Chapter 2 Alternatives

This "Alternatives" chapter describes the alternatives considered for the plan, including those eliminated from further analysis in this EIS. An EIS must consider a reasonable range of options that could accomplish the agency's objectives (the purpose and need). Six alternatives are being considered in detail, including taking no action at this time. The environmental impacts of implementing these alternatives are presented in chapter 4 of this EIS. Upon conclusion of the planning and decision-making process, one of the alternatives will be selected and will become the plan.

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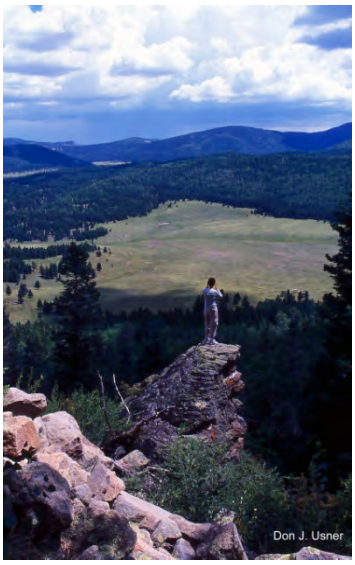
2. Alternatives



Introduction

This plan proposes the development of facilities and infrastructure to provide increased access onto and within the preserve, and to protect natural and cultural resources from the impacts of increased visitation.

The Valles Caldera Trust is proposing to implement a comprehensive public access and use plan for the Valles Caldera National Preserve. The plan proposes the development of facilities and infrastructure to provide increased access onto and within the preserve, and to protect natural and cultural resources from the impacts of increased visitation. The plan would also guide programs and activities for public access and use for recreation, education, scientific research, and other purposes.

Six alternatives are being considered in detail, including taking no action at this time. Upon conclusion of the planning and decision-making process, one of the alternatives will be selected and will become the public access and use management plan. This will be a long-term plan, subject to periodic review and evaluation through the *State of the Preserve*, a document that is prepared every five years to review the cumulative impacts of VCT actions and preserve operations.

The VCT is proposing to implement the plan in phases, ensuring continued access to the preserve during the transition from the current interim programs to long-term programs. If the no-action alternative is selected, the VCT would phase out current access through the Valle Grande and Banco Bonito staging areas, and would phase out the current interim programs and activities.

This chapter briefly describes the key issues and alternatives being considered in detail for public access to and use of the preserve. Alternatives that were considered and then eliminated from detailed analysis are also presented, along with a brief statement as to why they were eliminated. Each action alternative included for analysis considers the following implementation-level and programmatic-level decisions. Figure 2-1 and figure 2-2 visually depict these concepts.

Implementation-level Decisions

Implementation-level decisions address site-specific actions to be implemented following the publication of the record of decision (ROD). These decisions may be implemented without further review under NEPA. The implementation-level actions analyzed in this EIS are site-specific, based primarily on the physical footprint being affected and the area of impact. Under the action alternatives, implementation-level decisions include two basic components: the development of a visitor center / visitor contact station and the development of connected infrastructure and facilities. Connected infrastructure includes the following:

- access from NM-4 with prominent directional road signs
- short-term visitor parking at the visitor center / contact station

- day-use recreation amenities at the visitor center / contact station (e.g., trails, overlooks, picnic areas)
- visitor conveniences (toilets, picnic facilities, trash receptacles)
- group staging areas and interpretive information
- power, water, and utilities

The alternatives describe these components in general. Specific details will be determined during design, allowing the preserve to maintain flexibility by responding to site-specific details as design issues and criteria arise.

Programmatic-level Decisions

Programmatic-level decisions guide or prescribe future actions. The environmental analysis for programmatic-level decisions made under this EIS considers only a general area of impact that could occur in any area of the preserve. These future actions would require additional planning and decision making in compliance with NEPA prior to implementation. Future planning and decision making may require documentation in an environmental assessment or EIS, or may be categorically excluded from further documentation consistent with the VCT procedures for implementing NEPA. Under the action alternatives, programmatic-level decisions include the following:

- a transportation system to support primary access via shuttle or personal vehicle based on the selected alternative; the route would follow a loop from the selected visitor center / contact station location
- transportation system infrastructure
- a general scale and location of infrastructure to disperse visitor use beyond the visitor center / contact station location (trailheads, picnic areas, overlooks)
- a trail system to support day use and backpacking
- guidelines to locate outdoor education and group staging areas
- criteria for considering additional facilities; e.g., levels of visitor use

Alternatives Summary

Six alternatives are being considered in detail, including taking no action at this time.

