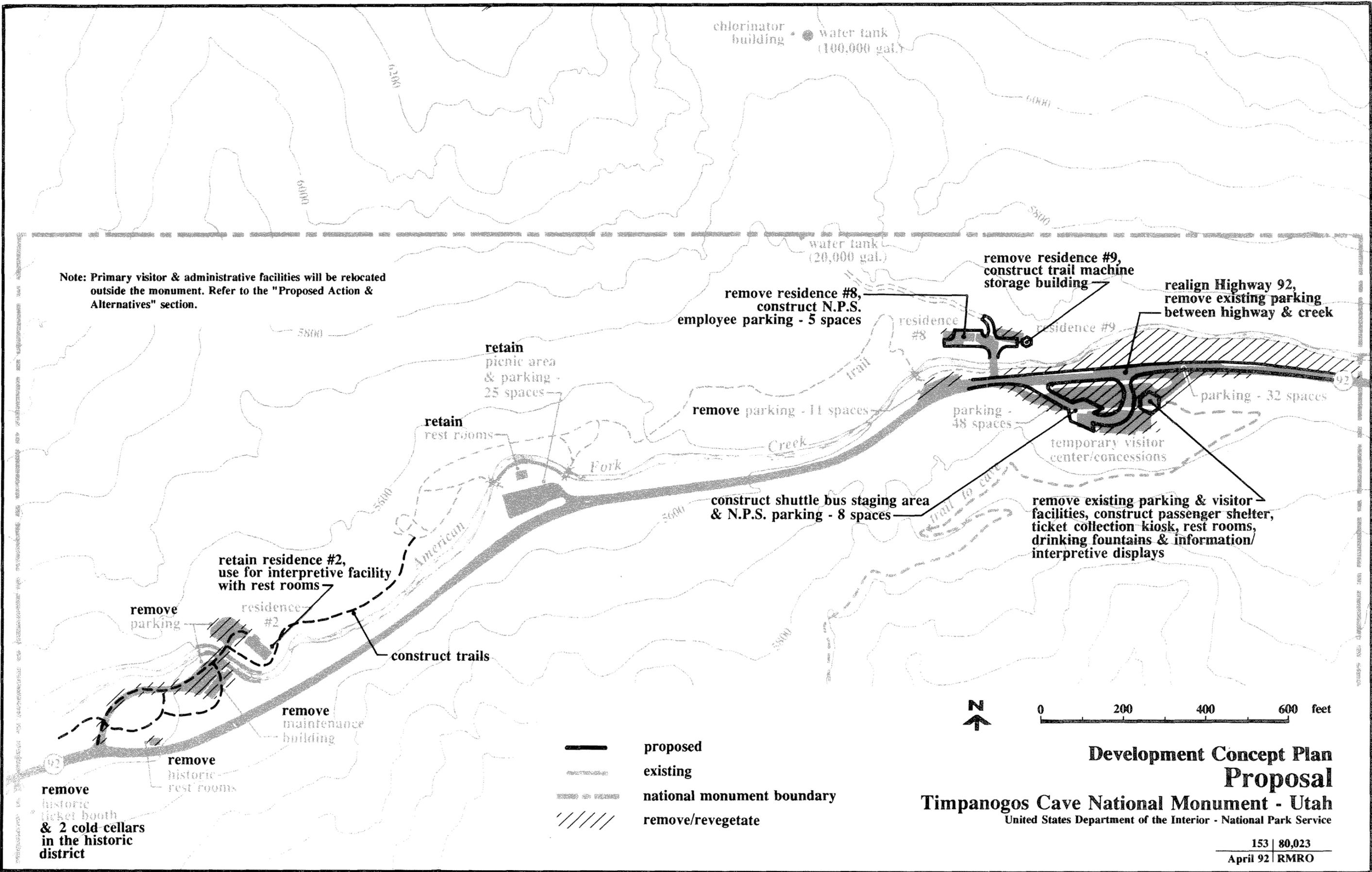
Staffing necessary to implement this proposal would be 21.2, an increase of 7.2 FTEs to cover bus drivers and additional interpreters. This assumes the NPS would be operating the shuttle system as opposed to a concessionaire. The annual operations and maintenance costs associated with this proposal would be \$699,000.

STAFFING NECESSARY TO IMPLEMENT THE PROPOSAL

FUNCTION	POSITION	FTE
PERMANENT STAFF		
Administration	Superintendent	1.0
	Administrative Officer	1.0
	Administrative Clerk	1.0
	Information receptionist/deposits/sales clerk	0.6
Maintenance	Maintenance Foreman	1.0
	Maintenance Workers	2.0
Interpretation/ Resource Management	Chief Ranger	1.0
	Resource Management Specialist (STF)	0.9
	Park Ranger (STF)	0.9
SEASONAL STAFF		
Maintenance	Custodial Laborers (2)	1.0
	Motor Vehicle Operators if shuttle is NPS operated (4)	2.0
Protection	Park Ranger, trail patrol/kiosk	0.5
Fee Collection	Park Ranger, lead	0.5
	Fee collectors/kiosk (4)	2.0
Interpretation	Park Ranger, lead	0.5
	Seasonal interpreters, (16 at 4 months each)	5.3
TOTAL		21.2

Development Concept Plan/Cost

Following is a graphic presentation of the development concept plan (DCP) that represents those needs described in the above sections. Also, following the DCP is a cost estimate for all development-related projects.



Note: Primary visitor & administrative facilities will be relocated outside the monument. Refer to the "Proposed Action & Alternatives" section.

chlorinator building • water tank (100,000 gal.)

water tank (20,000 gal.)

remove residence #8, construct N.P.S. employee parking - 5 spaces

remove residence #9, construct trail machine storage building

realign Highway 92, remove existing parking between highway & creek

retain picnic area & parking - 25 spaces

remove parking - 11 spaces

parking - 48 spaces

parking - 32 spaces

retain rest rooms

construct shuttle bus staging area & N.P.S. parking - 8 spaces

remove existing parking & visitor facilities, construct passenger shelter, ticket collection kiosk, rest rooms, drinking fountains & information/interpretive displays

retain residence #2, use for interpretive facility with rest rooms

remove parking

residence #2

construct trails

remove maintenance building

remove historic rest rooms

remove historic ticket booth & 2 cold cellars in the historic district

- proposed
- - - - -** existing
- =====** national monument boundary
- //////** remove/revegetate



0 200 400 600 feet

Development Concept Plan Proposal
Timpanogos Cave National Monument - Utah
 United States Department of the Interior - National Park Service

153 | 80,023
 April 92 | RMRO

ON MICROFILM

PROPOSED PLAN DEVELOPMENT COST

ITEM	NET ESTIMATE	CONSTRUCTION PHASE
DEVELOPMENT OUTSIDE THE MONUMENT		
Visitor/administrative center 8,020 SF @ \$210.00/SF	\$1,684,000	I
Visitor center landscaping @ 20% of net	337,000	I
Visitor center furnishings @ 25% of net	421,000	I
Visitor center interpretive media Including equipment and program materials	500,000	I
New utilities for visitor/admin. facility *1		
Water, 300 FT @ \$22.00/LF	7,000	I
Electrical, 300 FT @ \$17.00/LF	5,000	I
Telephone, 300 FT @ \$17.00/LF	5,000	I
Sewage, 300 FT, 6" line @ \$27.00/LF	8,000	I
New entrance road and parking for visitor/ administrative center		
300 FT 2-way road @ \$117.00/LF *2	35,000	I
131-car parking lot @ \$1,400/car	183,000	I
35 oversized parking spaces @ \$5,000/space	175,000	I
3 tour bus parking spaces @ \$5,000/space	15,000	I
Maintenance center		
2,839 SF @ \$115.00/SF	327,000	II
Maintenance center landscaping @ 20% of net	60,000	II
Maintenance center utilities *1		
Water, 300 FT @ \$22.00/LF	7,000	I
Electrical, 300 FT @ \$17.00/LF	5,000	I
Sewage, 300 FT, 6" line @ \$27.00/LF	8,000	I
New maint. center entrance road/parking		
300 FT 2-way road @ \$117.00/LF *2	35,000	I
10 employee parking spaces @ \$1,400/car	14,000	I
2 oversized parking spaces @ \$5,000/space	10,000	I

**IMPROVEMENTS WITHIN
THE MONUMENT**

SHUTTLE STAGING AREA:

Visitor shelter 1,200 SF @ \$45.00/SF	54,000	II
Rest room 400 SF	100,000	II
Kiosk 100 SF @ \$60.00 SF	6,000	II
Storage shed for trail maintenance machine 200 SF @ \$35.00/SF	7,000	II
Landscaping @ 20% of net on last 4 structures	33,000	III
Utilities for staging area		
Water, 200 FT @ \$22.00/LF	4,000	II
Electrical, 75 FT @ \$17.00/LF	1,000	II
Telephone, 75 FT @ \$17.00/LF	1,000	II
Sewage, 200 FT, 6" line @ \$27.00/LF	6,000	II
New roads and parking for shuttle staging area		
600 Ft 1-way road @ \$60.00/LF	36,000	III
12-car parking lot @ \$1,400/car	17,000	III
Obliterate 4,666 SY of pavement (NPS parking/Highway 96) @ \$9.00/SY	42,000	III
Restore 2,889 SY of paved area obliterated @ \$5.00/SY	14,000	III
Reconstruct 800 LF Highway 96 @ \$117.00/LF	94,000	III

**OTHER DEVELOPED
AREA REQUIREMENTS:**

Obliteration and site restoration work:		
Residences 8 and 9.	12,000	II
Historic bathhouse and ticket booth	8,000	II
Maintenance center	11,000	II
Temporary visitor center trailer	8,000	II
Concession terrace/food service	8,000	II
Roadway/parking in the maintenance area	15,000	III
Restore riverbank area	10,000	III

Remodel residence 2 for value as a rest room interpretive media in visitor shelter	24,000	III
Construct new trail from existing picnic area into the historic district 1,400 FT X 6 FT	15,000	III
Interpretive media for historic district	93,000	III
Wayside exhibits	30,000	III
Electronic gates (2) for shuttle bus entrance and exit @ \$8,000/system	16,000	II
Flood alarm system	15,000	II
GROSS CONSTRUCTION COST	\$5,923,000	
ADVANCED/PROJECT PLANNING	\$1,131,000	
TOTAL PROJECT COST	<u>\$7,054,000</u>	

Estimates are class C, meaning that they are derived from average cost of similar facilities in other NPS areas. These are based on 1992 cost estimating guides.

NOTES:

*1 These estimates are based on the assumption that utilities will not need to be extended beyond 300 feet from the main systems to the eventual building site.

*2 These quantities are based on an assumption that 300 feet of two-way road system will be sufficient to provide access between the existing primary roadway and the facility to be constructed.

Future Plans and Studies

The following plans and studies are recommended.

Transportation Study
Threatened and Endangered Species Survey
Complete Determination of Eligibility for pictograph site
Mitigate damage to stream banks from heavy visitor use
Prepare engineering study of alternatives for sewage disposal at cave rest room
Determine effects of air pollution and acid precipitation on watershed and park resources
Engineering study for accessibility to cave for persons with disabilities
Conduct survey of native flora and fauna

Prepare historic structures report
Prepare a historic preservation and maintenance plan
Complete ethnographic overview and assessment of American Indian culture and pioneer influences within monument
Complete park administrative history
Revise interpretive plan
Prepare a cultural landscape assessment of the monument

ALTERNATIVE A

General Management and Development Theme (Limit All Services and Facilities to Area within the Monument Boundary)

With full recognition of the floodplain, geologic and avalanche hazard zones, potential impacts of upstream dam failures, and extreme periods of freezing, this alternative is designed to use only existing developable sites within the monument boundary and mitigate potential impacts to the extent possible. This alternative calls for construction of a new visitor/administrative facility in the monument and takes advantage of the existing maintenance facilities and historic structures. The alternative also calls for the elimination of the two Mission 66 residential structures to minimize overnight human occupation in areas subject to flooding conditions and falling rock. Residence 2, however, would be retained and a study conducted to determine how to best floodproof it for residential use. This alternative further reduces impacts on the fragile river corridor soils and vegetation and limits developments to only those areas already impacted by existing development.

The basic services and facilities and general management direction proposed in this alternative are identified in the following subsections of this alternative. Information pertaining to the design concept, spatial requirements, and associated costs is presented in the section titled "Development Concept Plan/Cost."

Land Use And Management

For general management purposes, the monument in this alternative is divided into four zones, including natural, historic, development, and special use (see Management Zoning map). These zones represent the type of management that would be emphasized on the lands within the monument.

The natural zone (approximately 242 acres) would be managed to conserve the natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Facilities in this zone would be limited to those that have little effect on scenic quality and natural processes. Examples of facilities typical of the natural zone

include foot trails, signs, and trailside information displays. Within the natural zone are two subzones - outstanding natural feature subzone and natural environment subzone. The cave feature, which possesses unusual intrinsic value and significance, would represent the outstanding natural feature subzone. The remainder of the natural zone would be managed as a natural environment subzone.

The historic zone (approximately 4 acres) would be managed to preserve, protect and interpret cultural resources.

The development zone (approximately 3 acres) would provide the necessary space for visitor and management facilities. Examples of facilities within this zone include picnic tables, rest rooms, buildings, parking areas, roadways, primary pedestrian trails and shelters, ticket collection kiosk, and 20,000-gallon water tank.

The special use zone (approximately 1 acre) would include those lands within the monument that are dedicated for utility corridors for use by Mountain States Telephone Company and Utah Power and Light Company.

Land Protection and Adjacent Lands

Refer to the same section under the "Proposed Plan" above, page 10.

Cultural Resource Management

The problems associated with the storage of cultural resources within the 100-and 500-year floodplain would be resolved by incorporating appropriate storage facilities within the new visitor/administrative facilities, which would be designed for flood protection since they are within the 100-year floodplain.

An archeological survey completed in the monument identified one site; a Fremont-style anthropomorphic figure presented as a pictograph. Preliminary indications are that the figure does not meet the criteria for nomination to the National Register of Historic Places. A final decision on eligibility will be coordinated with the SHPO prior to any action that would directly or indirectly impact this site. On-site protection of the site, to prevent wind and water erosion from completely obliterating it would be implemented.

Based on the proposals contained in this section, the cultural resource management section of the monument's resource management plan would need to be revised.

The following table identifies the historic properties by name and building number, and the proposed use.

TABLE 4 PROPOSED USE OF HISTORIC STRUCTURES - ALTERNATIVE A

Historic Structure/Building Number	Proposed Use
1. Residence (HS-2)	Maintain in place and continue to use as residence
2. Bridge	Maintain in place and continue to use for vehicular and pedestrian access
3. Cave Rest Room (HS-127)	Maintain in place and continue to use as a rest room
4. Rest Room (HS-126)	Maintain and continue to use for maintenance storage
5. Storage Building (Ticket Booth)	Maintain and continue to use for maintenance storage
6. Two Cold Cellars	Remove and restore sites
7. Old Cave Trail	Maintain all portions currently being maintained

Natural Resource Management

Refer to the same section in the "Proposed Plan" above, page 14.

This alternative would eliminate the continued impact on soils and vegetation in the area between the American Fork River and the visitor parking area directly north of the visitor center and Highway 92, by constructing a pedestrian barrier or fencing. This would allow the monument staff the opportunity to rehabilitate the severely impacted area.

Additional impacts on the natural resources would be eliminated as a result of removing the picnic area and many of the existing trails from the monument as described below. This would enable the monument staff to restore these areas to a natural appearance and thereby reduce associated impacts to the natural resources.

Visitor Use and Interpretation

The monument would continue to be managed as a day-use area. Under this alternative a new visitor contact facility would be built in the same general location as the original structure that was destroyed by fire in February 1991. The facility would be designed to reflect consideration for the 100-and 500-year floodplain and to the degree possible, potential geological hazards. The visitor-related services would include the same functions and related space requirements as presented in table 2.

The parking area north of the temporary visitor center site between Highway 92 and the river would be expanded to the east to accommodate an additional 20 visitor vehicles.

The canyon view trail, proposed in the 1983 *General Management Plan* would remain closed and be dropped from any further consideration as part of the effort to move visitors out of what will become an extremely congested area. This would increase the turnover rate of visitors in an area where parking space is inadequate and there are critical circulation and congestion problems.

With the exception of the parking area, the picnic area facilities would be discontinued for the same rationale as presented above concerning the canyon view trail. The parking area would be retained as an overflow parking area since needed parking would be extremely marginal. A trail would also be built between the overflow parking and the visitor/administrative center.

Because of the extreme danger associated with the grades and length of the trail to the cave, access for the disabled would not be provided for. As an alternative, special interpretive techniques would be developed to give those interested a full understanding and appreciation for the underground resources. The visitor center and all related facilities would provide for access for persons with disabilities.

Concession Operation

Under this alternative concession services would be discontinued in the monument. Considering the same services and facilities are available within 3.5 miles, or 5 minutes, of the monument, it is not unreasonable to expect visitors to depend on such services to meet their needs. Therefore, it was determined that such facilities were not among the facilities considered to be the minimum essential for serving visitors. This would also avoid prolonging human presence in a geological hazard zone and would increase the turnover rate of visitors in an area where parking space is inadequate and there are critical circulation and congestion problems.

Park Operations

Under this alternative, a new administrative structure would be built in the same general location as the original structure and combined with visitor-related services. The facility would be designed to reflect consideration for the 100- and 500-year floodplain and to the degree possible, potential geological hazards. The administrative-related facilities would include the same functions and related space requirements as presented in table 2, with the exception that the transportation office would not be required.

Considering the investments in public property and the need for early response to emergencies, on-site housing for one employee would be provided. Residence 2 would be floodproofed and retained as housing. All other housing would be discontinued and all employees would be responsible for their own accommodations within the surrounding communities. The residential structures identified as 8 and 9 would be removed from their sites and disposed of. After the facilities are removed, parking would be developed to accommodate thirteen NPS vehicles and two Natural History Association employees.

The maintenance building would continue to be used in its present location and current fashion, with the exception that the curatorial space (120 SF) would be combined with the new visitor/administrative facilities. The lunch room (169 SF) and locker/shower area (139 SF) would be retained within the maintenance area as a part of that function. The 120 square foot space that would become available in the maintenance building as a result of relocating the curatorial function would be used for additional maintenance storage. The historic stone bathhouse and ticket booth would be retained for storage.

Staffing necessary to implement this alternative is displayed below. Under this alternative, staffing levels would increase by approximately 5 FTEs. The annual operations and maintenance costs associated with this alternative would be \$674,982.

STAFFING NECESSARY TO IMPLEMENT ALTERNATIVE A

FUNCTION	POSITION	FTE
PERMANENT STAFF		
Administration	Superintendent	1.0
	Administrative Officer	1.0
	Administrative Clerk	1.0
	Information receptionist/deposits/sales clerk	0.6
Maintenance	Maintenance Foreman	1.0
	Maintenance Workers	2.0
Interpretation/ Resource Management	Chief Ranger	1.0
	Resource Management Specialist (STF)	0.9
	Park Ranger (STF)	0.9
SEASONAL STAFF		
Maintenance	Custodial Laborers (2)	1.0
Protection	Park Ranger, trail patrol/kiosk	0.5
Fee Collection	Park Ranger, lead	0.5
	Fee collectors/kiosk (4)	2.0
Interpretation	Park Ranger, lead	0.5
	Seasonal interpreters, (16 at 4 months each)	5.3
TOTAL		19.2

ALTERNATIVE A DEVELOPMENT COST

ITEM	NET ESTIMATE	CONSTRUCTION PHASE
DEVELOPMENT NEEDS WITHIN THE MONUMENT		
Visitor/administrative center 7,880 SF @ \$210.00	\$1,655,000	I
Visitor/administrative center floodproofing	248,000	I
Visitor center landscaping @ 20% of net	330,000	I
Visitor center furnishings @ 25% of net	413,000	I
Visitor center interpretive media Including equipment/program materials	500,000	I
New utilities for visitor/admin. facility *1	2,000	I
Additional parking at visitor/administrative center-36 new car prkng spaces @ \$1,400/space	51,000	II
Maintenance center general remodeling to improve storage space	5,000	II
Floodproof residence 2	30,000	II
Storage shed for trail maintenance machine 200 SF @ \$35.00/SF	7,000	III
Landscaping for storage shed area, 20% of net construction	2,000	III
Structural obliteration and site restoration work:		
Residence 8	5,000	II
Residence 9	7,000	II
Temporary visitor center trailer	8,000	II
Concession terrace/food service	8,000	II
Rehabilitate riverbank area and construct barrier between parking/river	35,000	II
Remove picnic facilities except parking; rehab.	18,000	III

Timpanogos Cave National Monument - EIS, GMP, DCP

Construct pedestrian walkway between picnic parking area and visitor center and guardrails between the road and trail		
Asphalt trail 6' wide x 1,200' @ \$22/SY	18,000	III
Wood Guardrail \$28/LF x 1,200'	34,000	III
Flood alarm system	15,000	II
GROSS CONSTRUCTION COST	\$4,442,000	
ADVANCE/PROJECT PLANNING	\$848,000	
TOTAL PROJECT COST	\$5,290,000	

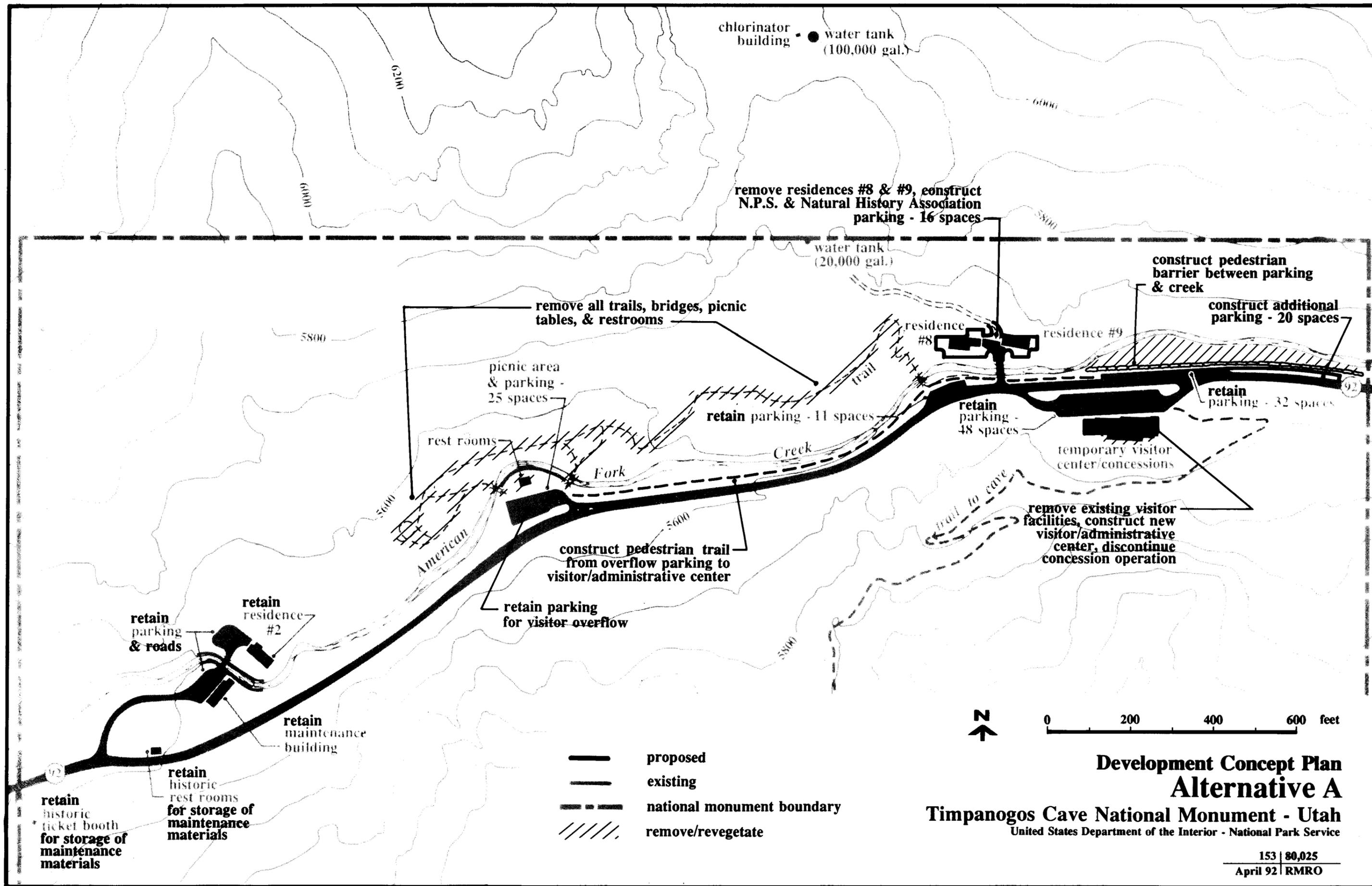
*1. Primary utilities are in place with only minor tie-in to new facility required. At the time of tie-in, age of facilities should be considered. There is a likelihood that renovation of the system will be necessary within ten years. There is also a continuing need for radon abatement, and recent discovery of lead in the water indicates a need for abatement there.

Future Plans and Studies

Refer to the same section under the "Proposed Plan" above.

Development Concept Plan/Cost

Following is a graphic presentation of the development concept plan that represents those needs described in the above sections. This section also identifies spatial requirements and associated costs of all development-related projects.



chlorinator building • water tank (100,000 gal.)

remove residences #8 & #9, construct N.P.S. & Natural History Association parking - 16 spaces

water tank (20,000 gal.)

construct pedestrian barrier between parking & creek

construct additional parking - 20 spaces

remove all trails, bridges, picnic tables, & restrooms

picnic area & parking - 25 spaces

retain parking - 11 spaces

retain parking - 48 spaces

retain parking - 32 spaces

rest rooms

temporary visitor center/concessions

construct pedestrian trail from overflow parking to visitor/administrative center

remove existing visitor facilities, construct new visitor/administrative center, discontinue concession operation

retain parking for visitor overflow

retain parking & roads

retain residence #2

retain maintenance building

retain historic ticket booth for storage of maintenance materials

retain historic rest rooms for storage of maintenance materials

- proposed
- existing
- - - national monument boundary
- //// remove/revegetate



0 200 400 600 feet

**Development Concept Plan
Alternative A**
Timpanogos Cave National Monument - Utah
United States Department of the Interior - National Park Service

ALTERNATIVE B

General Management and Development Theme (Minimum Action)

This alternative represents the minimum action and related costs needed to meet the visitor and administrative needs specifically related to the monument and attempts to resolve those concerns identified in the "Issues" section of this document. To accomplish this theme, the alternative is based on the following facts, assumptions, and concepts.

- In recognition for the continuing reduction in funds available for the National Park Service to administer units of the system and the unlikelihood that funding will become available in the near future for major development, this alternative significantly scales down and in some cases eliminates certain services and facilities as described below in this alternative.
- Some of the facilities within the monument no longer needed to serve their current use would be adapted to meet other needs wherever practical.
- Services and facilities determined not to be necessary and/or appropriate or directly related to the primary resource most significant in establishment of the monument would be eliminated due to the limited developable area within the canyon and efforts to resolve the multitude of issues presented earlier.
- This alternative also assumes that minimal visitor contact facilities would be combined in a new facility with the U.S. Forest Service, in an effort to further reduce costs. This facility would be west of the monument and outside the American Fork Canyon, in a location that would conveniently serve the 75 percent of the visitors who enter the monument and American Fork Canyon from the west. The remaining 25 percent of the visitors, who enter the monument from the east, would be directed to the new visitor center by adequate signing. Best estimates indicate that adequate visitor center sites could be obtained within 3 miles of the monument.
- Within the joint visitor facility, the NPS would support only those costs of the facilities essential to meeting visitor needs specifically related to Timpanogos Cave National Monument.
- In an effort to minimize the space requirements of the NPS portion of the joint facility, a concentrated effort would be made to expedite the turnover rate at the new visitor contact facility. Therefore, it would be essential to limit services and facilities that would detain visitors (interpretation, sales area, exhibits, etc.).

The basic services and facilities and general management direction proposed in this alternative are identified in the following subsections of this alternative. The graphic details pertaining to the design concept, spatial requirements and associated costs are presented in the section titled "Development Concept Plan/Cost."

Land Use and Management

For general management purposes, the monument in this alternative is divided into four zones, including natural, historic, development, and special use (see Management Zoning map). These zones represent the type of management that would be emphasized on the lands within the monument.

The natural zone (approximately 242 acres) would be managed to conserve the natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Within the natural zone are two subzones - outstanding natural feature subzone and natural environment subzone. The cave feature, which possesses unusual intrinsic value and significance, would represent the outstanding natural feature subzone. The remainder of the natural zone would be managed as a natural environment subzone.

The historic zone (approximately 4 acres) would be managed to preserve, protect, and interpret cultural resources.

The development zone (approximately 3 acres) would provide the necessary space for visitor and management facilities. Examples of facilities within this zone include rest rooms, parking areas, roadways, primary pedestrian trails, shelters, ticket collection kiosk, and 20,000-gallon water tank.

The special use zone (approximately 1 acre) would include those lands within the monument that are dedicated for utility corridors for use by Mountain States Telephone Company and Utah Power and Light Company.

Land Protection and Adjacent Lands

Refer to the same section under the "Proposed Plan" above.

Cultural Resource Management

The problems associated with the storage of curatorial resources in the existing maintenance structure, which is within the 100-and 500-year floodplain, would be resolved by taking action to first look at alternatives for protecting such resources in their current location and then initiating action to implement the most practical solution. If a reasonable solution

Visitor Use and Interpretation

The monument would continue to be operated as a day-use area. A visitor contact facility providing limited services would be built outside the monument. This facility would replace some of the services currently conducted within the monument and would be combined with the new visitor/administrative facility being considered by the U.S. Forest Service. The National Park Service portion of the facility would include ticket sales/information area (450 SF), and rest rooms (300 SF).

A total of 40 parking spaces (20 standard vehicles, 6 oversized recreation vehicles, 11 trailer storage spaces, and 3 tour busses) would also be needed to accommodate visitor demand at the new visitor contact facility.

Based on the 120 visitor per hour capacity of the cave, an estimated visitor turnover rate of 3.2 hours, and an average of 3.4 visitors per car, a total of 112 parking spaces would be needed in the monument just to accommodate visitors touring the cave. Therefore, all 116 existing visitor parking spaces within the monument would be retained. The parking area north of the temporary visitor center site between Highway 92 and the river would be expanded to the east to accommodate an additional 20 visitor vehicles. This would represent 24 spaces more than is needed to accommodate visitors touring the cave. These spaces would be used to accommodate those members of the public who will continue to stop in the area for reasons other than touring the cave. Adequate signing east and west of the monument directing visitors to the new visitor contact facility outside the monument should minimize such stops.

Under this alternative the temporary visitor trailer unit would be removed and permanent facilities, including ticket collection kiosk, rest rooms, and drinking fountain would be constructed. To minimize activities and related demands that take up limited space, cave tour tickets would not be sold at the ticket collection kiosk. Tickets would only be available at the joint facility outside the monument.

All interpretation concerning the cave and environment within the monument would take place either at the end or beginning of the cave tour, and while visitors have a commanding view of the canyon area. This would eliminate the need for interpretive facilities in the floor of the canyon bottom where rockfall presents the greatest threat to the safety, health, and well-being of all concerned. This would also be in keeping with the spirit of the alternative to minimize development.

The canyon view trail proposed in the 1983 *General Management Plan* would remain closed and be dropped from any further consideration as part of the effort to move visitors out of what will become an extremely congested area. This would further increase the turnover

rate of visitors in an area where parking space is inadequate and there are critical circulation and congestion problems.

With the exception of the parking area (25 spaces), the picnic area facilities would be discontinued in keeping with the intent of the minimum development alternative and the need for additional parking to serve cave visitors. The parking area would be retained as an overflow parking area, since needed parking would be extremely marginal for cave-related activities. A trail would be built between the overflow parking area and the cave trailhead.

Because of the extreme danger associated with the grades and length of the trail to the cave, access for persons with disabilities would not be provided. Since there would be no interpretation at the visitor contact facility outside the monument or the trailhead area, the only interpretive information that would be available to persons with disabilities would be brochures at the visitor contact facility. The proposed visitor contact station outside the monument and all other monument-related facilities (parking areas and rest rooms) would provide access for persons with disabilities.

Concession Operation

Under this alternative, concession services would be discontinued in the monument. Considering the same services and facilities are available within 3.5 miles, or 5 minutes, of the monument, it is not unreasonable to expect visitors to depend on such services to meet their needs. Therefore, it was determined that such facilities were not among those considered to be the minimum essential for serving visitors. This would also avoid prolonging human presence in a geological hazard zone and would increase the turnover rate of visitors in an area where parking space is inadequate and there are critical circulation and congestion problems.

Park Operations

The housing of employees within the monument would be discontinued and employees would be responsible for their own accommodations within the surrounding communities. The residential structures identified as 8 and 9 would be removed from their sites and disposed of. Once the facilities are removed, parking would be developed to accommodate eight NPS vehicles specifically related to the daily operation of the cave. Historic residence 2 would be retained and adaptively used for administrative purposes, as described below.

National Park Service functions consisting of ticket sales, reservations, information/orientation, and one office space would be in the joint (NPS/USFS) visitor contact facility referenced above. Residence 2 would be remodeled to serve as the

superintendent's office (125 SF), chief ranger's office (125 SF), offices for three administrative positions (300 SF), lockers/ready room (180 SF), library/interpretive work area (150 SF), general office files and storage (125), and rest room (existing - 40 SF). The referenced spatial needs for these functions equate to the total space available in residence 2 (1,046 SF). The parking area adjacent to residence 2 would need to be redefined (striped) to accommodate five vehicles and an additional seven spaces would need to be built west of and adjacent to the existing maintenance parking area.

Those cave-related facilities to be constructed in the monument would include a collection kiosk at the trailhead leading to the cave (tickets would not be sold at this location), and parking large enough to accommodate eight NPS passenger vehicles associated with the cave activities.

The existing maintenance building would continue to be used in its present location and fashion, including office space for the chief of maintenance. This facility also includes curatorial storage, lunch/conference room, showers, and maintenance storage/work areas. The historic stone bathhouse and ticket booth would also be retained for use as storage.

As a part of the minimum action alternative, the Natural History Association function would be discontinued as a service to the public. Due to the potential for continued congestion of vehicles, it was determined that removal of the Natural History Association activity would expedite visitor turnaround, thereby freeing up needed parking space.

Staffing necessary to implement this alternative is shown below. Under this alternative staffing levels would increase by approximately 5 FTEs. The annual operations and maintenance cost associated with this alternative would be \$674,982.

STAFFING NECESSARY TO IMPLEMENT ALTERNATIVE B

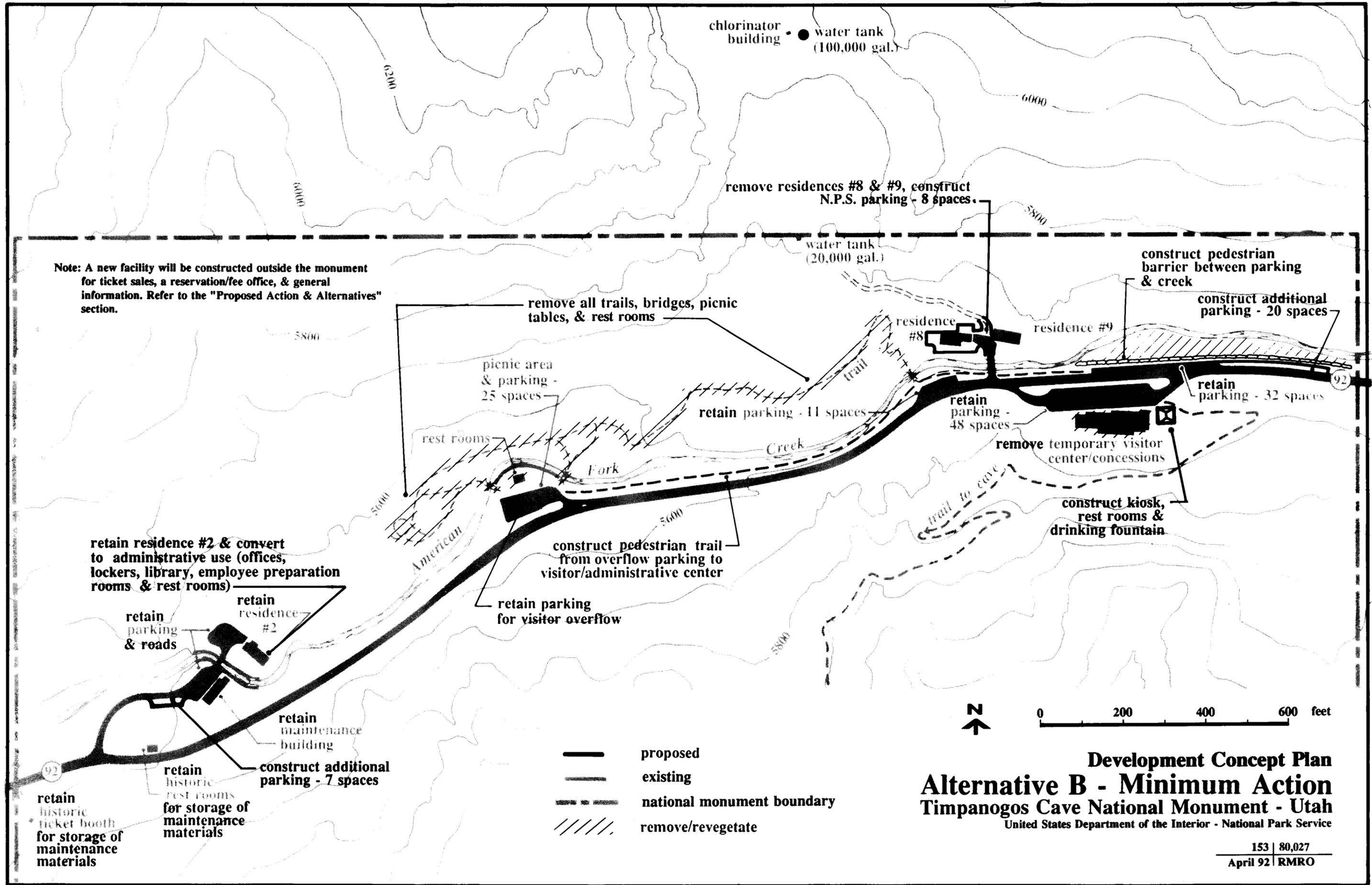
FUNCTION	POSITION	FTE
PERMANENT STAFF		
Administration	Superintendent	1.0
	Administrative Officer	1.0
	Administrative Clerk	1.0
	Information receptionist/deposits/sales clerk	0.6
Maintenance	Maintenance Foreman	1.0
	Maintenance Workers	2.0
Interpretation/ Resource Management	Chief Ranger	1.0
	Resource Management Specialist (STF)	0.9
	Park Ranger (STF)	0.9

SEASONAL STAFF

Maintenance	Custodial Laborers (2)	1.0
Protection	Park Ranger, trail patrol/kiosk	0.5
Fee Collection	Park Ranger, lead	0.5
	Fee collectors/kiosk (4)	2.0
Interpretation	Park Ranger, lead	0.5
	Seasonal interpreters, (16 at 4 months each)	5.3
TOTAL		19.2

Development Concept Plan/Cost

This section contains a graphic presentation of the development concept plan as described in the above sections. This section also identifies the associated cost of all development-related projects.



Note: A new facility will be constructed outside the monument for ticket sales, a reservation/fee office, & general information. Refer to the "Proposed Action & Alternatives" section.

chlorinator building • water tank (100,000 gal.)

remove residences #8 & #9, construct N.P.S. parking - 8 spaces.

water tank (20,000 gal.)

construct pedestrian barrier between parking & creek

construct additional parking - 20 spaces

remove all trails, bridges, picnic tables, & rest rooms

picnic area & parking - 25 spaces

retain parking - 11 spaces

retain parking - 48 spaces

retain parking - 32 spaces

rest rooms

remove temporary visitor center/concessions

construct kiosk, rest rooms & drinking fountain

retain residence #2 & convert to administrative use (offices, lockers, library, employee preparation rooms & rest rooms)

construct pedestrian trail from overflow parking to visitor/administrative center

retain parking for visitor overflow

retain parking & roads

retain residence #2

retain maintenance building

construct additional parking - 7 spaces

retain historic rest rooms for storage of maintenance materials

retain historic ticket booth for storage of maintenance materials

- proposed
- existing
- - - national monument boundary
- //// remove/revegetate



0 200 400 600 feet

Development Concept Plan
Alternative B - Minimum Action
Timpanogos Cave National Monument - Utah
 United States Department of the Interior - National Park Service

ALTERNATIVE B DEVELOPMENT COST

ITEM	NET ESTIMATE	CONSTRUCTION PHASE
DEVELOPMENT OUTSIDE THE MONUMENT		
Visitor/administrative center		
750 SF @ \$210.00/SF	\$157,500	I
Visitor center landscaping @ 12% of net	19,000	I
Visitor center furnishings @ 20% of net	31,500	I
New utilities for visitor/admin. facility *1		
Water, 300 FT @ \$22.00/LF = \$7,000	3,500	I
Electrical, 300 FT @ \$17.00/LF = \$5,000	2,500	I
Telephone, 300 FT @ \$17.00/LF = \$5,000	2,500	I
Sewage, 300 FT, 6" line @ \$27.00/LF = \$8,000	4,000	I
New entrance road and parking for visitor/administrative center		
300 FT 2-way road @ \$117.00/LF = \$35,100 *1	17,500	I
20-car parking lot @ \$1,400/car	28,000	I
6 oversized parking spaces @ \$5,000/space	30,000	I
3 tour bus parking spaces @ \$5,000/space	15,000	I
11 trailer storage spaces @ \$1,400/trailer	15,500	I
IMPROVEMENTS WITHIN THE MONUMENT		
CAVE TRAILHEAD AREA:		
Rest room 400 SF @ \$250/SF	100,000	II
Kiosk 100 SF @ \$60.00/SF	6,000	II
Landscaping @ 12% of net construction (rest room and kiosk)	13,000	II
Utilities at Trailhead Area		
Water, 200 FT @ \$22.00/LF	4,500	II
Electrical, 75 FT @ \$17.00/LF	1,000	II
Telephone, 75 FT @ \$17.00/LF	1,000	II
Sewage, 200 FT, 6" line @ \$27.00/LF	5,500	II

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New parking at trailhead area		
20 additional visitor parking @ \$1,400/car	28,000	III
8 NPS parking spaces @ \$1,400/car	11,000	III
OTHER DEVELOPED AREA REQUIREMENTS:		
Obliteration and site restoration work:		
Residences 8 and 9	12,000	III
Temporary visitor center trailer	8,000	II
Concession terrace/food service	8,000	II
Construct pedestrian barrier between parking/ river and restore riverbank area	35,000	III
Remodel residence 2 for administrative use	24,000	III
Construct 7 parking spaces for admin. staff near residence 2 @ \$1,400/car	10,000	III
Remove all picnic facilities excluding parking and rehabilitate site	18,000	III
Construct pedestrian walkway with guardrails between picnic parking area and trailhead		
Asphalt trail, 6' wide x 1,200 @ \$22.00/SY and wood guardrail \$28/LF x 1,200'	51,000	III
Flood alarm system	15,000	II
GROSS CONSTRUCTION COST	\$887,500	
ADVANCED/PROJECT PLANNING	\$169,500	
TOTAL PROJECT COST	\$1,057,000	

*It is assumed that half of these costs will be covered by the agency sharing the joint facility.