Six alternatives are proposed for this plan, as described below and in more detail on the following pages.

Alternative 1: No Action. This alternative would result in the removal of the Valle Grande and Banco Bonito staging areas and the elimination of the interim recreation program. The VCT would phase out current access through these staging areas and would phase out interim programs and activities. Access for the grazing or other land management activities would continue consistent with decisions and environmental documents guiding those specific actions. The current tribal access policy would continue.

1: Develop a Visitor Center

2: Develop Connected Infrastructure and Facilities

Access from NM-4

Short-term visitor parking

Day-use recreation amenities at visitor center

Visitor conveniences

Group staging, interpretive information

Power, water, utilities

Figure 2-1: Implementation-level Decisions

Decisions to Guide Future Development

1: Transportation System—Shuttle or Personal Vehicle

2: Transportation System Infrastructure

3: Infrastructure to Disperse Visitor Use

4: Trail System (Day Use and Backpacking)

5: Guidelines to Locate Outdoor Education, Group Staging Areas

6: Criteria for Additional Facilities

Figure 2-2: Programmatic-level Decisions

Alternative 2: Banco Bonito Visitor Contact Station. A small-scale visitor contact station would be developed at the Banco Bonito area in the southwestern part of the preserve. Additional development would include day-use facilities, a small parking area, and double-lane roads at specific locations to provide access into the preserve for personal vehicles and/or shuttles. Nonmotorized access from the visitor contact station would be generally open and unlimited. Shuttles would be incorporated into the transportation system to provide primary access on high-use days and in support of special events and tours. Facilities and infrastructure would include fishing access, trailheads, overlooks, and picnic areas, including parking lots for up to 10 vehicles in the backcountry. Hiking would be expanded to provide short day loops and multi-day backpacking opportunities. Pedestrian, equestrian, and mountain biking access would be managed to reduce conflicts while minimizing controls and restrictions. Reservations would continue to be an important tool for popular activities and for arranging group and educational access.

Alternative 3A: Entrada del Valle Visitor Center—Primary Access via Shuttle System. The central feature of this alternative is the development of a full-service visitor and interpretive center in the preserve near the Valle Grande to provide interpretive and other services to visitors. A trail from the visitor center would provide access to the East Fork of the Jemez River, overlooks, picnic areas, staging for groups and special events, and interpretive sites. Over time, hikers could access a variety of trails directly from this day-use area. Services and amenities would include covered drop-off, lobby, reception, and orientation areas; a theater; a main exhibit hall; a temporary exhibit hall; classroom/meeting space; retail and food service space; restrooms; and indoor/outdoor observation decks. Access into the preserve would be primarily by shuttle; personal vehicles would be allowed for specific activities by permit only. Facilities and infrastructure developed in the future would include fishing access, trailheads, overlooks, and picnic areas. These areas would include shuttle stops, parking for up to five vehicles, restrooms, trash and recycling receptacles, and interpretive signs. Hiking trails would be expanded to provide short day loops and multi-day backpacking opportunities.

Alternative 2 allows for personal vehicle access with optional shuttles on high-use days. Alternatives 3A and 4A provide access within the preserve using shuttles only. Alternatives 3B and 4B provide access within the preserve using personal vehicles.

Alternative 3B: Entrada del Valle Visitor Center—Primary Access via Personal Vehicle. This alternative would be the same as alternative 3A, with the exception of how the preserve would be accessed. As described above, a shuttle system would serve as the primary mode of access under alternative 3A, and personal vehicle access would be by special permit for specific activities only. Under alternative 3B, the primary mode of transportation onto the preserve would be personal vehicles. Shuttles would only be used for tours and group events or to reduce congestion on high-use days. Similar to alternative 3A, facilities and infrastructure developed in the future would include fishing access, trailheads, overlooks, and picnic areas. However, under alternative 3B additional parking areas and larger parking lots would be warranted in the preserve's interior to accommodate the use of personal vehicles.

Alternative 4A: Vista del Valle Visitor Center—Primary Access via Shuttle System. This alternative is similar to alternative 3A but would locate the full-service visitor and interpretive center south of NM-4 below Rabbit Mountain,

overlooking the Valle Grande. Services and amenities would be the same as under alternative 3A. Although alternative 3A would focus on day-use experiences centered on wildlife viewing in the Valle Grande, accessing the East Fork of the Jemez River and hiking South Mountain, alternative 4A would develop a day-use area focused on views of the Valle Grande, interpretation of geology, and proximity to Bandelier National Monument. An underpass would be developed to provide access below NM-4 for wildlife viewing. Interpretive trails and picnic areas would be developed south of NM-4, also emphasizing views of the Valle Grande. Like alternative 3A, a shuttle system would serve as the primary mode of access into the preserve.