Future Plans and Studies

The following plans and studies are recommended under this alternative:

- Flood protection plan for curatorial storage area in the maintenance shop. Possibilities for storage of collections off site, through cooperative agreement with another National Park Service unit or another agency might be an alternative to trying to floodproof the existing structure/area.
- For other plans and studies needed under this alternative, refer to the same section under the "Proposed Plan."

ALTERNATIVE C

General Management And Development Theme (Mothball/Caretaker)

Based on the potential hazards associated with the developments within the monument and the improbability that sufficient funds would be available in the near future to provide the type of services and facilities that address such concerns, the National Park Service would temporarily close cave access to the general public and cease all National Park Service-related activities. All facilities within the monument would be closed for use and secured. The only access to the cave would be for qualified scientific purposes, which is consistent with the primary purpose for establishing the monument. Under this alternative, another local, federal, or state agency would administer the area under a memorandum of agreement with the National Park Service. This management direction would continue until such time as sufficient funding were made available to resolve the life, health, and safety issues associated with the existing facilities.

Land Use and Management

Under this alternative, the existing Land Use and Management classifications would remain unchanged. Refer to alternative D (no action) below, for a description of the existing land use and management.

Land Protection and Adjacent Lands

Refer to the same section under the "Proposed Plan" above.

Cultural Resource Management

The following actions would take place concerning cultural resources management:

- Curatorial items currently stored in the maintenance center would be removed from the monument and properly stored to ensure their protection.
- With the exception of the trail to the cave, the existing park facilities, particularly the structures that constitute the historic district, would be routinely examined for possible maintenance needs in an effort to continue to insure the preservation and protection of such resources. The historic portion of the trail used by visitors to access the cave would be left to molder along with all other sections. Appropriate action would be taken to ensure that historic sections of the trail are properly inventoried and recorded. All such work would be coordinated with the SHPO and ACHP.

- Through an MOA with another entity, routine patrol and control of access to the cave would be arranged.

Visitor Use and Interpretation

The following actions would take place concerning visitor use and interpretation:

- The existing picnic area would be secured in such a fashion so as prevent use of the facility.
- All trails, including the one used to access the cave from the existing temporary visitor center, would be abandoned and left to molder.
- All existing parking areas adjacent to Utah Highway 92 would also be secured in such a fashion as to prevent use by the general public.

Concession Operation

The following actions would take place concerning concessions:

- The concession operation permit would not be renewed when it expires in December 1993.
- All facilities would be vacated and secured.

Park Operations

The following actions would take place concerning the park:

- The current lease with Utah Power and Light permitting the NPS to use a structure outside the monument for administrative offices would be terminated.
- The residential structures, maintenance center, and temporary visitor/administrative facility would be abandoned for use and secured. All supplies and equipment will be transferred to other parks or surplus.
- All park operations would terminate and the various staff members would be transferred to other National Park Service areas.

The costs associated with the caretaker's alternative are as follows:

Annual wages or contract costs, including annual storage space fee for curatorial items would be \$15,000. Ninety-seven percent of that \$15,000 (or \$14,500) would be for wages and the remaining 3 percent (\$500) for general maintenance.

One-time shut down costs (draining lines, removing equipment, securing buildings, removing personal property and office machinery, initial storage of curatorial items, transfer of records, etc.) would be \$15,000. Properties would be protected by an alarm to a local law enforcement agency.

Total: \$30,000 initially and \$15,000 annually thereafter for implementation.

ALTERNATIVE D

General Management and Development Theme (No Action)

This alternative represents the no-action alternative. Under the no-action alternative existing facilities and management direction would remain unchanged and consistent with the direction outlined in current management documents.

Land Use and Management

Current land management zoning is described in the park's *Statement for Management*. Most of Timpanogos Cave National Monument is in a natural management zone. The cave itself is classified as an outstanding natural feature subzone. The natural zone consists of 235 acres. The remaining land is divided into a historic zone (4 acres) and a development zone (10 acres). The historic zone contains the Timpanogos Cave Historic District, which is on the National Register of Historic Places. The old cave trail, cave rest room, and several stone structures dating from the 1930s and 1940s are within the zone. The majority of the structures are along Highway 92 just inside the west boundary of the monument.

Land Protection/Adjacent Lands

Refer to same section under "Proposed Plan" above.

Cultural Resource Management

The 1991 draft resource management plan provides the framework for management of the cultural resources within the monument. Under this alternative, historic structure 2 would continue to be used for residential purposes.

resource management strategies proposed for the monument. A more detailed description of proposed management actions can be found in the RMP.

Visitor Use and Interpretation

Under this alternative, the temporary trailer unit installed to replace the visitor facilities destroyed by fire in 1991 would continue to be used as the primary visitor contact facility. Although efforts were made to make this temporary facility accessible, problems remain. These problems and recommendations are covered in the August 1991 report titled "Update Self-Evaluation of Accessibility for Disabled Persons," on file in the park.

The picnic area and associated parking lots, rest rooms, tables, and trails would continue to be maintained and available to visitors. This facility is also substandard relative to handicap accessibility, as described in the previously referenced August 1991 report. Such deficiencies would need to be resolved. The park would continue to address the accessibility needs for persons with disabilities in accordance with the direction spelled out in the accessibility plan for the monument.

The monument would continue to be managed as a day-use area. Under this alternative, interpretation would be conducted within the framework and direction identified in the *Interpretive Prospectus* presented as a part of the *1983 General Management Plan* and as outlined in the 1992 Annual Statement For Interpretation.

The primary objective of the interpretive program is to provide an opportunity for the visitors to gain an understanding of the significance of Timpanogos Cave. Through an understanding of the uniqueness and scientific value of the cave, the visitor's appreciation and enjoyment of such resources would be increased and their cooperation in protecting the resource could be gained.

Under this alternative, the interpretive themes and goals as outlined in the 1990 Annual Statement For Interpretation would remain the same. These themes and goals follow.

Themes

- **Geology:** Interpretation of the geological aspects of the uplifting of the Wasatch Mountain Range and cave formation within the mountain range.
- **Hydrology:** Interpretation of the hydrology of the cave system and the importance of water in maintaining cave formations.

- **Human History:** Interpretation of the human history of American Fork Canyon and the discovery of the caves.
- **Natural History:** Interpretation of the natural history of American Fork Canyon.
- **Information:** To provide the visitor with information on cave tour times, additional interpretive services, and attractions in the surrounding area.
- **Resource Management and Research:** Interpretation of current resource monitoring and research projects through active visitor participation.

Goals

- Promoting visitor understanding and appreciation of the park's cultural values and the natural forces that created the spectacular cave formations and associated ecological communities.
- Promoting visitor awareness of the natural environment through varied interpretive and educational programs that focus on natural processes and resources.

Concession Operation

The concession operation, which survived the 1991 fire, would continue to operate to serve visitors.

Park Operations

Under this alternative, the monument staff would make arrangements for continued use of the Utah Power and Light building for NPS administrative purposes. Such arrangements were made when the administrative facilities were also destroyed in the 1991 fire.

The three structures (2, 8, and 9) would continue to be used for residential purposes.

The existing maintenance facility would be retained in its current location.

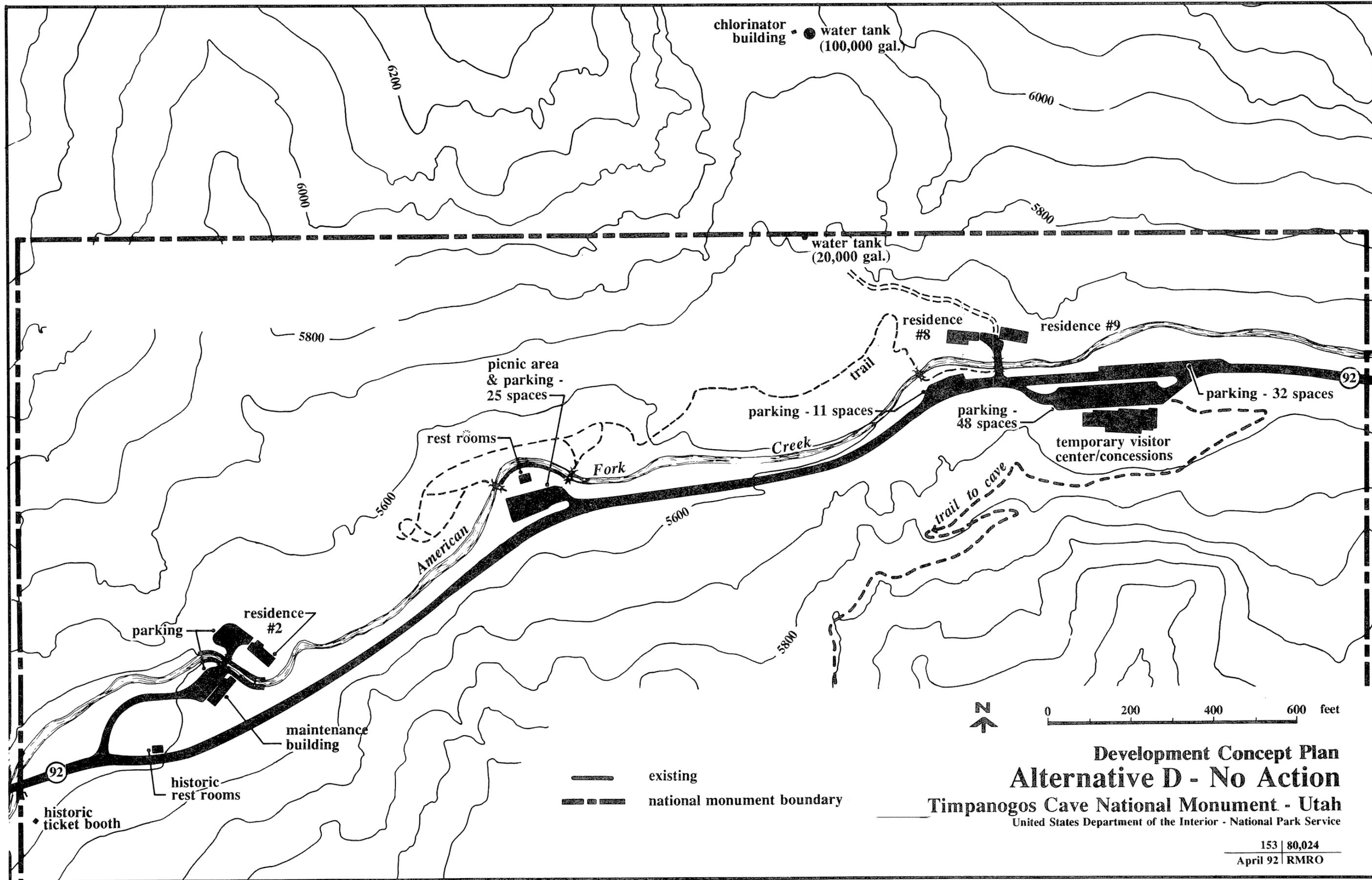
The historic bathhouse, and ticket booth would be retained and used for their value as storage facilities.

The monument normally has a staffing level of 14 full-time equivalents, as detailed in the "Affected Environment" section, "Management and Operations" subsection. Annual operating budget has averaged \$449,200.

Details of current park operations and current staffing are described in the "Affected Environment" chapter of this document.

Development Concept Plan/Cost

Following is a graphic entitled "Development Concept Plan - Alternative D - No Action" that reflects the location of existing developments as described above for this alternative. In concert with the "no action" concept, there are no new developments proposed under this alternative; therefore, the only costs associated with this alternative would involve the routine annual operation and maintenance.



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TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Land Use and Management	Natural zone of approx. 238 acres managed to conserve natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Two subzones - outstanding natural feature subzone (cave) and natural environment subzone. Historic zone of approx. 4 acres managed to preserve, protect, and interpret cultural resources. Development zone of approx. 7 acres would provide necessary space for visitor and management facilities. Special use zone of approx. 1 acre is those lands used for utility corridors.	Natural zone of approx. 242 acres managed to conserve natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Two subzones - outstanding natural feature subzone (cave) and natural environment subzone. Historic zone of approx. 4 acres managed to preserve, protect, and interpret cultural resources. Development zone of approx. 3 acres would provide necessary space for visitor and management facilities. Special use zone of approx. 1 acre is those lands used for utility corridors.	Natural zone of approx. 242 acres managed to conserve natural resources and processes of the monument while accommodating uses that do not adversely affect such values. Two subzones - outstanding natural feature subzone (cave) and natural environment subzone. Historic zone of approx. 4 acres managed to preserve, protect, and interpret cultural resources. Development zone of approx. 3 acres would provide necessary space for visitor and management facilities. Special use zone of approx. 1 acre is those lands used for utility corridors.	Same as under alternative D.	Management zoning will remain the same. The current zoning is as follows: Natural zone approx. 235 acres. The cave is classified as an outstanding natural feature subzone. The remaining land is divided into a historic zone (4 acres) and a development zone (11 acres).
Land Protection and Adjacent Lands	NPS would continue to coordinate with local land management agencies in developing and implementing land management plans.	Same as proposal.	Same as proposal.	Same as proposal.	Same as proposal.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Cultural Resource Management	All properties eligible for or listed on the National Register would be managed according to NPS-28, the National Historic Preservation Act, and the <u>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</u> . Where a historic property has a potential for being impacted by management decisions not discussed in this plan, NPS would consult with Utah SHPO and ACHP. Cultural resource management would emphasize maintenance, rehabilitation, and adaptive use of structures whenever practical.	Same as proposal.	Same as proposal.	Same as proposal except adaptive use of structures would not apply.	Same as proposal.
	Curatorial storage removed from floodplain and incorporated in the visitor/admin. facility outside monument.	Curatorial storage incorporated in new visitor/admin. facilities, designed for flood protection.	Alternatives for protecting curatorial resources in their current locations would be evaluated.	Curatorial items would be removed from monument and properly stored.	Curatorial storage would remain in the maintenance center.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Cultural Resource Management, Ctd.	Residence 2 retained for interpretive value and modified to provide rest rooms and to serve as a weather shelter. Stone Bridge maintained and used for pedestrian and vehicular access.	Residence 2 maintained and use as residence continued. Stone Bridge maintained and used for pedestrian and vehicular access.	Residence 2 converted to administrative use. Stone Bridge maintained and use as vehicular and pedestrian access continued.	All structures would be vacated and secured.	Residence 2 maintained and used as residence. Stone Bridge would be maintained.
	That part of the old historic cave trail currently used by visitors would be retained.	Same as proposal.	Same as proposal.	The entire cave trail would be secured and left to molder in place.	Same as proposal.
	Cave rest room maintained and use continued as a rest room. Stone rest room, stone building and two cold cellars removed and disturbed areas restored to natural condition.	Cave rest room would be maintained and use continued as a rest room. Stone rest room and stone building (ticket booth) maintained and use continued as maintenance storage. The two cold cellars would be removed and the sites restored.	Cave rest room maintained and use continued as rest room. Stone rest room and stone building (ticket booth) maintained and use as maintenance storage continued. The two cold cellars removed from monument and sites restored.	All structures would be vacated and secured.	Cave rest room maintained and use continued as a rest room. Stone rest room and stone building (ticket booth) maintained and used for maintenance storage. Two cold cellars would be retained.
	Prior to any action that would directly or indirectly impact the pictograph site, a determination of eligibility would be completed along with appropriate mitigation. Areas proposed for ground disturbance would be intensively inventoried.	Same as proposal.	Same as proposal.	Same as proposal, except no areas are proposed for disturbance.	Same as proposal.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Natural Resource Management	Complete cave hydrology study to establish hydrographs for entire cave system, to define the cave watershed, to determine chemical composition of water flowing through cave system, and develop a monitoring program for cave water quality and quantity. Add a pH meter, additional temperature and relative humidity sensors to monitoring system to have more complete, continuous record.	Same as proposal.	Same as proposal.	All studies, inventories, monitoring of resources by the NPS would be terminated. Natural resource management portion of resource management plan reevaluated and revised to support mothball/caretaker management of the cave. Secure all cave openings to eliminate unauthorized access. Only access for scientific purposes would be allowed. Through an MOA with another administrative entity, routine patrol and control of access to the cave would be arranged.	Same as proposal.
	A research program to determine how air pollution and acid precipitation affect park resources would be implemented.	Same as proposal.	Same as proposal.	Same as above.	Existing research efforts would continue.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
<p>Natural Resource Management, Ctd.</p>	<p>Complete sampling in American Fork River to identify aquatic ecosystems, riparian habitat, and endangered species. A water resource management plan for American Fork River and park would be completed.</p>	<p>Same as proposal.</p>	<p>Same as proposal.</p>	<p>Same as above.</p>	<p>Same as proposal.</p>
	<p>Research effects of water development and visitation on speleothems would be addressed.</p>	<p>Same as proposal.</p>	<p>Same as proposal.</p>	<p>Same as above.</p>	<p>Same as proposal.</p>
	<p>Fire management plan would be implemented.</p>	<p>Same as proposal.</p>	<p>Same as proposal.</p>	<p>Same as above.</p>	<p>Same as proposal.</p>
	<p>After completion of a threatened and endangered species survey, other important species in the monument would be identified and protected.</p>	<p>Same as proposal.</p>	<p>Same as proposal.</p>	<p>Same as above.</p>	<p>Same as proposal.</p>
	<p>Short cutting of the switchbacks on the cave trail, which causes loss of vegetation and soil erosion and increased rockfall danger would be prevented by planting trees and shrubs or by using fallen trees. Stone walls would also be built to eliminate off-trail travel.</p>	<p>Same as proposal.</p>	<p>Same as proposal.</p>	<p>All trails would be abandoned and left to molder. This would include the trail leading to and from the cave.</p>	<p>No change to existing conditions.</p>

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Natural Resource Management, Ctd.	Soil compaction, loss of ground cover vegetation, and erosion resolved by removal of existing visitor center parking areas and implementation of shuttle system. Impacted areas would be restored.	Soil compaction, loss of ground cover vegetation, and erosion resolved by removal of picnic area, and construction of pedestrian barriers. Impacted areas would be restored.	Same as alternative A.	Areas void of vegetation would be left to regenerate naturally.	No change to existing conditions.
Visitor Use and Interpretation	Continue to manage as a day-use area.	Same as proposal.	Same as proposal.	Close monument to all use except for qualified scientific purposes.	Same as proposal.
	Visitor center and parking relocated outside American Fork River canyon west of monument. Visitor center would include space for first-aid room, ticket sales, information, audiovisual room, museum, general lobby, rest rooms, an area to buy maps, brochures, and general info. on surrounding region. Options for a new joint visitor center facility with the USFS would be explored.	New visitor contact facility would be built in same general location as original, and designed with floodplain and geological hazards in mind. The facility would include space for first-aid room, ticket sales, information, audiovisual room, museum, general lobby, rest rooms, and an area to obtain maps, brochures, and general info. about the surrounding region.	Visitor contact facility providing limited services located outside monument and combined with visitor/administrative facility considered by the USFS. NPS portion to include ticket sales/info. and rest rooms.	All visitor facilities would be abandoned and secured (i.e., picnic area, trails, rest rooms, and parking). All trails would be abandoned and left to molder.	Temporary trailer would continue to be used as primary visitor contact facility.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Visitor Use and Interpretation, Ctd.	Mandatory transportation system implemented, including shuttle stop with shelter, rest rooms, water fountain, parking for three 40-passenger buses and a flood alarm system. At the new visitor center, parking space to accommodate 153 vehicles: 3 mass-transportation buses, 35 oversized vehicles, 103 standard vehicles for cave visitors and 12 non-cave-related vehicles.	Visitor access by personal vehicle. Parking north of the temporary visitor center expanded to accommodate an additional 35 vehicles.	Visitor access by personal vehicle. Forty parking spaces (20 standard, 6 oversized, 11 trailer storage, and 3 tour bus) to support new V.C. Retain 116 existing visitor parking spaces, and parking north of the temporary visitor center expanded for 20 more vehicles.	Same as above.	Visitor access by personal vehicle. Retain existing parking.
	Picnic area and amenities retained and new trail built between it and historic district. Ten walk-in picnic units added to historic district.	The picnic area facilities discontinued except for the parking, which would be retained for overflow. Trail built between the overflow parking and visitor/administrative center.	Same as alternative A.	Same as above.	Picnic area and associated parking lots, rest rooms and table, and trails would continue to be maintained and available to visitors.
	Canyon view trail to be abandoned.	Same as proposal.	Same as proposal.	Same as above.	Continue plans to abandon Canyon View Trail.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Visitor Use and Interpretation, Ctd.	Special interpretive techniques developed to provide a full understanding and appreciation for the resource for persons with disabilities. New facilities fully accessible.	Special interpretive techniques developed to provide a full understanding and appreciation for the resource for persons with disabilities. The visitor center and all related facilities fully accessible.	Persons with disabilities would receive interpretive brochures at visitor contact facility. Visitor contact building and other facilities fully accessible.	Monument closed to access by all visitors.	Monument would continue to address accessibility needs for persons with disabilities in accordance with their accessibility plan.
Concession Operation	Concession services discontinued.	Same as proposal.	Same as proposal.	Same as proposal.	Concession would continue to operate.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Park Operations	Construct administrative center and parking (16 NPS vehicles) outside American Fork River canyon west of monument on same site as visitor center. Admin. center include space for admin. and maintenance offices, library, interpretive, curatorial, and resource management work space, staff use rooms, storage, and Natural History Association Sales. Options for a new joint administrative facility with the USFS would be explored. At shuttle staging area in monument provide electronic gates, janitorial storage, and parking for 13 NPS vehicles.	Administrative structure built on same location as original and combined with visitor services. It would include space for administrative and rangers' offices, library and interpretive, resource management, and curatorial work space, staff use rooms, storage, and Natural History Association facilities. Construct 15-car employee parking on site where residences 8 and 9 were located.	Residence 2 retained and adaptively used for administrative and rangers' offices, staff use rooms, library, work areas, storage, and rest room. Residences 8 and 9 removed and parking for 8 NPS vehicles built. Parking area adjacent to residence 2 restriped for 5 vehicles and 7 spaces built. Ticket sales, reservations info./orientation and one office built in the joint NPS/USFS visitor contact facility. Within the monument, a collection kiosk and 8-car NPS parking. Natural History Association discontinued.	The current lease Utah Power and Light for use of a structure outside the monument for administrative offices terminated. Temporary visitor/administrative facility abandoned of use and secured.	Arrangements made for continued use of Utah Power and Light building for NPS administrative purposes.