Alternative 4B: Vista del Valle Visitor Center—Primary Access via Personal Vehicle. This alternative would be the same as alternative 4A, with the exception of how the preserve would be accessed. As described above, a shuttle system would serve as the primary mode of access under alternative 4A; personal vehicle access would be by special permit for specific activities only. Under alternative 4B, the primary mode of transportation onto the preserve would be personal vehicles. Shuttles would only be used for tours and group events or to reduce congestion on high-use days. Similar to alternative 4A, facilities and infrastructure developed in the future would include fishing access, trailheads, overlooks, and picnic areas. However, under alternative 4B additional parking areas and larger parking lots would be warranted in the preserve's interior to accommodate the use of personal vehicles.

Development and Screening of Alternatives

This section describes how the VCT developed and screened alternatives to identify those to be analyzed in detail in this EIS. Figure 2-3 illustrates the general approach used to select the alternatives.

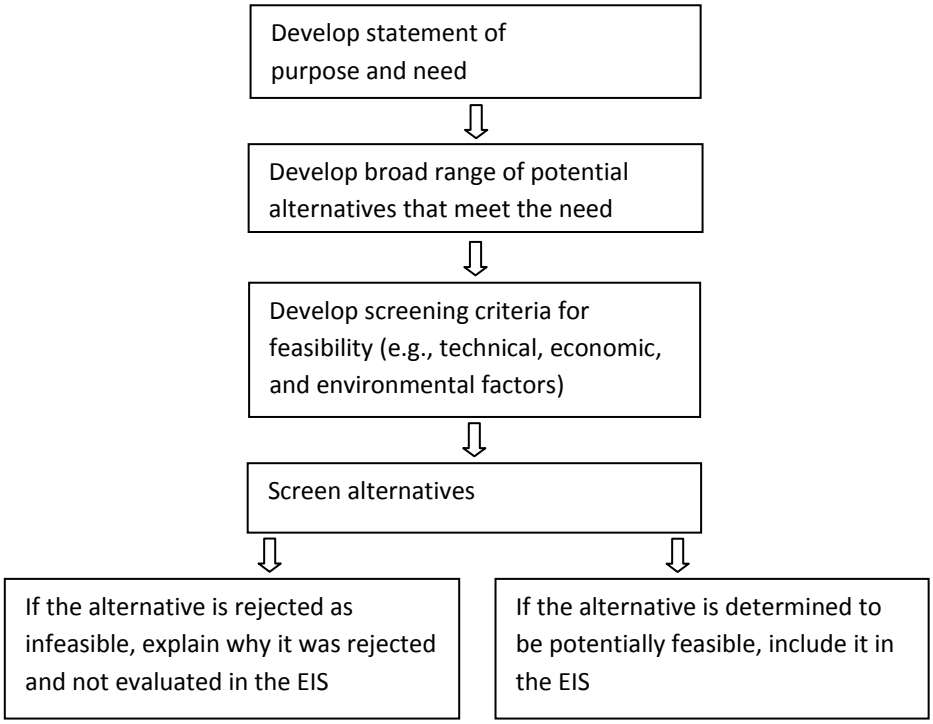
Public Involvement

Comments received from the public since the federal acquisition of the preserve played a large role in the development of the alternatives for this plan/EIS.

Comments received from the public since the federal acquisition of the preserve played a large role in the development of the alternatives for this plan/EIS. Three key comment periods that influenced the alternatives are described below. More detailed information about public involvement for this plan is included in chapter 5.

2001 Listening Sessions

Soon after the preserve transferred to federal ownership, the VCT held listening sessions with the public in 2001. The information from these sessions helped identify public concerns and desires, and helped the VCT develop interim programs for public access and use.



Source: Bass and Herson 1993.

Figure 2-3: Alternatives Screening Process

2007 Public Workshops

In 2006, the VCT formally initiated comprehensive public access and use planning, which led to public workshops hosted by the VCT in 2007 to identify goals and assess sites for development. These workshops were held in Jemez Springs, Pojoaque, Los Alamos, and Rio Rancho, and consisted of open houses with staffed stations. Preserve staff members solicited public feedback about the Valles Caldera landscape and potential changes to it within the framework of the act that established the preserve. Following these meetings, the VCT facilitated another workshop to identify values, activities, desired recreational activities, and management actions. Information gathered at these workshops helped define the scope of the analysis for this plan.