TABLE 8 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES					
RESOURCE TOPIC	PROPOSED PLAN	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
Park Operations, Ctd.	Maintenance building with 10-vehicle parking outside monument. Existing maintenance building and roadway removed and sites restored.	Maintenance building used where and as it is, except that curatorial storage moved to new visitor facility, and the 120 SQ. FT. made available would be used for maintenance storage.	Maintenance building used in present location and fashion. It includes chief of maintenance office, curatorial storage, lunch/conference room, showers, maintenance storage/work areas. Historic stone bathhouse and ticket booth retained and used for maintenance storage.	Maintenance center abandoned of use and secured. All supplies and equipment transferred to other parks or surplus.	Maintenance facility retained in its current location. Bathhouse and ticket booth retained and used for maintenance storage.
	Residences 8 and 9 removed and sites restored and staff to seek own housing.	Residence 2 floodproofed and retained as housing. All other housing discontinued and staff to seek own housing.	Employee housing in monument discontinued and employees would have to seek their own housing.	All residences would be abandoned of use and secured. Park operations would terminate and staff transferred to other NPS areas.	Residences 2, 3, and 9 would continue to be used as residences.
	Staffing to implement this proposal would increase by 7.2 FTEs (to 21.2) to support transportation system, and annual operations and maintenance costs would be \$699,000.	Staffing to implement this alternative would increase by 5 FTEs (to 19) and annual operations and maintenance costs would be \$674,982.	Same as alternative A.	An MOA would be established with another local federal or state agency to issue cave access for qualified research and to routinely patrol and inspect properties. Annual operation and maintenance costs would be \$15,000.	Staffing would remain at 14 FTEs and the annual operating budget would remain around \$449,200.
Development Cost	\$7,054,000	\$5,290,000	\$1,057,000	\$15,000	\$0

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Water Resources/ Floodplains/ Wetlands	No measurable increase in stream turbidity. Potential runoff from parking lots containing petroleum and other auto waste products that could result in minor surface water contamination would be reduced. No groundwater impairment is anticipated. There is a possibility for natural flash flooding as well as flash flooding associated with dam failures and resulting probable maximum flooding conditions.	No measurable increase in stream turbidity. Runoff from parking lots could contain petroleum and other auto waste products that could result in minor surface water contamination. No groundwater impairment is anticipated. There is a possibility for natural flash flooding as well as flash flooding associated with dam failures and resulting probable maximum flooding conditions.	Same as alternative A.	No measurable decrease in stream turbidity and runoff from parking lots. No groundwater impairment is anticipated. No impacts on floodplain.	No effect on floodplain, wetlands or water resources.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Water Resources/ Floodplains/ Wetlands, Ctd.	<p>New construction proposed within the 100- and 500-year floodplain would include the realignment of Utah Highway 92, shuttle bus parking, pedestrian shelters, ticket kiosk, rest rooms, NPS parking, and pedestrian trails with traffic barrier.</p> <p>Residences 8 and 9 would be removed from the 100- and 500-year floodplain.</p> <p>Residence 2 would be retained in the 100-year floodplain and used for interpretation. No wetlands or navigable waters would be affected. The existing visitor center parking areas would be removed from the 100- and 500-year floodplain. Eighty-five to 90 people at one time would remain involved in day-use activities within the 100- and 500-year floodplain.</p>	<p>New construction within the 100- and 500-year floodplain would include the visitor/ administrative center, 36 new parking spaces, a pedestrian barrier and 1,200 feet of pedestrian trail with traffic barriers.</p> <p>Structures retained within the 100-year floodplain would include residence 2, maintenance center with roadway and parking, historic rest room, and existing parking at visitor center.</p> <p>The picnic area and residences 8 and 9 would be removed from the 100- and 500-year floodplain. One hundred forty-five to 150 people at one time would remain involved in day-use activities within the 100- and 500-year floodplain. One overnight occupancy would also remain within the 100-year floodplain.</p>	<p>New construction within the 100- and 500-year floodplain would include ticket collection kiosk, rest rooms, and parking for 35 vehicles, pedestrian barrier and 1,200 feet of trail. Structures to be retained within the 100- and 500-year floodplain would include the maintenance building, roadways and parking, and all associated historic structures.</p> <p>The picnic area and residences 8 and 9 would be removed from the 100- and 500-year floodplain. One hundred ten to 115 people at one time would remain involved in day-use activities within the 100- and 500-year floodplain.</p>	<p>Existing structures within the 100- and 500-year floodplain would continue to be subject to damage. On a very limited basis no more than 5 to 10 people at one time would remain in the 100- and 500-year floodplain.</p>	<p>Existing structures within the 100- and 500-year floodplain would continue to be subject to damage. Two hundred to 210 people at one time would remain in the 100- and 500-year floodplain, and overnight residences would also be retained.</p>

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Water Resources/ Floodplains/ Wetlands, Ctd.	There would be a significant reduction on water resource demands in the monument and an increase outside the monument.	There would be a slight reduction on water resource demands in the monument.	The demand on water resources within the monument would be slightly reduced and a slight increase would occur outside the monument	The demand on water resources in the monument would be significantly reduced.	There would be no change in demands on water resources.
Geology/Soils/ Vegetation	About 1.6 acres of soil and less than .1-acre of vegetation would be disturbed. Topsoil would be removed and stored for rehabilitation of vegetation. Accelerated erosion for approximately one growing season on disturbed sites. Soil next to trails and roadways could be compacted and vegetation trampled, but traffic in non-designated areas would be reduced.	About 1.3 acres of soil and less than .1-acre of vegetation would be disturbed. The comment pertaining to topsoil storage, accelerated erosion, and soils and vegetation next to trails and roadways for the proposal is the same for this alternative.	About 1.4 acres of soil and less than .1-acre of vegetation would be displaced. The comment pertaining to topsoil storage, accelerated erosion, and soils and vegetation next to trails and roadways for the proposal is the same for this alternative.	Closure of the facilities would practically eliminate continued human impacts on soils and vegetation. The impacted area between the visitor center and river would continue to erode until the area regenerated naturally.	Impacts on soils and vegetation would continue.
	About 1 acre of land would be returned to natural vegetation.	About .75-acre of the total 1.3 would be restored to native vegetation.	About .8-acre of the total 1.4 would be restored to native vegetation.	No change in existing conditions.	No change in existing conditions.
	Would remove primary visitor/administrative facilities outside geologic hazard area and significantly reduce the life, health, and safety issues.	Potential impacts on life, health, and safety related to geologic hazards would continue.	This alternative offers some minor solutions to reducing the life, health, and safety issues related to geologic hazards.	This alternative would eliminate all long-term occupation of the geologic hazard area by visitors and employees other than those interested in scientific research.	The serious threats to human life, health, and safety would continue.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Wildlife	Construction would alter vegetation, which would result in the displacement and loss of some rodents and insects. About .1-acre of habitat would be lost, however, 1.2 acres would be returned to natural conditions, resulting in a net gain of 1.1 acres of habitat. No impacts are anticipated on birds, wildlife, or fish.	Construction would alter vegetation, which would result in the displacement and loss of some rodents and insects. About .1-acre of habitat would be lost, however, .7-acre would be returned to natural conditions, resulting in a net gain of .6-acre of habitat. No impacts are anticipated on birds, wildlife, or fish.	Construction would alter vegetation, which would result in the displacement and loss of some rodents and insects. About .1-acre of habitat would be lost, however, .8-acre would be returned to natural condition, resulting in a net gain of .7-acre of habitat. No impacts are anticipated on birds, wildlife, or fish.	No additional wildlife habitat would be lost. No effect on birds, wildlife, or fish.	Same as alternative C.
Threatened and Endangered Species	No effect on listed, proposed, or candidate threatened or endangered species is anticipated. A T&E species survey would be conducted prior to any construction.	Same as proposal.	Same as proposal.	Same as proposal, except that a T&E species survey would not be conducted.	No effect on listed, proposed, or candidate threatened or endangered species is anticipated.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Air Quality	Over the long term, increased traffic along the highway would result in increased auto emissions. Mandatory transportation system would result in short-term decreases in auto emissions. Temporary increases in dust and noise during construction. Class II airshed standards not violated by visitor use or construction.	Same as proposal, except that there would be no short-term decreases since a transportation system would not be involved.	Same as alternative A.	Closure of monument to general public would result in a substantial decrease in auto emissions within the monument. No measurable impacts associated with vehicle access to the area for cave research and routine patrol of government properties.	No additional impacts on air quality.
Archeological/ Historical/ Ethnographic Resources	Impacts to the known archeological site are unknown since the pictograph has not been evaluated for possible listing on the National Register of Historic Places. All ground-disturbing activity would be monitored to mitigate impacts that could occur should an archeo. site be encountered. Such activities would be coordinated with the SHPO and ACHP.	Same as proposal.	Same as proposal.	Same as proposal.	Same as proposal.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Archeological/ Historical/ Ethnographic Resources, Ctd.	Use of residence 2 for interpretation and visitor use would help its long-term preservation. Removal of historic rest room, stone ticket booth, and two cold cellars would adversely affect them. Curatorial storage moved from floodplain. Removal of maintenance facilities and restoration of area would restore part of historic district setting.	No known adverse impacts to historic resources anticipated. All structures would continue to be adaptively used. Curatorial storage would be moved to the new flood-proof visitor center.	Same as alternative A.	Impacts would be limited to potential vandalism and deterioration if cultural resources are not maintained on a regular basis. All curatorial items would be stored in a facility outside the 100- and 500-year floodplain. This alternative would most likely result in no adverse effect to all historic properties.	No additional effects on historic or cultural resources are anticipated. This alternative would most likely result in no effect on cultural resources.
	Impacts to ethnographic resources are unknown since an ethnographic review and assessment have not been completed.	Same as proposal.	Same as proposal.	Same as proposal.	Same as proposal.
Visitor Use	Transportation system should improve visitor access, convenience, and experience.	Inadequate parking situation for visitors and employees would continue, along with the circulation, congestion, and safety problems	Inadequate parking would continue, along with the circulation, congestion, and safety problems.	Access and use by the general public would be discontinued.	Conflicts involving visitor use would continue to be unresolved.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Visitor Use, Ctd.	Congestion and conflicts between pedestrians and vehicles significantly reduced. Visitors' length-of-stay in geologic hazard areas, floodplain, wetlands, and areas subject to probable maximum flooding significantly reduced. Would significantly reduce safety, health, and well-being problems.	Minimal reduction in length-of-stay in geologic hazard areas. Threat to visitor safety would continue.	Visitor length-of-stay in geologic hazard areas, floodplain, wetlands, and areas subject to probable maximum flooding somewhat reduced, thereby reducing related safety issues.	Elimination of access and use by general public would eliminate occupation and associated impacts of geologic hazard areas, floodplain, wetlands, and probable maximum floods.	Conflicts involving visitor use would continue to be unresolved.
	Picnic area walk-in sites would be expanded into historic district.	Visitors would not enjoy benefit of the picnic area.	Same as alternative A.	Visitor enjoyment of the area would cease.	No change to existing conditions.
	Access and use of facilities and services by persons with disabilities would be improved.	Same as proposal.	Same as proposal.	Access to and use of facilities and services by all persons would be discontinued.	No change to existing conditions.
Socioeconomic Resources	Sales revenue from park tourism could result in more than \$0.7 million annually to local economy.	Same as proposal.	Same as proposal.	There would be an annual \$0.7 million loss in sales benefits from park tourism to local economy.	Sales revenue from park tourism is about \$0.7 million annually.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Socioeconomic Resources, Ctd.	One-time expenditure of about \$7.3 million from construction activities. Total combined sales from one-time expenditure could exceed \$8.8 million, netting \$185,000 in increased tax revenue. Annual park operations and tourism benefits would result in approximately 76 jobs. Construction would cause temporary gain of 415 jobs.	One-time expenditure of about \$5.3 million from construction activities. Total combined sales in area from one-time expenditure could exceed \$6.3 million, netting \$133,000 in increased tax revenue. Annual park operations and tourism benefits would result in approximately 72 jobs in the local economy. Construction would result in temporary gain of 370 jobs.	One-time expenditure of \$1.3 million from construction activities. Total combined sales from one-time expenditure could exceed \$1.5 million, netting \$32,000 more in tax revenue. Annual park operations and tourism benefits would result in about 72 jobs. Construction would cause temporary gain of 143 jobs.	Would result in a loss of about \$77,000 in tax revenue per year, \$1.6 million in sales to local businesses from tourism, and about 75 jobs.	No change in current socioeconomic status. Total sales from park operating expenditures is about \$0.6 million annually. Total tax revenue gains is about \$77,000 annually and operation and use of the park result in about 76 jobs.
Concession Operation	Concession closing could force operators to seek new income sources, and eliminate long-term financial security. Represents an annual \$53,000 reduction in sales, a loss of about \$1,000 in tax, and a loss of about 2.5 jobs.	Same as proposal.	Same impacts as proposal, plus elimination of concession and NHA would represent a total reduction of \$84,000 in annual sales, about \$1,701 in tax benefits, and a total of about 3.9 jobs.	The impacts associated with alternative B relative to concession operation and NHA sales would apply here.	No anticipated impacts on the concession operation or the NHA sales operation.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Other Agencies	No impacts on other federal, state, or local agencies.	Same as proposal.	Same as proposal.	Establish MOA with other federal or state entity for maintenance and protection of existing monument facilities and resources. To mitigate impact on the agency managing the unit, about \$15,000 annually would be provided for overseeing resources.	Same as proposal.
	Continue to work with local entities in developing land management plans.	Same as proposal.	Same as proposal.	Same as proposal.	Same as proposal.
Management and Operations	Employees' length-of-stay in geologic hazard areas, floodplain, wetlands, and areas subject to probable maximum flooding significantly reduced. Would significantly reduce potential for injury or death.	Employees would occupy areas identified as geologic hazards, 100-year floodplain, and probable maximum flood zones. Short-term solution to vehicular/pedestrian congestion. Potential for loss of property and injury or death. Residence 2, in the 100-year floodplain used for housing, further jeopardizing life, health, safety. Flood warning systems installed to minimize potential impacts.	Would only slightly reduce the life, health, safety risk associated with geologic hazard for very limited number of employees. Residence 2 to be adaptively used for an administrative center, and the new ticket collection kiosk would place employees in geologic hazard, floodplain, and probable maximum flood areas. Represents a minor short-term solution to vehicular and pedestrian congestion.	Life, health, safety risks associated with geologic hazards, floodplain, and probable maximum flood areas would be all but eliminated because of closure of facilities.	No change in life, health, safety risks associated with geologic hazards, floodplain, and probable maximum flood areas.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Management and Operations, Ctd.	Would require staff to travel 3 miles more to maintain facilities and manage resources.	All staff would be located within the immediate vicinity of the primary resource. This would minimize traveling of employees.	Ninety-eight percent of the staff would be located within the immediate vicinity of the primary resource. The remaining 2% of the staff would be located outside the monument and would only have to travel to the monument on an occasional basis.	Closure of the monument would eliminate need for all existing staff.	No change in current management and operations of the monument.
	Removal of structures should have a minor reduction on the maintenance staff workload. New facilities would enable park to consolidate maintenance supplies, saving time and improving efficiency. Curatorial space incorporated into new visitor center, making it more secure and readily available to staff and visitors doing research.	Removal of picnic area and residences 8 and 9 would only have a minimal effect on maintenance workload. This should slightly reduce utility use. Removal of curatorial storage would free up space enabling staff to consolidate materials. Historic rest room and ticket booth used for maintenance storage. Curatorial space incorporated into new visitor center, making it more secure and available to those doing research.	Removal of the picnic area and residences 8 and 9 would only have a minimal effect on reducing maintenance workload. This would slightly decrease impacts on monument utility systems.	All facilities would be closed to public, vacated, and secured. Memorandum of agreement would be negotiated with other agency for management and operation of monument.	No change.

TABLE 9 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES					
IMPACT TOPIC	IMPACTS OF PROPOSED PLAN	IMPACTS OF ALTERNATIVE A	IMPACTS OF ALTERNATIVE B	IMPACTS OF ALTERNATIVE C	IMPACTS OF ALTERNATIVE D
Management and Operations, Ctd.	Would require about \$699,000 annually for operations and maintenance and about 21.2 FTEs.	Would require about \$674,982 annually for operations and maintenance and about 19 FTEs.	Would require about \$674,982 annually for operational and maintenance costs and about 19 FTEs.	Would require about \$15,000 annually for operational and maintenance costs and would eliminate existing 14 FTEs.	Would continue to require approximately \$449,000 annually for operational and maintenance costs and 14 FTEs.

AFFECTED ENVIRONMENT

WATER RESOURCES/FLOODPLAIN/WETLANDS

Timpanogos Cave National Monument, consisting of 250 acres within the Wasatch Mountains, is situated in the very narrow and extremely rugged American Fork Canyon. The American Fork River, which flows through the monument from east to west, varies from a small brook during the winter months to an extremely swift and dangerous river caused by the deep melting snow during the early summer. The drainage area above Timpanogos Cave consist of approximately 34,500 acres, containing three large bodies of water contained by earthen dams. These bodies of water are Tibble Fork, Silver Lake Flat, and Silver Lake. These dams are primary used for irrigation and recreation.

The entire water system in the canyon floor is gravity operated. The water source is two box springs, located on U.S. Forest Service land in Swinging Bridge Canyon. This system is in fair condition. The water source for the drinking fountain at the cave comes from a natural pool approximately 300 feet inside Hansen Cave. This area is closed to public access and the water is ultimately stored in a steel tank where it is batch chlorinated. From the tank, the water is gravity flow to the public water fountain. Although this system requires a substantial amount of manual operation and generates some resource concerns, it works well. A water pump is also located in Middle Cave Lake. When the lake level rises to the point where it begins to cover the cave walkways and threaten electrical systems, water is pumped to a safe level to reduce potential problems.

As indicated in the Cave Management Plan a hydrology study was initiated in 1989 in an effort to determine the effects of pumping from cave lakes. This study will monitor the hydrologic, temperature, and relative humidity characteristics of the cave.

A 100- and 500-year floodplain map of the American Fork River through the park was produced by the Corps of Engineers (COE) (see enclosed map titled "Floodplains"). According to the map and report, all buildings are in the floodplain except residence 8. Because of the supporting documentation in the COE letter dated June 2, 1992, and the associated floodplain maps that show floodplain only a few feet away from all of the residences, it is assumed for planning purposes and safety reasons that residence 8 is also within the 100-and 500-year floodplain.

In a report published in January 1992, the Soil Conservation Service (SCS) indicated the probable maximum flood in the canyon would produce water surfaces varying between 6½ to 18½ feet higher than the road grade in front of the existing visitor center and residences 8 and 9. This is based on respective stream flows of 10,000 and 35,000 cfs (results of

probable maximum precipitation) coupled with dam failures on Tibble Fork and Silver Lake Flat reservoirs when they are at maximum capacity. These two dams are approximately 5 and 7½ miles upstream from the east boundary of the monument, respectively. The latter stream flow would also cause water approximately 11 feet deep in the maintenance area and residence 2.

The SCS report recommended, that in regard to the safety of visitors in the canyon, an appropriate flood warning system could be installed at each dam. The SCS further recommended that "yearly visual inspection of both dams through the Operation and Maintenance program and the performance of identified maintenance items will help to insure that these structures remain sound and functional."