2009 Scoping

Scoping is a process required by NEPA to solicit important issues and information related to a proposed action from within an agency, other agencies, and the public. Scoping aids in the development of alternatives for a proposed action.

The VCT published a notice of intent to prepare an EIS for a public access and use plan in the Federal Register on Friday, August 28, 2009. Soon after this notification, the VCT created an area of its website devoted to presenting information about elements the VCT had identified to help guide the development of alternatives. This

website was designed to allow users to provide comments and feedback about each element (access, capacity, activities, development, financing, and values) to help build the alternatives.

The VCT held two public meetings in September 2009 in Albuquerque and Santa Fe, New Mexico. The general format of each meeting included an open house, where attendees could visit several stations with background information and descriptions of the various planning elements the preserve had identified for incorporation into the alternatives development process. After each open house, the VCT presented a brief overview of the process, which was followed by a group discussion. The VCT carefully considered the comments received from these meetings, on the interactive website, and in other written forms to help identify key issues and develop the alternatives described below.

Key Issues

Key issues are substantive conflicts or concerns associated with the action being proposed and help focus the analysis.

Key issues are substantive conflicts or concerns associated with the action being proposed. They serve to focus the analysis and provide the basis for developing mitigation measures and alternatives to the proposed action. In addition, key issues form the basis for the impact topics discussed and analyzed in chapters 3 and 4 of this document. The following key issues were identified for this EIS.

Alternative Elements

Location of Development

Multiple criteria for determining the location of a visitor center were considered, including the following:

- association with the Valle Grande (key feature for attracting spontaneous visitors)
- previous disturbance or development (avoiding new disturbance)
- access to utilities, water, and wastewater
- sustainability, energy use
- maintenance costs
- impacts on views
- types of day-use activities that could be supported

No location met all of these criteria; however, three locations are being considered in detail under the six proposed alternatives.

Scale of Development

On public lands with large numbers of visitors, such as national and state forests and parks, infrastructure elements such as maintained roads, campgrounds, parking lots, trailheads, and restrooms are used to protect resources and influence activity patterns. Impacts are typically highly concentrated around attractions and recreational facilities, as well as along the travel routes that connect them. Although people who provided public comments expressed strong support for resource

protection, they expressed low to moderate support for the development of recreation facilities.

Performance requirements are being proposed to mitigate the impact of the various scales of development being considered. "Performance requirement" means the limitation placed on the implementation of a stewardship action[1] necessary for compliance with applicable laws, regulations, standards, mitigating measures, or generally accepted practices (VCT 2003a). Performance requirements are also being proposed to incorporate long-term sustainability concepts into programs and facilities for public access and use, as called for in comments received during scoping and as directed by Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," signed October 5, 2009. All alternatives include efficient, Leadership in Environment and Energy Design (LEED) designs and the potential to develop a solar energy system to reduce future operations and maintenance costs and energy consumption.

Access via Personal Vehicles versus Shuttle System

While some public comments received during scoping and from participants in the interim recreation program expressed a strong desire for unmanaged access to the preserve via personal vehicles, comments also consistently placed a high value on the quiet and sense of solitude experienced on the preserve. Some comments expressed both a desire to minimize road improvements and a desire for access via personal vehicles. In response to these comments, the alternatives being considered in detail vary in the degree of access by personal vehicles versus by a shuttle system, and the associated levels of infrastructure needed to support these different systems of access.

Lodging

Limited lodging is currently available on the preserve. Expanding full-service lodging could be a major attraction and could lead to an increase in visitation to the preserve year-round, potentially contributing to economic sustainability. However, public comments received during scoping were overwhelmingly against such development. In addition, the development of lodging on the preserve could compete with existing lodging in Jemez Springs, La Cueva, Los Alamos, and White Rock, and thus conflict with the Valles Caldera Preservation Act goal of benefiting local communities and small businesses.

The goal of this EIS is to address public access to and use of the preserve, and a lack of lodging is not currently limiting public access. In addition, the viability of sources to fund the expansion of lodging is uncertain, and specific economic analyses are needed to determine whether available funding would be sufficient. Therefore, this issue is not ripe for a decision. Consideration of new lodging will be deferred for future analysis.

[1] A "stewardship action" is an activity that may (1) guide or prescribe alternative uses of the preserve on which future implementing decisions will be based or (2) use or manage the resources of the preserve. This EIS represents a stewardship action.

Environmental/Cultural Resources Impacts

Impacts on the Valles

The vast montane grasslands and associated riparian areas of the preserve's valles are a unique ecological feature and are rare in the southwest (Muldavin and Tonne 2003). The proposed development of facilities and infrastructure, and the associated increase in access and use, could impact the character and ecology of these areas. Performance requirements are being proposed to minimize the intensity and context (significance) of the impacts from the proposed development and to guide or prescribe future activities and development that may be proposed.

Impacts on Elk

The proposed action alternatives would substantially increase the presence and distribution of people in the Valle Grande during elk calving periods, potentially impacting the elk herd. Performance requirements are being proposed to reduce these impacts.

Impacts on Cultural Resources

The proposed action would substantially increase the presence and distribution of people throughout the preserve. Cultural resources on the preserve under the protection of the National Historic Preservation Act could be impacted by visitors. For example, obsidian is common throughout the preserve and collectively represents a resource under the protection of the National Historic Preservation Act. Obsidian is often easily visible to the naked eye and therefore vulnerable to collection and removal by visitors (especially pieces that have been worked into arrowheads). Performance requirements are being proposed to reduce these impacts.

Effects on Tribal Access and Areas of Importance

The preserve is a place of cultural and religious significance to area Tribes and Pueblos. Currently the VCT manages special access for cultural pursuits under the Tribal Access and Use Policy, signed in 2004. Among other provisions, this policy allows exclusive tribal access by request (VCT 2004c). Increased use and distribution of visitors could conflict with cultural access to and use of these special areas. Performance requirements are being proposed to reduce these impacts.

The development of a caldera rim trail has gained interest recently. Five entities, including Valles Caldera National Preserve, own parts of the rim. One owner, the Pueblo of Santa Clara, is a separate nation with ancient spiritual ties to the mountains and a strong drive to protect its boundaries (Valles Caldera Rim Trails 2007). At recent Senate hearings regarding the potential transfer of the preserve to the National Park Service, the Santa Clara Pueblo expressed opposition to the development of trails for hiking on the Caldera's rim, and the Jemez Pueblo expressed a desire to have all public access limited to areas below 9,250 feet above sea level (U.S. Senate Committee on Energy and Natural Resources 2010).

Cost/Feasibility

Logistics/Costs for Development

No building footprint or utilities currently exist to support the development of a visitor center or contact station along NM-4 near the Valle Grande. Developing a visitor center or contact station along NM-4 could be costly and time consuming to construct and maintain. However, NM-4 provides easy access to stunning views of the Valle Grande, which is the central feature that attracts visitors to the preserve, making a visitor center along this highway a viable option. Therefore, the proposed alternatives consider various visitor center locations accessed from NM-4 near the Valle Grande, as well as development elsewhere that includes access to the Valle Grande through the interior of the preserve. Estimated construction costs for each alternative are included at the end of this chapter.

Future Preserve Management

Potential Transfer of the Preserve to the National Park Service

Senate Bill 1689, which would have transferred administration of the preserve to the National Park Service, passed committee review in 2010 but did not make it through the Congress. The proposed transfer was again introduced in the Senate in 2011. It is possible that such a transfer could occur in the near future, possibly during this planning and decision-making process. The alternatives are consistent with both the Valles Caldera Preservation Act and the language of the legislation currently being considered. The VCT will continue operating under its existing legislation and will adjust to any changes accordingly.

Alternatives Development

The VCT initially developed a large range of potential public access and use management scenarios with input from a variety of sources.

The VCT initially developed a large range of potential public access and use management scenarios with input from VCT staff, the board of trustees, consultants, and the public (including tribes, municipalities, and agencies). Alternatives development for this plan began with a relatively blank slate with public meetings in 2007 as described in the "Public Involvement" section of this chapter. Although opinions varied, the most consistent pattern was a desire for increased and unstructured access with a relatively light amount of development.