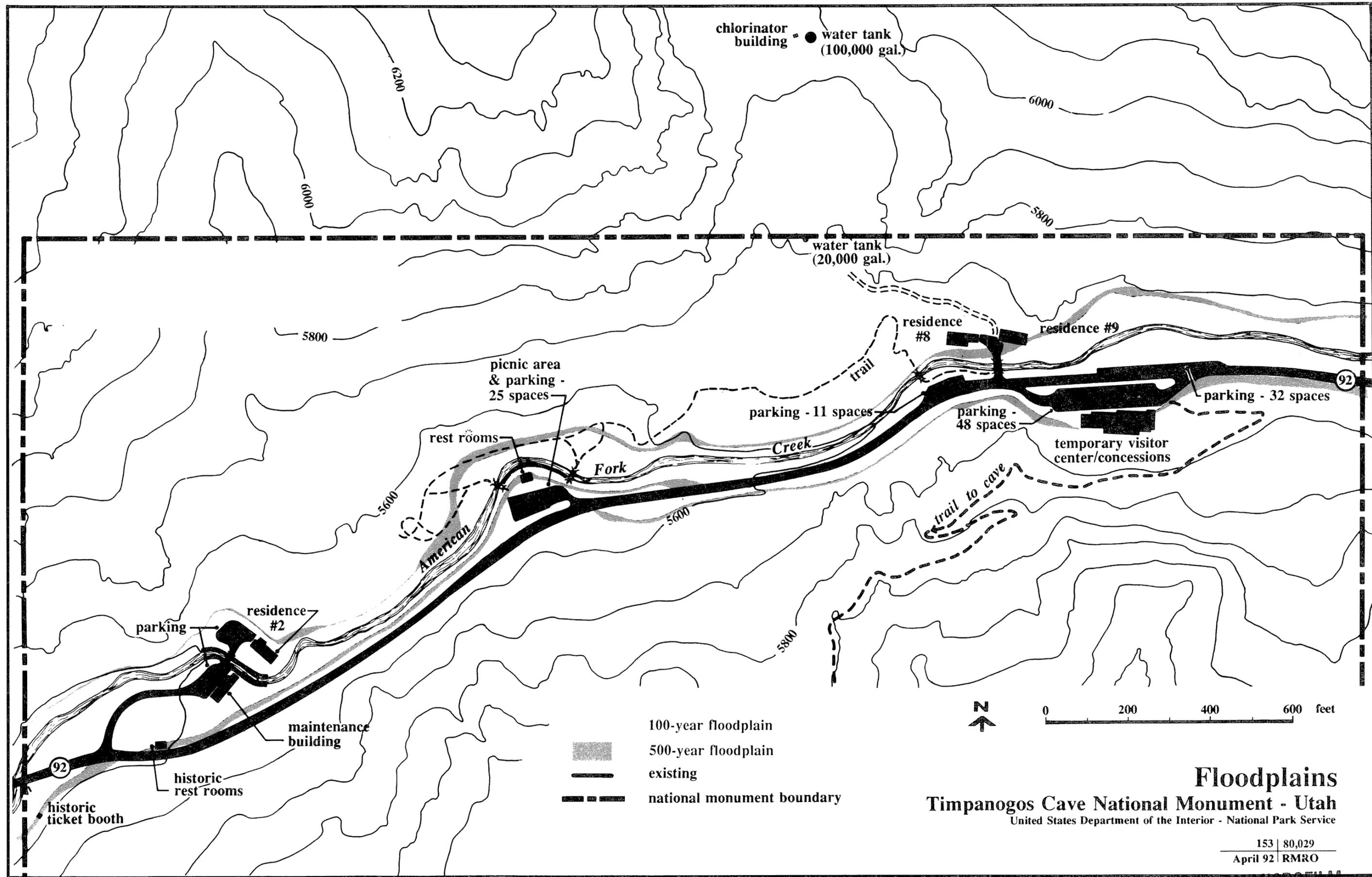
A wetlands survey was conducted in the summer of 1991. The survey indicated that the only wetlands associated with the monument were adjacent to the American Fork River. The survey identified the wetlands as being ". . . a narrow strip several feet wide on both sides of the aquatic environment (stream channel)." The survey also state that ". . . this coincides approximately with the ordinary high-water line."

GEOLOGY AND SOILS

The elevation of the monument ranges from 5,485 feet along the American Fork River to 8,035 feet near the southeast corner of the monument, a difference of 2,550 feet. The erosive action of the American Fork River has exposed a wide variety of geologic formations along the canyon walls. Due to the extremely steep and rugged nature of the canyon, the side slopes are primarily solid rock formations with large colluvial deposits randomly located along the canyon walls especially near the toe of the slopes. Those soils within the canyon bottom are alluvial in nature and relatively shallow due to the scouring force of the river and visitor impact.

VEGETATION

Because of the changes in elevation and exposure, a wide variety of plants are found in the monument. These plants may be grouped by location into three categories. South- and west-facing slopes, which are a warm and relatively dry environment, are dominated by gambel oak, but also include Rocky Mountain juniper, hackberry, narrow and broad leaf mountain mahogany, squaw bush, big sage, and cliff rose. The canyon floor provides a moist environment suitable for such large trees as cottonwood, box elder, and white fir, as well as chokecherry, Utah juniper, Oregon grape, and red osier dogwood. The cool, moist, shaded environment of the north-facing slopes supports white fir, Douglas fir, red osier dogwood,



- 100-year floodplain
- 500-year floodplain
- existing
- national monument boundary

Floodplains
Timpanogos Cave National Monument - Utah
 United States Department of the Interior - National Park Service

mountain maple, elderberry, jamesia, dwarf juniper, and a variety of other plants.

WILDLIFE

Despite the monument's small size, a variety of animals are found within it. Common animals include mule deer, skunks, raccoons, chipmunks, mice, and several species of ground squirrels. A few bats may be found in the caves but are not common. Cougars live in the area but are seldom seen.

Avian life abounds in the monument. The most common types are wrens, thrashers, thrushes, kinglets, waxwings, vireos, and wood warblers.

Several types of snakes, including the Great Basin rattlesnake, are found in the park, and lizards are common on the rocky slopes.

THREATENED AND ENDANGERED SPECIES

In a memorandum dated August 1, 1991, the Fish and Wildlife Service indicated that it appeared as though the threatened species, Ute Lady's-tresses orchid (*Spiranthes diluvialis*) ". . . may occur in the area of influence." They also identified two other species; Bonneville Cutthroat trout (*Oncorhynchus [Salmo] clarki utah*) and Wasatch pika (*Ochotona princeps wasatchensis*), ". . . which are candidates for official listing as threatened or endangered," and also ". . . may occur in the area." At this time there are no known endangered plants or animals in the monument; however, a threatened and endangered (T&E) species survey has not been undertaken. The park is in the process of arranging to have a T&E species survey conducted. If such information is not obtained prior to publication of the final EIS, separate Section 7 consultation will need to be conducted.

ARCHEOLOGICAL/HISTORIC/ETHNOGRAPHIC RESOURCES

In 1887, Martin Hansen "discovered" the main entrance to the cave system. In subsequent years further exploration revealed three limestone caves: Hansen, Middle, and Timpanogos. Concern over protecting this resource lead the U.S. Forest Service to recommend national monument status. President Harding issued the necessary executive order on October 14, 1922. The monument was added to the National Park System as part of a general transfer of sites in 1934.

A List of Classified Structures inventory was carried out in November 1975. A National Register nomination was submitted in February 1982 for the Timpanogos Cave Historical District. On October 13, 1982, the district was placed on the National Register. The contributing structures of the Historic District are: Building Number 2, Residence; Bridge; Building number 126, Rest Room; Building Number 127, Rest Room; Storage Building; Two Cold Cellars; and Old Cave Trail (see enclosed map titled "Historic District"). Table 10 illustrates historic structures and buildings and their conditions. The condition rating assessment is as follows:

Excellent (E) Like new
 Good (G) Intact, needs no repair
 Fair (F) Signs of wear

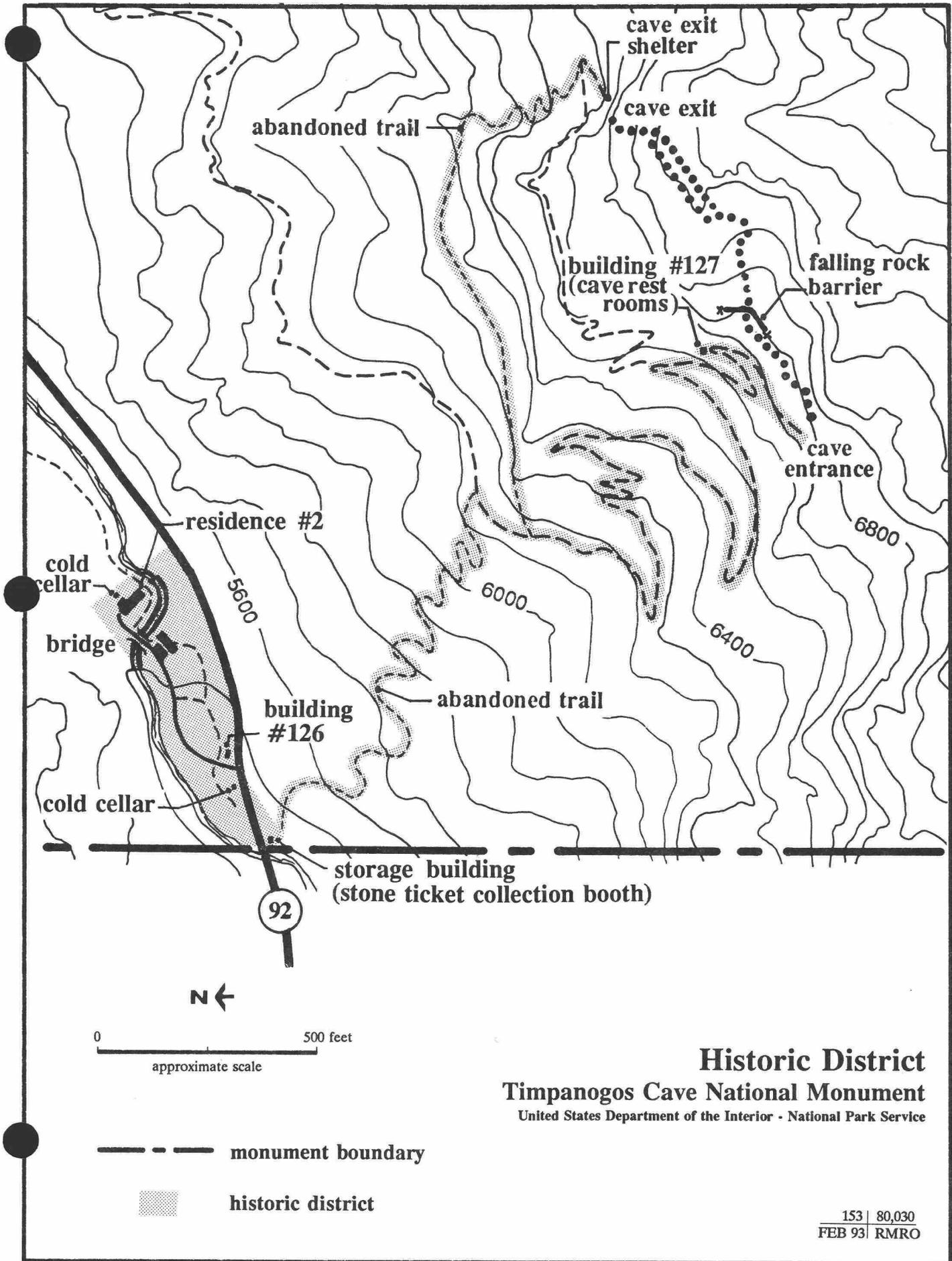
Poor (P) Failure of systems/materials
 Obsolete (O) Beyond Rehabilitation

Table 10 HISTORIC STRUCTURES/BUILDINGS AND THEIR CONDITIONS

Historic Structure/ Building Number/Condition	Materials	Builders	Dates	Current Use
1. Residence (HS-2) F	Rubble stone	Park Service	1941	Residence
2. Bridge F	Rubble stone	Park Service	1935 (circa)	Vehicle/Pedestrian Access
3. Cave Rest Room (HS-127) F	Rubble stone	Park Service	1939	Rest Room
4. Rest Room (HS-126) P	Rubble stone	Forest Service	1928	Storage
5. Storage Building (Ticket Booth) O	Rubble stone	Forest Service	1922 (circa)	Storage
6. Two Cold Cellars P	Rubble stone	Forest Service	1930	Vacant
7. Old Cave Trail	Rubble stone	Forest Service	1920s	None

The park collection emphasizes natural history specimens. There are a number of pioneer farm implements and other monument history items in the collection. None of these objects qualifies for listing on the National Register of Historic Places.

The environmental setting of Timpanogos Cave National Monument, with its sheer cliffs, frequent landslides/snowslides, and floodplain canyon bottom makes the potential for existence of archeological sites with integrity very low. The 1975 survey, which focused on the few areas that were both accessible and undisturbed in the recent past, as well as those areas of obvious disturbance that could possibly still contain archeological remains, located only one archeological site. All areas of ongoing visitor and employee impact were inventoried. The one side appears to have had its integrity compromised during previous construction activities when the surrounding area was leveled to create employee housing. It is also within the 500-year floodplain.



Historic District
Timpanogos Cave National Monument
 United States Department of the Interior - National Park Service

--- monument boundary
 [shaded box] historic district

For these reasons, additional archeological inventory in the monument has not been considered a high priority and dollars have not been spent on additional survey or on developing a park archeological overview and assessment to address its one known site of dubious significance.

However, prehistoric use of the American Fork canyon is documented by the one archeological site (24UT417) known to exist within the monument, which is a red anthropomorph dating to approximately AD 1000 to 1200. This rock art site is protected under the National Historic Preservation Act, as amended, until a formal determination of eligibility or non-eligibility is made. This would direct its future preservation needs as an archeological site. In addition, the significance of rock art often goes beyond the concerns of standard cultural resource management; pictographs and other forms of native American rock art are more than aesthetic presentations of American Indian culture. These images are potentially important ethnographic resources since contemporary Indian cultural knowledge concerning these images often applies to on-going elements of tribal religious beliefs or practices or may feature importantly in the transmission of tribal culture from one generation to the next. An assessment of the monument's resources to determine the presence of ethnographic resources has never been conducted, therefore, the need for an ethnographic overview and assessment is identified in the "Future Plans and Studies" subsection of this document.

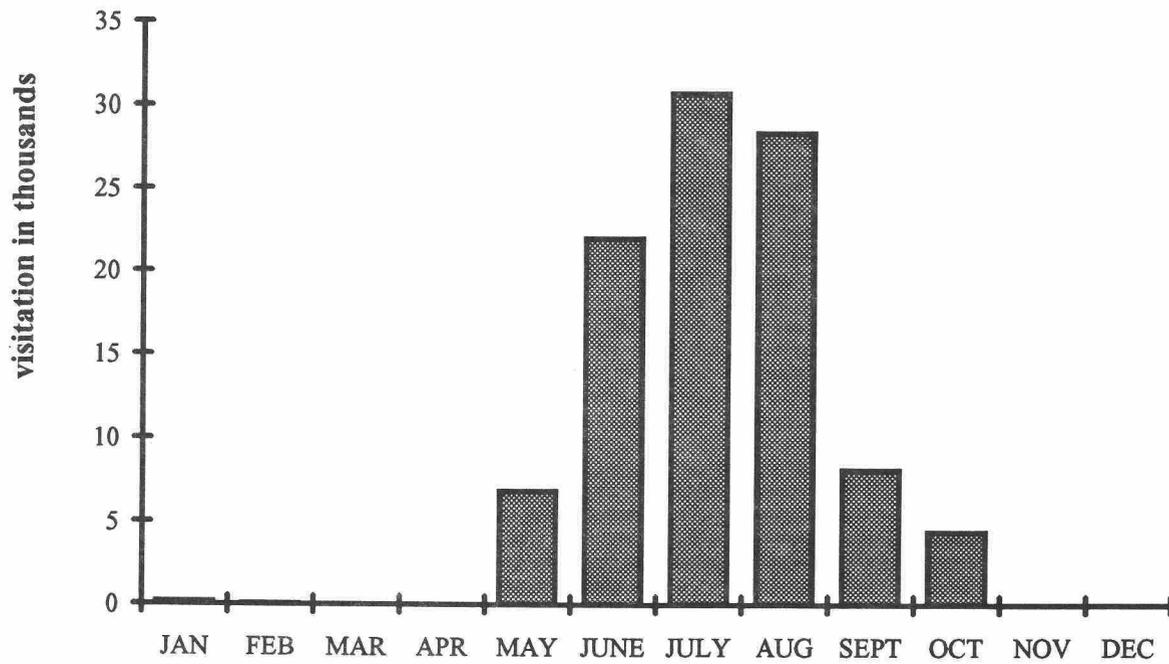
An assessment of the monument resources to determine the presence of cultural landscapes has never been conducted. The need for such a survey is identified in the "Proposed Action and Alternatives" section under the "Proposed Action" and "Future Plans and Studies" subsections.

AIR QUALITY

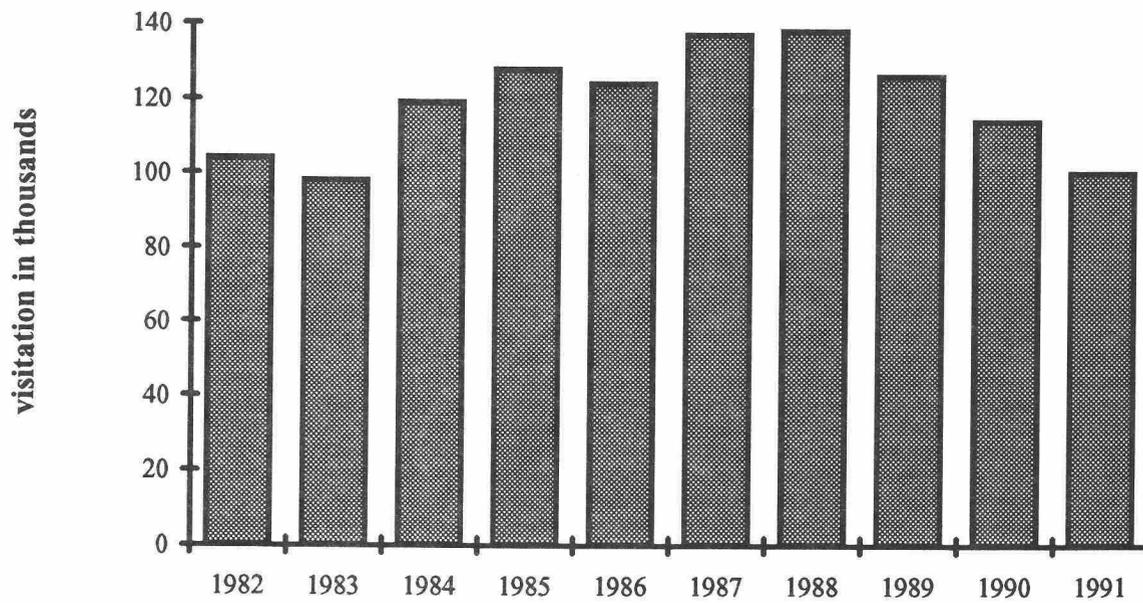
The monument is in a class II air quality area situated next to a nonattainment area with higher levels of air pollutants. As future development occurs in the Salt Lake Valley, only 2½ miles from the monument, the potential for air pollution will increase. This is particularly true in situations when prevailing winds from the southwest and inversions combine to intensify air pollution conditions.

VISITOR USE

For the five years preceding the visitor center fire in 1991, yearly visitation to the cave averaged 82,514. Total visitation within the monument, however, has averaged approximately 122,000 per year over the last 10 years. The visitor-use season extends from



1991 Monthly Visitation



Annual Visitation

Timpanogos Cave National Monument

May to October, with an average of 77 percent of the visitation occurring in June, July, and August.

A random visitor-use survey conducted ten days per month between May and September of 1991 revealed that 75 percent of the visitors to the monument arrived in the park from the west along Utah Highway 92. Approximately 84 percent of those visitors surveyed also indicated that Timpanogos Cave was their primary destination. The survey also revealed that the average length-of-stay was 3 hours and 40 minutes. Approximately 60 percent of those surveyed were from Utah, 12 percent from California, 3 percent from Arizona, and 2 percent from Colorado. Collectively these four states represent 77 percent of the 864 survey forms distributed. Approximately 93 percent of the visitors entering the monument arrived by car or truck and 2 percent arrived by self-contained recreation vehicle such as a motor home.

During the last year (1990) before the visitor center fire, the park recorded 4,132 cave tours given for 72,463 visitors. An additional 6,048 visitors were turned away because tours were sold out during the time they visited.

From mid-June until schools open in late August, visitation is consistently heavy. On a weekday, the wait to begin a cave tour will often be one hour, by mid-afternoon, because visitors are arriving faster than the tours can be given. All tours for the day are usually filled by early afternoon and may frequently fill as early as 11 a.m. Each tour can accommodate 20 people. Tours are generally run 10 minutes apart, which accommodates 120 visitors per hour. On particularly busy days (holidays, weekends) tours may be as close as 7 minutes apart. Sellouts occur 95 percent of the days the cave is open. Refer to illustrations titled "1991 Monthly Visitation" and "Annual Visitation."

CONCESSION OPERATION

The concession facility (food/souvenirs/and dining terrace), which survived the fire, was retained as a concession operation. This concession facility is operated by a local small business enterprise. The concession operation has been providing limited food and beverage service and gift and souvenir sales to the visiting public at the monument since 1967. It is a partnership with the state of Utah, with each owning 50 percent interest. The concession facility includes a snack bar, grill service (hamburgers, hot dogs and sandwiches), and food preparation area, a sales area, employee rest room and service closet.

LANDOWNERSHIP

Timpanogos Cave National Monument is in Utah County, Utah, which is in the Third Congressional District. The 250-acre monument is in rugged, scenic American Fork Canyon. Access to the monument is via Utah Highway 92, the Alpine Scenic Loop. Timpanogos Cave is surrounded by the Uinta National Forest. Over 30,000 acres of National Forest lands bordering the monument on the north is part of the Lone Peak Wilderness Area. The south boundary for the monument is bordered by the Pleasant Grove District of the Uinta National Forest. This area, which includes Provo and American Fork canyons, is heavily used by local residents for various types of recreation such as sightseeing, camping, picnicking, hunting, fishing and winter sports.