The VCT presented five scenarios to the public during scoping in 2009. These scenarios were designed to solicit feedback on what a wide range of management themes (which could meet the purpose of and need for action) might look like when implemented. These scenarios, which were not proposed for inclusion in the EIS in their entirety, included one scenario that would continue the current interim recreation program; one scenario that would allow increased access with light development (this scenario was intended to represent the public desires expressed in the 2007 public meetings); and three scenarios that would partially or completely meet the financial self-sufficiency goal through increasing levels of development and available activities. These three scenarios included ideas developed by an economic consultant hired by the VCT to explore how the VCT could meet the financial self-sufficiency goal (Entrix 2009). Some of the ideas included in the consultant's report,

such as green burial, were not included in these scenarios or future alternatives developed because the VCT determined that they were not feasible or inconsistent with the Valles Caldera Preservation Act.

Public comments from the 2009 scoping efforts varied widely, but in general, the same theme that was expressed in 2007 was expressed again: the comments favored increased access with light development. VCT staff members applied the public comments to the conceptual scenarios that were presented during scoping and explored some new ideas that were either suggested by the public or developed by VCT staff to develop a revised range of alternatives. The primary change in the range of alternatives was the elimination of alternatives with higher levels of development, as described in the screening process below. The conceptual scenarios were replaced with an expansion on alternatives with varying approaches to visitor access and use, incorporating lower levels of development.

Thus the VCT developed, assessed, and screened the following alternatives:

- no action—no public access and use plan
- continuation of the interim recreation program
- alternatives based on the revenue enhancement study
- open access for dispersed recreation (Valle Vidal model)
- wilderness/roadless management emphasis (San Pedro Parks wilderness model)
- a small-scale visitor center / visitor contact station at Valle Grande location
- minimal development with a visitor contact station at Banco Bonito Staging Area
- a visitor center near South Mountain with a shuttle transportation system
- a visitor center near South Mountain with a managed mix of shuttle transportation and personal vehicle transportation
- a visitor center near Rabbit Mountain with a shuttle transportation system
- a visitor center near Rabbit Mountain with a managed mix of shuttle transportation and personal vehicle transportation

Alternatives Screening

Initial alternatives were screened to arrive at a reasonable range to analyze in detail in this EIS.

In late 2009 and early 2010 the VCT screened the alternatives listed above to arrive at a reasonable range of alternatives to analyze in detail in this EIS, one of which would ultimately be implemented as the public access and use plan following publication of the ROD. VCT staff eliminated alternatives from detailed analysis by considering the following two questions in a two-level screening process:

- Does the alternative meet the purpose of and need for action?
- Is the alternative technically and economically feasible?

These criteria were applied to the alternatives in a combination of brainstorming meetings and internal peer review of written conceptual alternatives. This two-level process is illustrated in tables 2-1 and 2-2. The purpose and need criteria are divided into components of the need for action, as further described in chapter 1 under "Need," and the feasibility criteria are divided into three components, as shown in the following tables. If an alternative did not meet all components of purpose and need, it was eliminated from detailed analysis in this EIS. Those that did were advanced to Level 2 to be screened against the feasibility criteria. Because several environmental protection, feasibility, and economic elements were included in the purpose and need statement, few such issues remained after addressing purpose and need during Level 1 screening.

Predicted visitation levels were based on traffic counts on NM-4, visitation at similar recreation sites such as Bandelier National Monument, and current visitation to the preserve. VCT staff also considered daily visitation based on seasons and weekends vs. weekdays.

Table 2-1: Level 1 Screening Summary

Alternative or Component of Alternative	Purpose	Need						Screening Result
		Access[a]	Safety[b]	Infrastructure[c]	Physical Point of Access	Sustainable Management	Balanced Sustainable Management[d]	
No action—no public access and use plane								Advanced to EIS
Continuation of the interim recreation program								Eliminated
Open access for dispersed recreation: Valle Vidal model		✓						Eliminated
Wilderness/roadless management emphasis: San Pedro Parks wilderness model		✓						Eliminated
Revenue enhancement study alternatives and similar variations		✓	✓	✓	✓	✓		Eliminated
Visitor center at the headquarters area	✓	✓			✓	✓		Eliminated
Visitor center along NM-4 at locations other than near Rabbit Mountain	✓	✓	✓	✓		✓		Eliminated
Small-scale contact station / visitor center development at Valle Grande locations	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2
Minimal development with visitor contact station at Banco Bonito Staging Area	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2
Visitor center near South Mountain with shuttle transportation system	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2
Visitor center near South Mountain with managed mix of shuttle transportation and personal vehicle transportation	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2
Visitor center near Rabbit Mountain with shuttle transportation system	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2

Alternative or Component of Alternative	Purpose	Need						Screening Result
		Access[a]	Safety[b]	Infrastructure[c]	Physical Point of Access	Sustainable Management	Balanced Sustainable Management[d]	
Visitor center near Rabbit Mountain with managed mix of shuttle transportation and personal vehicle transportation	✓	✓	✓	✓	✓	✓	✓	Advanced to Level 2

[a] Provide more access and freedom.
[b] Institute safety standards for facilities and infrastructure.
[c] Provide adequate infrastructure to protect resources from impacts due to increased visitor access.
[d] Promote financially sustainable management consistent with public values and other purposes (e.g., natural and cultural resources).
[e] A no-action alternative is required by NEPA. It does not have to meet purpose and need to be evaluated.
✓ = meets criterion.

Table 2-2: Level 2 Screening Summary

Alternative	Feasibility Criteria			Screening Result
	Authorized by Valles Caldera Preservation Act	Justifiable Cost/Benefit Ratio	Adequate Capacity for Predicted Visitation	
Small-scale contact station / visitor center development at Valle Grande locations	✓			Eliminated
Minimal development with visitor contact station at Banco Bonito Staging Area	✓	✓	✓	Advanced to EIS
Visitor center near South Mountain with shuttle transportation system	✓	✓	✓	Advanced to EIS
Visitor center near South Mountain with managed mix of shuttle transportation and personal vehicle transportation	✓	✓	✓	Advanced to EIS
Visitor center near Rabbit Mountain with shuttle transportation system	✓	✓	✓	Advanced to EIS
Visitor center near Rabbit Mountain with managed mix of shuttle transportation and personal vehicle transportation	✓	✓	✓	Advanced to EIS

✓ = Meets criterion.

Alternatives Considered for Detailed Analysis

The screening process described above resulted in six alternatives, including taking no action (required by NEPA), being considered in detail. The action alternatives vary in the scale and location of development and address key issues presented

The action alternatives vary in the scale and location of development and address key issues.

above. Two of the alternatives vary regarding transportation, specifically comparing a shuttle system versus access with personal vehicles.

Visitation for all alternatives was based on estimates provided by the Mid-region Council of Governments used by Aldrich Pears in the 2005 *Valles Caldera National Preserve Master Plan for Interpretation* (VCT 2005g). Aldrich Pears estimated potential visitation based on these figures, taking into consideration traffic counts and reasonable assumptions. The VCT used the annual estimates created by Aldrich Pears to determine weekend, weekday, and seasonal visitation. For the purposes of this EIS, the highest visitor use scenario is assumed, which is weekends during peak visitation (summer). Estimates of the visitor contact station / visitor center square footage for each alternative were based on studies conducted by Enterprise Technical Services. Enterprise Technical Services is a USFS Enterprise Unit providing engineering and related technical services to public land agencies (VCT 2009k). For the purposes of this EIS, estimates were based on the maximum visitation anticipated.

As the VCT moves into the architecture and engineering phases of design, the visitor contact station / visitor center footprint may be modified if needed, and would be designed to incorporate principles of sustainability and the preserve's sense of place. Final design would also incorporate the cultural and ecological setting of the landscape within the identified area of impact. Neither the scale nor the visitor capacity described for each alternative is precise. Capacity varies by activity, time, and space. For example, a 40-person group could enjoy a hike together, while 40 individuals (with no personal connections) on the same trail may feel congested. In addition, more detailed estimates of water use and utilities for generating electricity would be conducted during the design phase, further refining site layout and design. The VCT would also coordinate with the local fire jurisdiction about fire protection requirements, which would be incorporated into facility design during the architecture and engineering phases of design.

Alternative 1: No Action

NEPA requires agencies to analyze the consequences of taking no action, which also provides a baseline for comparing the consequences of the action alternatives.

NEPA requires agencies to analyze the consequences of taking no action. In addition, an assessment of taking no action provides a baseline for comparing the consequences of the action alternatives. The no-action alternative means that the proposed activity would not take place; it is a continuation of existing conditions and activities without a particular planning context. However, the existing conditions and activities currently in place at the preserve have not evolved through a planning context. Therefore, under the no-action alternative, they would be eliminated if not previously addressed under a specific planning process.