Since there are no other federal, state, county, or private inholdings within the monument, it was determined that the park would not need a land protection plan at this time.

SOCIOECONOMIC RESOURCES

Utah County, Utah, in which Timpanogos Cave National Monument is located, has grown to a population of 260,000, with Provo, Utah, being the county seat and situated 19 miles from the monument. Recreation opportunities within the county are excellent, considering the attraction of the Wasatch Mountains and developments associated with many of the larger surrounding communities. Many ski areas, resorts, campgrounds, state parks, lakes, and rivers are conveniently located in the county. For those who enjoy organized and team sports, Utah County offers eight 18-hole golf courses, 35 public tennis courts, and more than 800 city league teams of softball, basketball and soccer.

Utah County represents an area with room to grow. More than 3,000 acres of industrial property were identified as available for purchase in the fall of 1991. Nine industrial parks offer a variety of settings from light to heavy industry. An ever-expanding industrial base in proximity to an international airport are additional conveniences. Within a 20-mile radius of the monument, there are seven communities that represent a significant network of services and facilities. These communities include: Provo (population 82,000), Orem (population 65,000), American Fork (population 15,300), Pleasant Grove (population 13,000), Lehi (population 8,500), Highland (population 2,435), and Alpine (population 3,200).

With regard to the alternatives that recommend discontinuing housing in the monument as well as relocating visitor and administrative facilities outside the monument, the following socioeconomic factors are presented to give credence to the feasibility of such actions. According to the fall 1991 investigation, there are adequate single-family and multiple-family

dwelling units either for sale or rent in the communities referenced above. Rental properties ranging between 1,200 and 1,500 square feet may command a rental of \$800 to \$1,000 per month, plus utilities. While the market value for land in the communities referenced above is highly divergent, the estimated value ranges between \$10,000 and \$15,000 per acre. However, in those areas where lands are influenced by commercial values, the market value ranges between \$20,000 and \$50,000 per acre. It is also important to point out for comparison purposes, that based on the General Services Administration's experience with leases for office space over the past several years in the Provo area, leased space ranges between \$7.00 and \$10.00 per square foot, per year. The rental units were essentially "full service," meaning that all services, including janitorial, utilities, maintenance, taxes, and insurance were furnished by the lessor.

The socioeconomic cross-section of the region would indicate that there should be no major constraints in developing general management plan alternatives that would rely on the surrounding communities for certain goods and services, as opposed to providing them within the monument at government expense. This is particularly true in view of the relatively close location of the monument to surrounding communities.

Timpanogos Cave has a substantial impact on the local regional economy. Park-related federal expenditures in fiscal year 1991 totaled approximately \$.7 million. This resulted in total annual sales, considering indirect and induced multipliers, of about \$1.5 million. Sales benefits from park tourism results in direct sales of about \$.6 million annually, and when considering indirect and induced multipliers contributes nearly \$.7 million annually to the local economy. Total tax revenue gained as a result of NPS operations, tourism and other park-related activities and projects is approximately \$76,800.

MANAGEMENT AND OPERATIONS

Timpanogos Cave normally has a staffing level of 14 full-time equivalents. The annual operating budget has averaged \$449,200. Approximately \$250,000 in cave tour tickets was collected in 1992, the last visitor-use season.

Park administrative, management, and operational functions are scattered in various facilities in and outside the monument. The primary administrative facilities are in a residence leased from Utah Power and Light Company, approximately 1 mile outside the monument. The maintenance building, which includes an office for the chief of maintenance and a room dedicated to curatorial storage, lies within the historic district of the monument. The maintenance operation also uses one historic building (building 126, rest room) to help alleviate their storage needs. The historic residence (building 2) and two Mission 66 residences (buildings 8 and 9) are currently being used for the purpose designed.

A temporary trailer was placed on the same site as the visitor center that was destroyed by fire. The trailer is currently being used to house ticket sales operation, information/orientation services, Natural History Association sales, and rest rooms.

Current permanent staffing for the monument is as follows:

CURRENT STAFFING

FUNCTION	POSITION	FTE
PERMANENT STAFF		
Administration	Superintendent	1.0
	Administrative Officer	1.0
	Administrative Clerk	1.0
Maintenance	Maintenance Foreman	1.0
	Maintenance Workers	1.8
	Chief Ranger	1.0
Interpretation/ Resource Management	Park Ranger	1.0

SEASONAL STAFF

Protection	Park Ranger, trail patrol/kiosk	0.4
Fee Collection	Fee collectors/kiosk (2)	1.0
Interpretation	Park Ranger, lead	0.5
	Seasonal interpreters, (16 at 4 months each)	5.3
TOTAL		14.0

OTHER FEDERAL/STATE/COUNTY/LOCAL AGENCIES

Following is a list of the federal, state, county, and local agencies that have a direct interest in the area: U.S. Forest Service, U.S. Fish and Wildlife Service, Soil Conservation Service, State Historic Preservation Office, Advisory Council On Historic Preservation, State of Utah Department of Natural Resources, Utah Department of Transportation, Mountain States Telephone Company (right-of-way in monument), Utah Power and Light Company (electrical services agreement with monument and lease of structure outside the monument), Uinta/Ouray Tribal Council and Paiute Indian Tribe (Bureau of Indian Affairs), The Wasatch Grotto, Utah County Commission, Wasatch Co. Commission, and Mr. and Mrs. Carl Wagner (concessioner within the monument).

ENVIRONMENTAL CONSEQUENCES

WATER RESOURCES/FLOODPLAIN/WETLANDS

Impacts of the Proposed Plan

The removal and site rehabilitation of the visitor/administrative trailer, maintenance building, historic rest room (building 126) and ticket booth, residences 8 and 9, temporary visitor contact facility, concession facility and all related roadways and parking as described earlier in the "Proposed Action and Alternatives" section and in the graphic entitled "Development Concept Plan - Proposed Plan" would not create any measurable increase in stream or surface water turbidity. This also applies to the construction activities related to the proposed shuttle facilities, parking facilities (13 spaces) for National Park Service employees, realignment of Highway 92, and the proposed trail to be constructed between the picnic area and the historic district. These activities would involve a total of approximately 1.6 acres within the drainage area of the American Fork River. Approximately 1 acre of the total 1.6 acres would be restored to natural conditions.

The overall reduction of hard surface areas through the vegetative rehabilitation of disturbed areas, approximately (1 acre), would decrease the amount of surface water runoff during rains and snow melt.

No groundwater impairment from continued use of the area or the removal, rehabilitation and/or construction of new facilities is anticipated. Based on an August 1991 inspection of the existing utility systems by the Rocky Mountain Regional Office, it was determined that given the conditions and constraints of the area, the existing water and sewage systems should be maintained. The water quality of the American Fork River is currently being monitored.

The demands on the existing water and sewage systems would be reduced with the removal of the facilities and services referenced above.

There is a potential for flooding in the canyon in relation to the 100- and 500-year floodplain and probable maximum flooding condition as described in a January 1992 report prepared by the Soil Conservation Service. Those facilities to be retained or possibly constructed within the 100- and 500-year floodplain and probable maximum flood area include: historic residence 2 (to be converted to an interpretive facility), existing picnic area and trail systems, 1,400 feet of new trail between the picnic area and historic district; 13 new parking spaces for NPS employees; new visitor shuttle system facility (roadway and shuttle bus parking, kiosk, rest rooms, pedestrian shelter, water fountain); and a new storage

structure for the special trail maintenance machine. All existing structures and areas within the monument that are large enough and suitable for development are within the 100- and 500-year floodplain as well as the area impacted by the probable maximum flood condition.

None of the structures within the floodplain is proposed for overnight occupancy. All use in the area would be limited to day-use activities. Estimates indicate that as many as 85 to 90 people at one time (visitors and NPS employees) could be in the area subject to the 100- and 500-year and probable maximum flood zones. Therefore, the area would be signed to warn visitors of such threats and identify routes to escape floods. A flood warning system would also be installed to give visitors and employees adequate time to escape potential flood impacts. Assuming there was a break in Tibble Fork Dam, with a 35,000 cubic-foot-per-second stream flow, estimates indicate there would be a water velocity of 12 feet per second. Based on these conditions, occupants of the monument would have a warning time of approximately 39 minutes prior to flood waters reaching the east boundary of the monument.

The proposed construction- and management-related activities called for in all alternatives except of Alternative D, would not impact wetland areas in any way. Areas subject to higher concentrations of visitor use and management-related activities would be monitored to detect and take action to control potential impacts.

There are no anticipated secondary effects to floodplain or wetlands and there is no increase in flood loss potential to existing developments from the proposal or any alternatives. There are no anticipated effects on natural and beneficial floodplain values, including water resource values (natural moderation of floods, water quality maintenance, and groundwater recharge), living resource values (fish, wildlife, and plant resources), and cultural resource values (natural beauty, scientific study, outdoor education, and recreation).

The proposal does not involve the placing of structures or fill in navigable waters; nor does it call for discharge of fill material.

There are no state or local floodplain standards applicable to the proposal.

Impacts of Alternative A

The removal of facilities, site rehabilitation work, and construction activities associated with this alternative would not create any measurable increase in stream or surface water turbidity. Under this alternative approximately 1.3 acres would be disturbed within the drainage area of the American Fork River. Approximately .75 acres of the total 1.3 disturbed would be rehabilitated to a natural state.

The overall reduction of hard surfaced areas through the vegetative rehabilitation of disturbed areas, approximately (.75 acre), would decrease the amount of surface water runoff during rains and snow melt.

The demands on the existing water and sewage systems would be reduced with the removal of the concession operation and picnic facilities.

Those facilities that would be retained or constructed under this alternative within the 100- and 500-year floodplain and probable maximum flood area include: existing maintenance shop operations, all historic structures including their existing uses, all existing parking areas and roadways, 36 new parking spaces, new visitor/administrative center, pedestrian trail from picnic parking area to new visitor/administrative center and pedestrian barrier with rehabilitation of the adjacent riverbank area.

Estimates indicate that 145 to 150 people at one time (visitors and NPS employees) would be in the 100- and 500-year and probable maximum flood zones. Residence 2 (historic) would also be retained and used as a residence for security purposes within the 100- and 500-year floodplain. This would result in one family (assume a maximum of five people) remaining in the floodplain overnight. Because of the severe potential impacts associated with a probable maximum flood, emergency flood warning systems would need to be installed and all employees instructed on emergency actions and location of evacuation routes.

The proposed construction- and management-related activities called for by this alternative should not impact wetland areas in any way. The removal of the picnic area and the construction of the pedestrian barrier between the river and parking area along with the restoration of the severely impacted area should aid in protection of the wetlands area and reduce the potential for increases in turbidity, particularly during high water flows in the American Fork River.

Impacts of Alternative B (Minimum Action)

The removal of facilities, site rehabilitation work, and construction activities associated with this alternative would not create any measurable increase in stream or surface water turbidity. Under this alternative, approximately 1.4 acres would be disturbed within the drainage area of the American Fork River. Approximately .80 acres of the total 1.4 would be restored to its natural appearance.

The overall reduction of hard surface areas through the vegetative rehabilitation of disturbed areas, approximately (.80 acre), would decrease the amount of surface water runoff during rains and snow melt.

The demands on the existing water and sewage systems within the monument would be reduced with the removal of the concession operation, picnic facilities, visitor services related to ticket sales/information/orientation services to a site outside the monument, and the elimination of residential facilities.

Those facilities to be retained or constructed under this alternative within the 100- and 500-year floodplain and within the probable maximum flood area include: existing maintenance shop operations, all historic structures, all existing parking areas and roadways, 35 new parking spaces, new visitor contact facility, pedestrian trail from picnic parking area to new visitor contact facility, and pedestrian barrier with rehabilitation of the adjacent riverbank area.

The proposed construction- and management-related activities that are called for by this alternative should not impact wetland areas in any way. The construction of the pedestrian barrier between the river and parking area along with the restoration of the severely impacted area should aid in protection of the wetlands area and reduce the potential for increases in turbidity particularly during high water flows in the American Fork River.

None of the structures within the floodplain are proposed for overnight occupancy. All use in the area would be limited to day-use activities. Estimates indicate that as many as 110 to 115 people at one time (visitors and NPS employees) could be in the area subject to the 100- and 500-year flood zones and probable maximum flood conditions. Therefore, the area would be signed to warn visitors of such threats and identify routes to escape flooding. A flood warning system would also be installed to give visitors and employees adequate time to escape potential flood impacts.

Impacts of Alternative C (Mothball/Caretaker)

The demands on the existing water and sewage systems within the monument would be completely eliminated with the evacuation and securing of all visitor and NPS facilities.

The heavily impacted natural area between the American Fork River and the existing 32-space parking area north of Utah Highway 92 would continue to contribute insignificantly to the degradation of water quality due to soil particles being eroded into the stream.

All existing structures would remain within the 100- and 500-year floodplain as well as in the probable maximum flood area. It does not appear that the structures alone pose any threat to the floodplain area. Estimates indicate that on a very limited basis, no more than 5 to 10 people related to day-use activities would be within the 100- and 500-year floodplain and probable maximum flood zone at any one time. There would be no overnight occupation of floodplain areas under this alternative. A flood warning system would be

installed to give visitors and employees adequate time to escape. Signing to warn visitors and employees of such threats and the location of escape routes would be adequately posted.

Impacts of Alternative D (No Action)

There would be no change in impacts presently being experienced (refer to "Issues" section). It does not appear that this alternative represents a major threat to the water resources or wetlands in the monument. Minor impacts on water turbidity would occur as a result of the continued visitor impacts on the natural area between the river and the 32 space parking area north of Utah Highway 92.

Residences 2, 8, and 9 would be retained and used for residential purposes. This would result in three families (assume a maximum of fifteen people) remaining in the 100-year floodplain overnight. Because these structures are in the 100- and 500-year floodplains, and because of the severe potential impacts associated with a probable maximum flood, emergency flood warning systems would need to be installed and all employees instructed on emergency actions and location of evacuation routes. Approximately 200 to 210 people at one time are often engaged in day-use activities within the 100- and 500-year floodplains and probable maximum flood zone, under this alternative. Impacts on wetlands under this alternative are considered to be insignificant.

GEOLOGY/SOILS/VEGETATION

Impacts of the Proposed Plan

All proposed construction and rehabilitation work would disturb approximately 1.6 acres of soil and less than 0.1 acre of vegetation. Approximately 99 percent of the area has been previously disturbed by construction and pedestrian-related activities. Approximately 55 percent of the previously disturbed area is currently occupied by roads, parking areas, and various types of structures.

Rehabilitation efforts would restore approximately 1 acre of the existing developed area to native vegetation. The remaining 0.6 acre would continue to be used for development. Soil compaction would occur from construction activities, placement of pavement, and settling of buildings on the 0.6 acre. When available, top soils would be removed from construction zones, stock-piled and used to restore natural areas impacted by construction and restoration activities. This would reduce the overall loss of topsoil and enhance revegetation efforts. Accelerated erosion would occur on all disturbed sites until revegetation is complete. One growing season should be sufficient to establish vegetation and minimize soil erosion. The levels of erosion are expected to be minimal since all proposed construction would occur

on lands with a slope of less than 3 percent. Roadside shoulders and parking areas would experience increased runoff of moisture, which could alter vegetation and create slight changes in soil chemistry adjacent to these areas of construction. Vegetation adjacent to roadways, parking areas and pedestrian walkways would be subject to crushing by pedestrians. This could encourage the growth of exotic species of vegetation. Paved pedestrian walkways to and through the site would be provided where heavy foot traffic is anticipated, and visitors would be encouraged to stay on maintained trails. Whenever possible trails would be built on gentle slopes to minimize potential for erosion. The soil next to trails would continue to be compacted along with vegetation. Soils and vegetation near interpretive waysides and displays would be subject to compaction and trampling by foot traffic. Invasion of these areas by weedy species could become a problem requiring control actions. Because of NPS presence and enforcement programs, this impact is expected to be limited to slight changes in vegetation composition.

This alternative would remove the primary visitor/administrative center and maintenance-related functions out of a geologic hazard area considered to pose a serious threat to human life because of falling rock. The elimination of the concession operation further reduces the potential threat to human life and health. By design, this alternative minimizes the need for visitors to prolong their stay near the foot of the trailhead, especially in structures where there is no warning of falling rock.

Impacts of Alternative A

Under this alternative soil surface disturbance related to construction and rehabilitation would be confined to total of approximately 1.3 acres and less than 0.1 acre of existing vegetation would be displaced. Approximately .75 acre of the total 1.3 acres would be rehabilitated and restored to native vegetation. This alternative represents the highest concentration of use. Such use would result in increased levels of soil compaction and vegetation trampling. Impacts associated with these activities are similar to those described for the proposal.

This alternative continues to concentrate and prolong visitor use in an area considered to pose a serious threat to human life because of falling rock. The removal of the concession operation in this alternative does aid to some degree in minimizing the visitors' stay in the rockfall area.

Impacts of Alternative B (Minimum Action)

Under this alternative, soil surface disturbance related to construction and rehabilitation would be confined to a total of approximately 1.4 acres and less than 0.1 acre of vegetation would be displaced. Approximately .80 acre of the total 1.4 acres would be restored to native vegetation. The removal of the primary visitor/administrative facilities, concession

area, Natural History Association sales, picnic area and the construction of the pedestrian barrier between the river and visitor parking lot would significantly reduce potential pedestrian impacts on soils and vegetation. The impacts of the actions proposed in this alternative are similar to the soils and vegetation impacts described for the proposal.

The removal of the facilities as described above would significantly decrease the number of visitors and their length of stay in an area considered to represent a serious threat to human life because of falling rock.

Impacts of Alternative C (Mothball/Caretaker)

All human impacts on soils would be completely eliminated with the evacuation and securing of all visitor and NPS facilities. However, the heavily impacted natural area between the American Fork River and the existing 32 space parking area north of Utah Highway 92 would continue to erode and impact existing vegetation during periods of rain and melting snow.

This alternative would eliminate approximately 99.9 percent of the visitors and employees from an area considered to be a geologic hazard zone which poses a threat to human life and health.

Impacts of Alternative D (No Action)

There would be no change in the impacts presently being experienced. The existing erosion problem associated with the area between the American Fork River and the 32 space parking area north of Utah Highway 92 would continue. This would in turn continue to lead to the further loss of vegetation in the area.

This alternative would not resolve the life, health, safety issue associated with human occupation of areas determined to be geologically unsafe because of falling rock.

WILDLIFE

Impacts of the Proposed Plan

There would be no significant impact on wildlife associated with the monument under the proposed plan. No impacts are anticipated on the fish in the American Fork River or the birds within the monument.

Impacts would generally be limited to a total of 1.6 acres. Construction, rehabilitation, and maintenance activities would alter approximately 0.1 acres of vegetation and possibly result

in the displacement and loss of some insects (grasshoppers, beetles, ants, flies) and rodents (mice).

Approximately 1.2 acres would be restored to native vegetation, resulting in a net gain of 1.1 acres of habitat. It is anticipated that a majority of displaced rodents and insects would relocate to adjacent areas. None of these impacts is considered to be significant.

Impacts of Alternative A

There would be no significant impact on wildlife associated with the monument under this alternative. No impacts are anticipated on the fish in the American Fork River or the birds within the monument.

Impacts would generally be limited to a total of 1.3 acres. Construction, rehabilitation, and maintenance activities would alter approximately 0.1 acre of vegetation and possibly result in the displacement and loss of some insects (grasshoppers, beetles, ants, flies) and rodents (mice).

Approximately 0.7 acre would be restored to native vegetation, resulting in a net gain of 0.6-acre of habitat. It is anticipated that a majority of displaced rodents and insects would relocate to adjacent areas. None of these impacts is considered to be significant.

Impacts of Alternative B (Minimum Action)

Under this alternative, there would be no significant impacts on wildlife associated with the monument. No impacts are anticipated on the fish in the American Fork River or the birds within the monument.

Impacts would generally be limited to a total of 1.4 acres. Construction, rehabilitation and maintenance activities would alter approximately 0.1 acres of vegetation and possibly result in the displacement and loss of some insects (grasshoppers, beetles, ants, flies) and rodents (mice).

Approximately 0.8 acre would be restored to native vegetation, resulting in a net gain of 0.7-acre of habitat. It is anticipated that a majority of displaced rodents and insects would relocate to adjacent areas. None of these impacts is considered to be significant.

Impacts of Alternative C (Mothball/Caretaker)

No additional wildlife habitat would be lost, and current displacement of rodents and insects from the existing facilities would continue. There would be no effect on birds, wildlife, or fish in other habitats of the monument.

Impacts of Alternative D (No Action)

Same as for alternative C above.

THREATENED AND ENDANGERED SPECIES

Impacts of Proposed Plan and All Other Alternatives

At this time there are no known threatened or endangered species within the monument, however, a survey has not been completed for the monument. In their 1992 Outline of Planning Requirements, the monument identified the need for a threatened and endangered species survey as their first priority. This need is also reflected in the monument's draft resource management plan. As a result of the August 1, 1991, letter from the U.S. Fish and Wildlife Service indicating the possible existence of one threatened species and two species that are candidates for official listing as threatened or endangered, a threatened and endangered species survey must be completed before implementation of any management actions that have the potential of impacting such resources.

AIR QUALITY

Impacts of the Proposed Plan

Increases in visitation are anticipated. This would normally result in increased auto emissions, however, the introduction of the mandatory visitor transportation system should actually reduce the existing auto emission levels. The construction and rehabilitation as proposed would temporarily increase the amount of dust in the air. If necessary, construction dust would be controlled with application of water or other approved dust palliative. Problems related to airborne construction dust would be temporary. There would also be a temporary increase in noise levels during construction.

Class II airshed standards would not be violated by visitor use or construction activities. It is not anticipated that increases in emissions and dust would become visually noticeable because of prevailing winds, minimum situations when inversion occur, or the implementation of a visitor transportation system, which should actually reduce the number of vehicles in the canyon.

Impacts of Alternative A

Air quality impacts under alternative A are similar to those described for the proposal.

Impacts of Alternative B

Air quality impacts under alternative A are similar to those described for the proposal.

Impacts of Alternative C (Mothball/Caretaker)

There would be no construction-related air quality impacts under this alternative. Air quality impacts would only result from those persons who were granted access for research purposes. Considering the minimal number of people this would involve, impact on air quality would be minuscule.

The only other air quality impacts within the monument would come from those vehicles traveling through the monument on Utah Highway 92. Those impacts are unrelated to this alternative.

Impacts of Alternative D (No Action)

There would be no construction-related air quality impacts under this alternative. Impacts are limited to emissions from visitor vehicles. Current emissions are not visually noticeable and are within standards prescribed for class II airsheds.

ARCHEOLOGICAL/HISTORIC/ETHNOGRAPHIC RESOURCES

Impacts of the Proposed Plan

The proposal provides for the adaptive use of historic residence 2 for interpretive purposes. Use of the building to support interpretation, and visitor use would contribute to its long-term preservation. The integrity of the residence's exterior would be retained and construction techniques used in the interior would minimize damage. The removal of the historic rest room (building 126), stone ticket booth, and two cold cellars, would adversely affect these historic properties. The actual historic fabric would be demolished and disposed of.

When any project affects historic building and structures that are or have been determined eligible for listing on the National Register of Historic Places, the work must meet the Secretary of the Interior's Standards for Rehabilitation and any other constraints mandated by *NPS-28, Cultural Resource Management Guideline*. This includes actual stabilization projects as well as new construction in or adjacent to an historic district. Before such projects can start, the plans and drawings must be reviewed and approved by the regional historical architect and by the Utah SHPO and ACHP. Removal of historic buildings or structures would have an adverse effect on the cultural qualities that qualify them for listing

on the National Register of Historic Places. This impact can be mitigated by recording the buildings or structures to the standards of the Historic American Building Survey (HABS) or the Historic American Engineering Record.

Removal of the maintenance facility and associated roads and parking would minimize the visual impact of non-historic structures upon the historic district and restore the ambiance associated with the historic setting.

The relocation of the curatorial storage space outside of the 100- and 500-year floodplain would protect such resources from possible damage or loss. The new curatorial storage facility would provide environmentally controlled space, with fire detection and suppression systems and intrusion alarms. Access to the collections would be more easily controlled and further improve security. Museum objects would be consolidated in a clean environment with stable conditions, further contributing to object preservation.

The proposed action would not directly affect the one documented site within the monument. However, removal of employee housing could possibly indirectly affect the site. Prior to initiating action that could potentially affect this site, it would be redocumented using the most current Utah State archeological site form and a formal concurrence determination of eligibility sought with the Utah State Historic Preservation Office. Native American expressions of interest in the rock art would be solicited and appropriate consultation undertaken. If the site is determined to be eligible for listing in the National Register and/or of import to the American Indian community, measures would be taken to protect the cliff face where the pictograph is located during removal of the employee housing.

Areas of potential disturbance resulting from this plan would be carefully evaluated to determine the intensity and type of past disturbance and potential for containing cultural resources. If warranted, an archeological inventory would be conducted prior to any disturbance.

Impacts to ethnographic resources are unknown since an ethnographic overview and assessment have not been completed.

Impacts of Alternative A

Under this alternative, there would be no adverse impacts to historic structures. All structures would be retained and used as they are now. The curatorial storage area however would be relocated to the new visitor/administrative facility, which would be in the 100-and 500-year floodplain. This structure would be floodproofed to protect such resources from potential impacts of flooding.

Alternative A would not directly affect the one documented site within the monument. However, removal of employee housing could possibly indirectly affect the site. Prior to initiating action that could potentially affect this site, it would be redocumented using the most current Utah State archeological site form and a formal concurrence determination of eligibility sought with the Utah State Historic Preservation Office. Native American expressions of interest in the rock art would be solicited and appropriate consultation undertaken. If the site is determined to be eligible for listing in the National Register and/or of import to the American Indian community, measures would be taken to protect the cliff face where the pictograph is located during removal of the employee housing.

Areas of potential disturbance resulting from this plan would be carefully evaluated to determine the intensity and type of past disturbance and potential for containing cultural resources. If warranted, an archeological inventory would be conducted prior to any disturbance.

Impacts to ethnographic resources are unknown since an ethnographic overview and assessment have not been completed.

Impacts of Alternative B (Minimum Action)

Under this alternative, there would be no effect on historic properties. All historic structures would be retained and adaptively used for the function they are currently serving, with the exception of residence 2, which would no longer be used to house employees. It would be remodeled to serve as an administrative facility as described in the "Proposed Action and Alternatives" section above.

Alternative B would not directly affect the one documented site within the monument. However, removal of employee housing could possibly indirectly affect the site. Prior to initiating action that could potentially affect this site, it would be redocumented using the most current Utah State archeological site form and a formal concurrence determination of eligibility sought with the Utah State Historic Preservation Office. Native American expressions of interest in the rock art would be solicited and appropriate consultation undertaken. If the site is determined to be eligible for listing in the National Register and/or of import to the American Indian community, measures would be taken to protect the cliff face where the pictograph is located during removal of the employee housing.

Areas of potential disturbance resulting from this plan would be carefully evaluated to determine the intensity and type of past disturbance and potential for containing cultural resources. If warranted, an archeological inventory would be conducted prior to any disturbance.

Impacts to ethnographic resources are unknown since an ethnographic overview and assessment have not been completed.

Impacts of Alternative C (Mothball/Caretaker)

Under this alternative, no significant impacts are anticipated. Potential impacts from nonoccupancy would be limited to vandalism and deterioration from lack of regular maintenance. These impacts could be mitigated by incorporating provisions in a memorandum of agreement with the local entity that would be overseeing the properties, for routine inspections of the monument properties. This would most likely result in no adverse effect to the historic properties other than the historic cave trail system. Under this alternative all cave trails including the historic trail would not be maintained. This would result in a large portion of the trail system being covered with rockslide material, eventually rendering them inaccessible. This could result in sections of the historic trail and rock walls being eventually lost because of deterioration. This would result in an adverse effect on the historic trail.

All collections would be removed from the monument and transferred to another NPS location and properly stored.

Impacts to the known archeological site, one small humanoid pictograph, are unknown since the pictograph has not been evaluated for possible listing on the National Register of Historic Places. A final decision on the eligibility of the pictograph will be coordinated with the SHPO. All ground disturbing activities will be monitored to mitigate impacts that could occur should any archeological site be encountered.

Impacts to ethnographic resources are unknown since an ethnographic overview and assessment have not been completed.

Impacts of Alternative D (No Action)

The routine maintenance of buildings would continue in an effort to minimize impacts to cultural resources. The curatorial storage area would remain in the maintenance building and be subject to possible damage or loss because of its location in the 100- and 500-year floodplain. This alternative would most likely result in no effect on cultural resources. The curatorial management issues would remain unresolved.

Alternative D would not directly or indirectly affect the one documented archeological site within the monument. Native American expressions of interest in the rock art would be solicited and appropriate consultation undertaken. If the site is determined to be eligible for listing in the National Register and/or of importance to the American Indian

community, measures would be taken to protect the cliff face where the pictograph is located, during any activities that would impact the resource.

Impacts to ethnographic resources are unknown since an ethnographic overview and assessment have not been completed.

VISITOR USE

Impacts of the Proposed Plan

The proposal would resolve the issue related to the congestion and conflicts between pedestrian and vehicles. It would also eliminate the safety issues associated with visitors having to back their vehicles out onto Utah Highway 92, which is highly congested and unsafe because of blind curves near the parking areas. The alternative also eliminates the need for pedestrians having to cross the same highly congested highway in order to reach the visitor center.

This proposal significantly reduces the number and length-of-stay of visitors in an area considered to be a "high risk site" because of falling rock. The alternative also eliminates existing residential development, thereby resolving the safety issue related to falling rock and overnight occupancy in the 100- and 500-year floodplain, and in areas susceptible to severe impacts associated with probable maximum flooding.

The visitor transportation system proposed in this alternative would also enable the monument to better control the flow of visitors to the cave, thereby eliminating large congregations of visitors in areas determined to be highly subject to falling rock. Visitor needs related to the concession services would be eliminated under this alternative. Such needs would be accommodated within the local communities surrounding the location of the new visitor center.

The proposed visitor transportation system would significantly reduce the number of vehicles traveling the very narrow and winding Utah Highway 92 and thereby improve visitor safety along the roadway system.

Considering the number of visitor-related issues that would be resolved under this alternative, it should improve the visitors' experience and appreciation for the resource. The visitors' image of the National Park Service and other agencies that might be involved would also be improved.

The new facilities proposed under this alternative would improve overall accessibility and convenience for all visitors especially those with disabilities. Considering that the cave is

not accessible to many persons with disabilities, the new visitor center interpretive programs would place special emphasis on interpreting the resource for such populations.

The location of the new visitor contact facility outside the mouth of the American Fork Canyon has not been determined. Once all options have been identified, appropriate action would be taken to resolve all related planning and compliance concerns. However, the location of the visitor center should take into consideration the fact that 75 percent of visitors enter the monument from the west along Utah Highway 92. It would be important to either locate the new visitor center where it would be clearly visible, or to install appropriate signing that would clearly direct visitors to the site and to the transportation facilities.

Impacts of Alternative A

Visitors would no longer enjoy the benefit of the existing picnic area facilities, which would be removed except for the 25-space parking lot. These parking spaces would be needed to help meet the demand for parking generated by visitors who are able to acquire cave tour tickets. Under this alternative, there would continue to be a problem meeting the demand for parking generated by those visitors who only stop for information/orientation, and those who stop and are not able to obtain cave tour tickets. The need for visitor parking would continue to increase as visitation within the region increases.

Congestion between vehicles and pedestrians would continue, as would the requirements for visitors to walk across, and back vehicles onto, the highly congested Highway 92. This alternative continues to encourage large congregations of visitors in an area identified as a geological hazard area and floodplain. All of these conditions continue to represent serious life, health, and safety problems.

As with the existing development, due to the extremely limited and confined sites within the canyon, the alternative does not provide the capability to adequately accommodate large recreation vehicles or tour busses without seriously impacting other parking needs.

With the elimination of concession services in the monument, visitors would have to travel approximately 3.5 miles, or 5 minutes, to obtain food and souvenirs. The discontinuation of concession services would aid in minimizing human presence in a geological hazard zone and would increase the turnover rate of visitors in an area where parking space is inadequate and there are critical circulation and congestion problems.

Impacts of Alternative B (Minimum Action)

With the elimination of picnic facilities, relocation of the ticket sales, reservation/fee office, and general information/orientation services to a new structure outside the monument, and some of the scale-backs and modifications to other services, this alternative would significantly reduce the number and length-of-stay of visitors in areas affected by 100- and 500-year floodplain, probable maximum floods, and falling rock. The impacts associated with retaining the existing visitor parking areas that were referenced in alternative A above would also apply to this alternative.

The alternative eliminates existing residential development, thereby resolving the human safety issue related to falling rock and overnight occupation in 100- and 500-year floodplain, and areas subject to probable maximum flooding.

The elimination of the concession services under this alternative would produce the same visitor impacts outlined above in alternative A.

Impacts of Alternative C (Mothball/Caretaker)

Under this alternative, visitors would no longer have the opportunity to enjoy any of the resources or facilities associated with the monument for an indefinite period of time. For all practical purposes the monument would be completely closed to visitor access. As mentioned earlier, the only visitation allowed in the monument would be for research purposes.

Impacts of Alternative D (No Action)

Under this alternative, there would continue to be a problem meeting the demand for parking spaces generated by those visitors who only stop for information and orientation, and by those who stop and are not able to obtain cave tour tickets. The need for visitor parking would continue to increase with increases in regional visitation.

Congestion between vehicles and pedestrians would continue, as would the requirements for visitors to walk across, and back vehicles onto, the highly congested Highway 92. This alternative continues to encourage large congregations of visitors in an area identified as a geological hazard area and floodplain. All of these conditions continue to represent serious life, health, and safety problems.

There would continue to be a problem accommodating large recreation vehicles and tour busses, which contribute to the congestion problem. Conflict between pedestrians and vehicles and associated negative visitor experience would also continue.

The temporary trailer that replaced the visitor facility that was destroyed by fire would continue to be used. Visitors would continue to experience an extremely cramped and congested environment, which contributes to a negative visitor experience.

CONCESSION OPERATION

Impacts of the Proposed Plan

The elimination of the concession services could force the operators to seek new income sources, eliminate any income source, may force them to relocate and could eliminate any long-term financial security for them. The inventory of gift items, as well as food service equipment and building furnishings, could be liquidated at a loss. The elimination of the concession operation would represent a reduction in total sales of approximately \$53,000 annually. This would also represent a loss of approximately \$1,000 in tax benefits, and 2.5 jobs.

Impacts of Alternative A

Impacts to the concession operation would be the same under alternative A as described for the proposed plan.

Impacts of Alternative B (Minimum Action)

Impacts to the concession operation would be the same under alternative B as described for the proposed plan.

Impacts of Alternative C (Mothball/Caretaker)

Impacts to the concession operation would be the same under alternative C as described for the proposed plan.

Impacts of Alternative D (No Action)

There would be no impacts to the concession operation under the no-action alternative, because under it the concession contract would be renewed.

SOCIOECONOMIC RESOURCES

Impacts of the Proposed Plan

The proposal would substantially contribute to the local economy. Sales revenues from park tourism could result in direct sales of about \$.6 million annually, and when considering indirect and induced multipliers, could contribute more than \$.7 million annually to the local economy.

An estimated annual park budget of \$.7 million could result in total sales, considering indirect and induced multipliers, of about \$1.6 million annually. The proposed rehabilitation and development program anticipates a one-time expenditure of about \$7.3 million. Total combined sales in the area from this expenditure should exceed \$8.8 million, netting nearly \$185,000 in increased tax revenue.

Annual park operations and tourism benefits would result in approximately 76 jobs. Implementation of the rehabilitation and development program would result in a short-term gain of 415 jobs.

The above economic benefits could increase levels of normal services available in surrounding communities of American Fork and Provo, Utah, and could enhance local businesses. No measurable change in population levels or changes in lifestyle are anticipated.

No prime or unique farmlands would be affected.

The economic viability of a transportation system would be contingent upon visitors' willingness to pay for such a service. To encourage use of the system and to relate its economic viability, an onboard interpretive program could be incorporated. To help mitigate potential economic loss, such a system would need to be tested with minimal investments, such as through the use of leased vehicles and the establishment of a low cost, temporary parking area, which could easily be restored if a transportation system proves not to be practical. To ensure maximum ridership, and accomplish the objectives of the alternative, such a system would need to be mandatory. A more in-depth transportation study is recommended to explore various alternatives including service contractors and rider fee options.

Impacts of Alternative A

Under this alternative, an estimated annual budget of \$.6 million would be required. This would result in total sales of about \$1.5 million annually. The one-time rehabilitation and

development program of about \$5.3 million should result in total combined sales of about \$6.3 million, with about \$133,000 in increased tax revenues. Jobs created by operations and tourism should total about 72, while the rehabilitation and development program should result in short-term gains of about 370 jobs.

Sales revenues from park tourism and impacts to services and businesses would be the same as those described under the proposed plan.

No prime or unique farmlands would be affected.

Impacts of Alternative B

An estimated annual budget of \$.6 million would be required. This would result in total combined sales of about \$1.5 million annually. The one-time rehabilitation and development program of about \$1.3 million should result in short-term sales of about \$1.5 million, with about \$32,000 in increased tax revenues. Jobs created by operations and tourism should total about 72, while the rehabilitation and development programs should result in short-term gains of about 143 jobs.

The impacts associated with the concession operation that are described under the proposed plan would also apply here. The elimination of the Natural History Association sales would further reduce total sales by \$31,200 annually. The elimination of the concession operation and the NHA would equate to a total reduction of \$84,000 in annual sales. This would also represent a total loss of approximately \$1,701 in tax benefits and 3.9 jobs.

No prime or unique farmlands would be affected.

Impacts of Alternative C (Mothball/Caretaker)

Under this alternative, an estimated annual budget of \$15,000 would be required for occasional repair and rehab of park facilities and regulation of research efforts in the cave once the park is closed to public access.

This would result in a loss of 75 jobs and approximately \$77,000 in tax revenue per year. There would also be a reduction of approximately \$1.6 million in sales to local businesses from tourism.

The same impacts associated with alternative B relative to the concession operation and NHA sales would apply here.

No prime or unique farmlands would be affected.

Impacts of Alternative D (No Action)

Economic benefits of current park operations are described in the "Affected Environment" chapter of this document.

Total sales from park operating expenditures is about \$.8 million annually. Sales benefits from park tourism is about \$.7 million annually. Total tax revenue being gained is about \$77,000 annually and operation and use of the park results in about 76 jobs.

There would be no anticipated impacts on the concession operation or the Natural History Association sales operations.

No prime or unique farmlands would be affected.

OTHER AGENCIES

Impacts of Proposed Plan

The actions proposed under this alternative would not have any negative impacts on other federal agencies. The U.S. Forest Service (USFS) has informally expressed an interest in considering alternatives for combined visitor/administrative facilities outside the mouth of the American Fork Canyon west of the monument. The USFS's interest in relocating their existing facilities stems from the fact that such facilities are not in a location convenient to serve visitors to the national forest, and that they also cause a degree of conflict with residential communities that have expanded to the point of surrounding the existing operations. This alternative would open the door for the USFS and NPS to look more in depth at the possibility and alternatives for complementing the various efforts to satisfy visitor and administrative needs and meet agency goals.

Impacts of Alternative A

This alternative would have no impacts on other federal agencies.

Impacts of Alternative B (Minimum Action)

Impacts associated with this alternative are the same as those described for the proposed plan.

Impacts of Alternative C (Mothball/Caretaker)

Under this alternative, the NPS would make arrangements through a memorandum of agreement with another federal or state entity for the maintenance and protection of the existing facilities and resources of the monument. To mitigate the impact on staffing and funding of another entity, the NPS would compensate the second party with \$15,000 annually for services in managing the resources.

Impacts of Alternative D (No Action)

This alternative would have no impacts on other federal agencies.

MANAGEMENT AND OPERATIONS

Impacts of Proposed Plan

By removing all of the maintenance and administrative facilities outside the monument there would be a substantial reduction in the life, health, and safety risks associated with the potential geologic, floodplain, and probable maximum flood hazards. The day-to-day problems of attempting to resolve major congestion problems in the canyon would be substantially reduced, thereby permitting the staff to direct more attention to other areas concerning the daily management and operations of the monument.

Removal of the curatorial storage area from the maintenance area and consolidation of the maintenance operation within a new facility would improve operating efficiency. However, the relocation of the new facility to a site outside the monument would require the maintenance staff to travel a longer distance in order to accomplish daily management and operation activities within the monument.

Removal of residences 8 and 9 and the historic structures now being used for maintenance storage would result in a minor reduction in the workload of the maintenance staff. Storage of the specialized trail maintenance vehicle and other trail maintenance tools near the trailhead would also improve efficiency.

Because housing of employees within the monument would be discontinued, the existing alarm systems, particularly the one on the cave, would need to be regularly inspected to ensure they are in proper working order as a means of minimizing vandalism. The monument staff would also need to routinely coordinate with the supporting local law enforcement units to ensure that appropriate procedures are followed in the event of an alarm.

The elimination of the concession operation, Natural History Association, residences 8 and 9, and maintenance facilities within the monument would create a substantial reduction in impacts to the monument's existing utility systems.

The proposal would require about \$724,000 annually for operational and maintenance costs. About 21 FTEs would be required to fully implement operational and management aspects of the proposal. This would include 2 FTEs that would be needed to drive shuttle buses for the visitor transportation system.

Impacts of Alternative A

The removal of the curatorial storage area from the existing maintenance building would enable the monument staff to consolidate maintenance supplies currently stored in other structures away from the primary maintenance facility. This would make the supplies more readily accessible and therefore would improve the efficiency of the maintenance operation. The relocation of the curatorial items to the new visitor/administrative facility would also make such resources more available to the staff and visitors who are most interested in them.

Retaining residence 2 for residential purposes would add a degree of security to the facilities within the monument, providing that adequate alarms are installed. This could, to some degree, aid in minimizing vandalism and theft.

This alternative does not resolve the life, health, and safety risks associated with potential geologic hazards. Employees would continue to be in areas subject to rockfall. This applies to the new visitor center, maintenance building, and residence 2. Visitors and monument staff would also continue to be subject to potential impacts associated with the 100- and 500-year floodplain and probable maximum flooding, however, such impacts would be mitigated through the installation of flood warning systems.

This alternative would represent a minor short-term solution to some of the congestion problems. There would continue to be times when the park staff would have to spend time resolving circulation problems, which would take them away from other visitor and administrative activities.

The removal and rehabilitation of the picnic area and residences 8 and 9 would result in a minor reduction in the workload of the maintenance staff. This would also allow the staff to direct their efforts toward meeting other visitor and administrative needs.

The elimination of the picnic area, concession operation, and residences 8 and 9 would aid in minimizing impacts on the monument's existing utility systems.

This alternative would require about \$675,000 annually for operation and maintenance costs. About 19 FTEs would be required to fully implement operation and maintenance aspects of the alternative.

Impacts of Alternative B (Minimum Action)

This alternative would resolve the life, health, and safety risks associated with potential geologic hazards for only a very limited number of employees. Those employees who would be conducting administrative operations from residence 2 would remain in a rockfall area. This would also apply to the staff in the maintenance building, and small kiosk at the trailhead. Visitors and monument staff would also continue to be subject to potential impacts associated with the 100- and 500-year floodplain and probable maximum flooding, however, such impacts would be mitigated through the installation of flood warning systems.

This alternative would represent a minor short-term solution to some of the congestion problems. There would continue to be times when the park staff would have to spend time resolving circulation problems, which would take them away from other visitor and administrative activities.

The removal and rehabilitation of the picnic area and residences 8 and 9 would reduce the workload of the maintenance staff. This would also allow the staff to direct their efforts toward meeting other visitor and administrative needs.

The elimination of the picnic area, concession operation, Natural History Association, and residences 8 and 9 would aid in minimizing impacts on the monument's existing utility systems. Provision of a small visitor contact facility to meet general information/orientation needs and to serve as a cave tour reservation and ticket sales center, would reduce existing impacts on the monument's utility systems.

Because housing of employees within the monument would be discontinued, the existing alarm systems, particularly the one on the cave, would need to be regularly inspected to ensure they are in proper working order as a means of minimizing vandalism. The monument staff would also need to routinely coordinate with the supporting local law enforcement units to ensure that appropriate procedures are followed in the event of an alarm.

This alternative would require about \$675,000 annually for operation and maintenance costs. About 19 FTEs would be required to fully implement operation and maintenance aspects of the alternative.

Impacts of Alternative C (Mothball/Caretaker)

The closure of the park to public use other than that related to scientific purposes would eliminate the need for all existing monument staff. Staff assistance from another federal agency would be required to issue permits for cave exploration and occasionally inspect monument properties for maintenance needs and signs of vandalism.

The closure of all facilities would significantly minimize impacts on the monument's existing utility systems.

Impacts of Alternative D (No Action)

With park operational facilities remaining in the geologic, floodplain, and probable maximum flood hazard zones, the life, health, and safety issues associated with such areas would remain unresolved. This could result in a major loss of operational facilities. The park operations functions would continue to remain scattered within and outside the monument. The inefficiencies associated with such an arrangement would continue.

CUMULATIVE IMPACTS OF THE PROPOSAL

There would be no cumulative impacts resulting from the proposal.

CONSULTATION/COORDINATION

SUMMARY OF PUBLIC INVOLVEMENT

On October 18, 1991, a Notice of Intent was published in the Federal Register. A scoping brochure for this plan was also distributed and made available for public comment on March 10, 1992. The availability of the scoping brochure was also announced in all of the newspapers in Utah as well as through the Associated Press. Copies of the brochure were sent under special letter to the Uintah/Ouray Tribal Council and the Paiute Indian Tribe. A total of 16 comments were received as a result of the scoping brochure distribution.

In preparation for the planning effort, a visitor-use survey was conducted from May through September 1991. A total of 864 visitor surveys were distributed. A total of 579, or 67 percent, of the survey forms were returned. A special place on the survey form was designated for visitors to provide any additional comments that they felt were important. Additional comments were received on 338 survey forms, or 58.4 percent of the responses. Issues identified by these respondents were similar to those outlined in the "Purpose and Need" chapter of this document.

LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ARE SENT

Following is a list of the federal, state, and local agencies; organizations; and individuals who will receive copies of this Draft Environmental Impact Statement for review and comment. A Notice of Availability will be published in the Federal Register and news releases directed to various forms of news media. Following the review period, comments will be consolidated and published in the Final Environmental Impact Statement, with responses from the National Park Service. All interests providing comments to the draft EIS will be added to the official mailing list and will also receive a copy of the final EIS.

FEDERAL AGENCIES

Advisory Council On Historic Preservation
Arches National Park
Bryce Canyon National Park
Bureau of Land Management
Bureau of Reclamation
Canyonlands National Park

Capitol Reef National Park
Cedar Breaks National Monument
Department of Interior-Regional Environmental Officer
Dinosaur National Monument
Earth Science Information Center, U.S.G.S.
Federal Highway Administration
Fossil Butte National Monument
Glen Canyon National Recreation Area
Golden Spike National Historic Site
Great Basin National Park
Great Sand Dunes National Monument
Natural Bridges National Monument
Mr. Marty Ott, Utah State Coordinator, National Park Service
Pipe Spring National Monument
Soil Conservation Service
U. S. Congressman James Hansen
U. S. Congressman Bill Orton
U. S. Congresswoman Karen Shepherd
U. S. Environmental Protection Agency
U. S. Fish and Wildlife Service
U. S. Forest Service Public Affairs Office
U. S. Forest Service Salt Lake Ranger Station
U. S. Forest Service Uinta National Forest
U. S. Senator Robert F. Bennett
U. S. Senator Orrin Hatch
Zion National Park

STATE AGENCIES

College of Natural Resources, Utah State University
Echo Visitor Information Center
Honorable Mike Leavitt, Governor of Utah
State Planning Coordinator
Utah Department of Natural Resources
Utah Department of Transportation

LOCAL AGENCIES

Mayor, Alpine City
Mayor, American Fork City
Mayor, Cedar Hills

Mayor, Heber City
Mayor, Highland City
Mayor, Lehi City
Mayor, Lindon City
Mayor, Midway City
Mayor, Orem City
Mayor, Pleasant Grove City
Mayor, Provo City
Utah Association of Counties
Utah County Commission
Wasatch County Commission
Wasatch State Park

ORGANIZATIONS

Brigham Young University, Department of Geology
Cave Research Foundation
Center for Urban Affairs, Northwestern University
Country Corners
Department of Community Development
Green River Travel Council
Mountainland Association of Governments
National Parks and Conservation Association
National Public Lands Council
Paiute Indian Tribe
Provo/Orem Commerce
Salt Lake Convention and Visitor Bureau
Salt Lake Grotto, NSS
Sierra Club
Southwest Parks and Monuments Association
St. George Chamber of Commerce
The Nature Conservancy
The Wilderness Society
Timpanogos Grotto NSS
Uintah/Ouray Tribal Council
U. S. West
Utah County Travel Council
Utah Power and Light
Utah Travel Council
Utah Wilderness Association
Wasatch Grotto, NSS

Wasatch Mountain Club

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U.S. DEPARTMENT OF AGRICULTURE

Soil Conservation Service

"Summary Report on Dam Failure Inundation Study for Silver Lake Flat and Tibble Fork Dams (American Fork - Dry Creek Watershed, Utah)." January 1992.

USDA Forest Service

October 16, 1991 memorandum from Paul H. Skabelund, Forester, Watershed Specialist, to Uinta National Forest Supervisor on the subject of Wetlands Situation - Timpanogos Cave National Monument.

U.S. DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

Endangered Species List for Timpanogos Cave National Monument, Utah, (included in August 1, 1991, memorandum to Acting Associate Regional Director, Planning and Resource Preservation, Rocky Mountain Region, National Park Service, Denver, Colorado, from Assistant Field Supervisor, Fish and Wildlife Enhancement, U.S. Fish and Wildlife Service, Salt Lake City, Utah).

National Wetlands Inventory - Timpanogos Cave National Monument, 1990.

National Park Service

"Annual Statement for Interpretation, Timpanogos Cave National Monument - 1990." Prepared by Chief of Interpretation and Resource Management, Timpanogos Cave National Monument.

Archeological Evaluation, Timpanogos Cave National Monument, December 24, 1975. Prepared by Supervisory Archeologist, Midwest Archeological Center.

Timpanogos Cave National Monument - EIS, GMP, DCP

Class "C" Estimating Guide, Prepared by the Denver Service Center, Branch of Estimating, April 1991.

Draft Resource Management Plan, Timpanogos Cave National Monument, September 1991. Prepared by Chief Interpretation and Resource Management, Timpanogos Cave National Monument.

General Management Plan, Development Concept Plan, Interpretive Prospectus, Environmental Assessment, Timpanogos Cave National Monument, May 1983. Prepared by Rocky Mountain Regional Office and Timpanogos Cave National Monument, National Park Service.

Memorandum (no date) to Chief, Branch of Planning, Planning and Compliance Division, Rocky Mountain Region, from Jim Ellis, Geotechnical Engineer, Denver Service Center, Transportation, on the subject of "Geologic Hazard Relative to Existing Residence at Timpanogos Cave National Monument."

National Register of Historic Places Inventory - Nomination Form for Federal Properties - covering Timpanogos Cave Historic District.

Statement for Management - Timpanogos Cave National Monument, July 1991. Prepared by the Branch of Planning, Rocky Mountain Regional Office.

"Timpanogos Cave National Monument - Summary of Survey Findings," February 5, 1992. Prepared by Sandra D. Bargas, Statistical Assistant, Socio-Economic Studies Division, WASO-TNT, National Park Service, Denver, Colorado.

The Money Generation Model, Prepared by the Office of Social Science, Socio-Economic Studies Division, Denver, Colorado, December 1990.

Trip Report. To Chief, Division of Construction and Maintenance, Rocky Mountain Region from John Criger, Civil Engineer. Purpose "Review existing sewage systems and make recommendations for replacement or continued use of the sewage facilities."

"Valuation Study of the Range of Fee Value for Approximately 10 Acres on Either Side of State Highway 92 from its Intersection with I-15 Extending Eastward to its Intersection with State Highway 74 and Slightly Beyond," May 22, 1991. Prepared by Chief Appraiser, Land Resources Division, Rocky Mountain Region.

LIST OF PREPARERS

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Michael G. Schene, Historian, National Park Service, Rocky Mountain Region, Division of Planning and Compliance, holds a PH.D. degree in history from Florida State University.

He has been with the National Park Service for fifteen years and his experience includes Supervisory Regional Historian, Rocky Mountain Region; Supervisory Cultural Resource Planner, Denver Service Center; historian, Florida Division of Archives, History and Records Management.

Jacobus (Dutch) Scholten, Chief of Maintenance, Timpanogos Cave National Monument, has been Chief of Maintenance since August of 1992. He has an environmental biology major and physical/cultural anthropology minor at the college level. Originally from the Netherlands, Dutch has ten years of National Park Service experience in maintenance-related trades; ten years with the U.S. Forest Service in fire and maintenance fields, and operated his own outdoor recreation business for ten years. He also has considerable experience as a buildings and utilities foreman, in automotive repair, and home construction.

Mike Tranel, Chief Interpretation and Resource Management, Timpanogos Cave National Monument, holds a bachelor of arts degree in American Studies/Earth Science from the University of Notre Dame and a master of arts degree in geography from the University of Iowa. Originally from Montana, he has served as a park ranger at Ocmulgee National Monument and Gulf Islands National Seashore from 1985-1989. He became the Chief of Interpretation and Resource Management at Timpanogos Cave National Monument in October 1989.

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APPENDICES

APPENDIX A - LEGISLATION

A PROCLAMATION

WHEREAS, a natural cave, known as the Timpanogos Cave, which is situated upon unsurveyed lands within the Wasatch National Forest in the State of Utah, is of unusual scientific interest and importance, and it appears that the public interests will be promoted by reserving this cave with as much land as may be necessary for the proper protection thereof, as a National Monument.

Timpanogos Cave
National Monument,
Utah.
Preamble.

NOW, THEREFORE, I, Warren G. Harding, President of the United States of America, by virtue of the power in me vested by section two of the Act of Congress approved June eight, nineteen hundred and six, entitled, "An Act for the preservation of American antiquities," do proclaim that there is hereby reserved from all forms of appropriation under the public land laws, subject to all prior valid adverse claims, and set apart as a National Monument, the tract of land in the State of Utah shown as the Timpanogos Cave National Monument on the diagram forming a part hereof.

National Monument,
Utah.
Vol. 34, p. 225.

The reservation made by this proclamation is not intended to prevent the use of the lands for National Forest purposes under the proclamation establishing the Wasatch National Forest, and the two reservations shall both be effective on the land withdrawn but the National Monument hereby established shall be the dominant reservation and any use of the land which interferes with its preservation or protection as a National Monument is hereby forbidden.

Use of Wasatch Na-
tional Forest not af-
fected.

Warning is hereby given to all unauthorized persons not to appropriate, injure, deface, remove, or destroy any feature of this National Monument, or to locate or settle on any of the lands reserved by this proclamation.

Reserved from settle-
ment, etc.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE at the City of Washington this fourteenth day of October, in the year of our Lord one thousand nine hundred and [SEAL] twenty-two, and of the Independence of the United States of America the one hundred and forty-seventh.

WARREN G HARDING

By the President:

CHARLES E. HUGHES
Secretary of State.

TIMPANOGOS CAVE NATIONAL MONUMENT

within

WASATCH NATIONAL FOREST

Partly surveyed township 4 South Range 2 East

UTAH

Salt Lake Base and Meridian

— National Monument Boundary

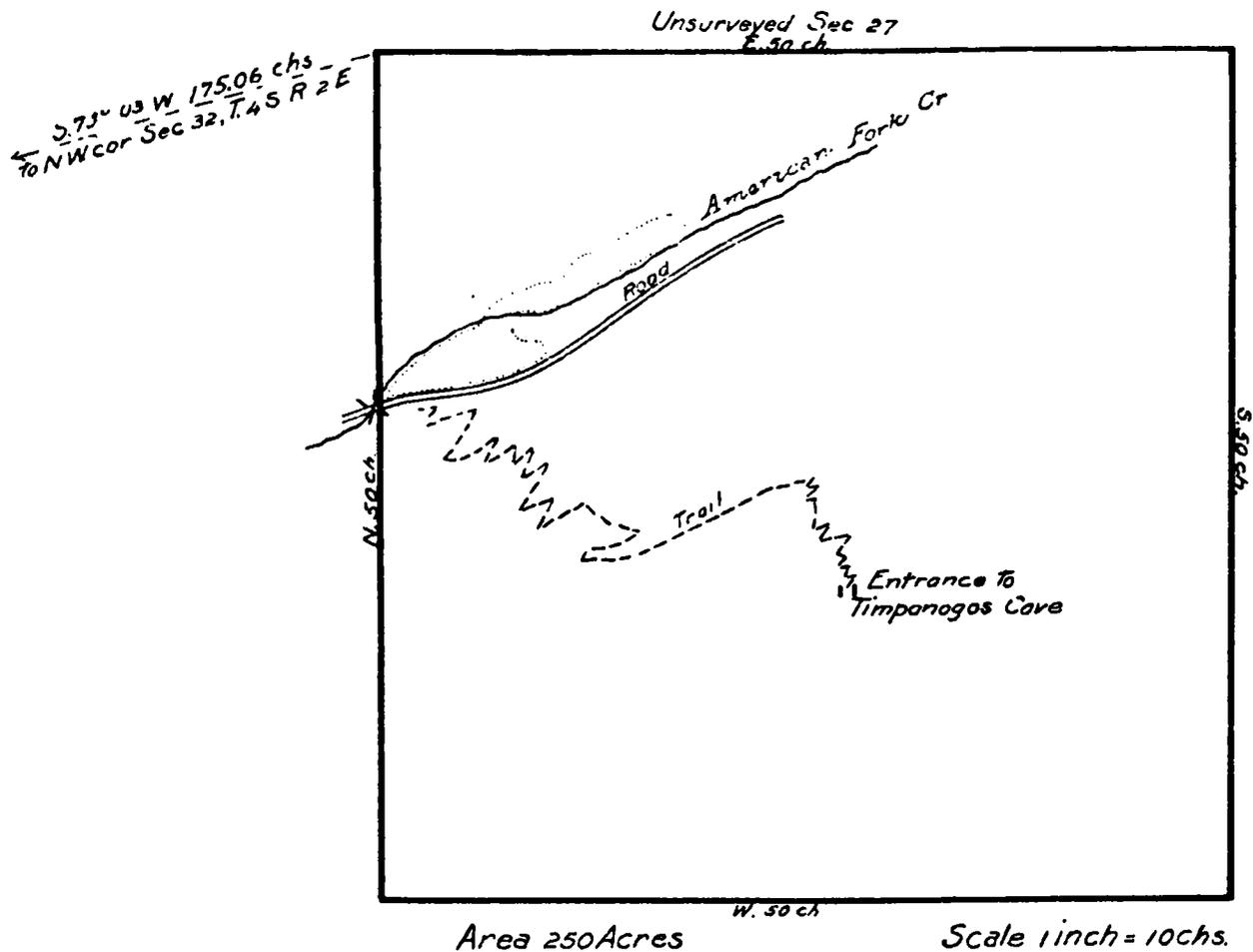


DIAGRAM FORMING A PART OF PROCLAMATION DATED OCTOBER 14, 1922

Proclamation 3457**REDEFINING THE EXTERNAL BOUNDARIES OF THE TIMPANOGOS CAVE
NATIONAL MONUMENT, UTAH****By the President of the United States of America**March 27, 1962**A Proclamation**

WHEREAS, by Proclamation No. 1640 of October 14, 1922 (42 Stat. 2285), there were reserved and set apart, as the Timpanogos Cave National Monument, Utah, certain lands as shown on a diagram forming a part of that proclamation; and

WHEREAS a subsequent survey, accepted by the General Land Office on May 17, 1945, disclosed that that diagram does not accurately depict the boundaries of the monument as those boundaries are marked on the ground; and

WHEREAS it appears that it would be in the public interest to redefine the external boundaries of the monument in conformity with the survey:

NOW, THEREFORE, I, JOHN F. KENNEDY, President of the United States of America, under and by virtue of the authority vested in me by the Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 431), do proclaim that the lands within the following-described boundaries shall constitute the Timpanogos Cave National Monument:

SALT LAKE BASE AND MERIDIAN, UTAH

Beginning at a point marked by a brass cap located 8.33 chains S. 7°30' W. from the quarter section corner common to sections 27 and 28, township 4 south, range 2 east; thence north approximately 20 chains to a point; thence east approximately 50 chains to a point; thence south approximately 50 chains to a point; thence west approximately 50 chains to a point; thence north approximately 30 chains to a brass cap, the point of beginning, as depicted on the plat for township No. 4 south, range No. 2 east, of the Salt Lake Meridian, Utah, Survey and Dependent Resurvey, accepted May 17, 1945, by Assistant Commissioner, General Land Office, Joel David Wolfsohn.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of the United States of America to be affixed.

DONE at the City of Washington this twenty-seventh day of March in the year of our Lord nineteen hundred and sixty-two, and [SEAL] of the Independence of the United States of America the one hundred and eighty-sixth.

JOHN F. KENNEDY

By the President:

GEORGE W. BALL,
Acting Secretary of State.

APPENDIX B - USFWS CORRESPONDENCE



United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
UTAH STATE OFFICE
2078 ADMINISTRATION BUILDING
1745 WEST 1700 SOUTH
SALT LAKE CITY, UTAH 84104-5110

TAKE PRIDE IN AMERICA

AUG 5 1991

In Reply Refer To

(FWE)

August 1, 1991

Memorandum

To: Acting Associate Regional Director, Planning and Resource Preservation, Rocky Mountain Region, National Park Service, Denver, Colorado

From: ~~For~~ Assistant Field Supervisor, Fish and Wildlife Enhancement, U.S. Fish and Wildlife Service, Salt Lake City, Utah

Subject: Endangered Species List for Timpanogos Cave National Monument, Utah

Regional Director
Deputy Reg. Director
Park Oper.
Admin.
Plan. & Res. <i>9/5</i>
Comm. & P.A.
Ed.
Action Taken

Garland

We have reviewed your letter of July 8, 1991 concerning the proposed revision of the General Management Plan and Development Concept Plan for Timpanogos Cave National Monument, Utah County, Utah. It appears that the following listed endangered and threatened species, may occur in the area of influence of this action:

Listed

Ute ladies'-tresses

Spiranthes diluvialis

We would also like to bring to your attention species which are candidates for official listing as threatened or endangered. While these species have no legal protection under the Endangered Species Act, we ask that you try to avoid them if they are found in the area. Candidate species which may occur in the area of your project are:

Candidate

Bonneville cutthroat trout
Wasatch pika

Oncorhynchus (=Salmo) clarki utah
Ochotona princeps wasatchensis

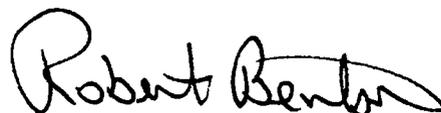
The National Park Service should review their proposed action and determine if the action would affect any listed species or their critical habitat. You should also determine if the action is likely to jeopardize the continued existence of proposed species or result in the destruction or an adverse modification of any critical habitat proposed for such species. If the determination is "may affect" for listed species, you must request in writing formal consultation from the Assistant Field Supervisor, at the address given above. In addition, if you determine that the proposed action is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, you must confer with this office. At that time, you should provide this office a copy

of the biological assessment and any other relevant information that assisted you in reaching your conclusion.

The Service can enter into formal Section 7 consultation only with another Federal agency. State, county, or any other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participate in meetings, etc.

Your attention is also directed to Section 7(d) of the Endangered Species Act, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

If we can be of further assistance, please advise us. The Service representative who will provide you technical assistance is Robert Benton; FTS 588-4430, Commercial (801) 524-4430.



cc: Utah Division of Wildlife Resources/Springville



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