The no-action alternative would result in the removal of the Valle Grande and Banco Bonito staging area facilities and the elimination of the interim recreation program. The VCT would phase out current access through these staging areas and phase out interim programs and activities, which have not been reviewed for significant direct, indirect, or cumulative effects. The temporary facilities at these locations would be removed in phases. Ultimately, no facilities or new infrastructure would exist in the preserve under this alternative. The services provided by the

existing temporary facilities, which would be removed, would not be replaced. Visitors would still be able to hike the trails located at Rabbit Mountain without a permit or fee. However, spontaneous access to the majority of the preserve would be limited. The VCT would continue to conduct fee-based tours and activities on a scheduled basis. Additional orientation and interpretive information would not be provided other than what is available on the website or at the Jemez Springs administrative facility. Existing highway signs would remain limited to interpretive exhibits along NM-4 pullouts. No improvements would be made to roads or parking facilities. Access for the grazing program would continue, but the VCT would not enter into any new agreements or grants. The current tribal access policy would continue.

Implementation Decisions

Temporary facilities established in support of interim programs would be removed.

Programmatic Decisions

Current access through staging areas, as well as interim programs and activities, would be phased out.

Elements Common to All Action Alternatives

All the proposed action alternatives would include the following elements and performance requirements:

- The current interim recreation program would continue in the short term as infrastructure and facilities are developed and a transition is made to the selected alternative.
- The VCT's facilities at Jemez Springs would continue to provide ancillary support to visitors, particularly to visitors arriving from the south.
- Each action alternative would include space for maintenance activities within the footprint of the visitor contact station / visitor center. This area may be incorporated into the main structure and would have a separate entry. The area would not likely be larger than 300 square feet. Details would be determined during design.
- No motorized, off-road access for hunting or for any type of visitor use is being proposed; current prohibitions against such use would continue. The VCT would provide game carts to hunters and would allow pack horses to travel in designated areas.
- Each action alternative would include an upgraded public road to the visitor contact station / visitor center and farther into the preserve to varying degrees. These roads would be upgraded to Level 4, which provides a moderate degree of comfort and convenience at moderate travel speeds (see the "Transportation" section of chapter 3 for a definition of USFS road levels). Currently, all roads in the preserve are Level 1 through 3; no Level 4 roads exist. All other roads would remain at their current level.

Sustainable construction can lessen impacts on the environment.

- Each action alternative would include an entry portal. Before reaching this gateway, visitors would be provided clear direction by well-placed signs along NM-4. The entry roads would include appropriate traffic controls (e.g., acceleration and deceleration lanes) so visitors can enter and exit with safety and convenience (USFS 2001).
- During winter, visitors would recreate using trails at the visitor contract station or visitor center (figure 2-8 and figure 2-9).
- The USFS has identified sustainable design concepts for lands in its jurisdiction. The design of the visitor center and/or visitor contact station structure, as well as the affected landscape as a whole, would incorporate principles of sustainable design, described in more detail below.

Sustainable construction can lessen impacts on the environment through green building and by integrating the building into natural systems and the region's particular environment. Green buildings typically use 30 percent less energy than conventional buildings, primarily due to reduced electricity purchases and reduced peak energy demand. The financial benefits of reduced consumption equal or exceed the average additional cost associated with sustainable building (Kats 2003b). For the USFS, sustainability "considers energy conservation at every level, from the energy required to transport materials to the energy consumed by heating, cooling, lighting, and maintaining a structure" (USFS 2001).

USFS sustainable design guidelines note that "visitors to national forests expect to see natural-appearing landscapes. To fulfill those expectations, Forest Service facilities should harmonize with their landscape settings." In this regard, sustainability responds primarily to three contexts (USFS 2001), which include the following:

- **ecological**—the natural forces that shape landscape, including climate, geology, soils, water, elevation, and vegetation
- **cultural**—the human forces that shape and define the landscape, including history, development patterns, agriculture, and social uses
- **economic**—the budget realities and cost-saving considerations that shape the built environment

The USFS has identified eight geographic areas based on the contexts of ecology and culture. Valles Caldera National Preserve is located in the Rocky Mountain Province, which is characterized by sparse rainfall, low humidity, abundant and intense sunlight, dramatic freeze/thaw cycles, visible geology (e.g., rock outcrops), long vistas with dramatic views, wide open landscapes, high winds, thin soils, less diverse vegetation, mountainous terrain, high elevation, and clear, brilliant skies. Cultural influences include Native American, European, and Mormon cultures; ranching; a strong heritage of rustic architecture; large amounts of public land; tourism; a fast-growing population with strong demands and expectations for outdoor recreation; and strong public expectation of a "wilderness experience" (USFS 2001). The preserve embodies these characteristics, and the sustainable design concepts

proposed below address the Rocky Mountain Province's contexts of ecology and culture.

The preserve would incorporate an ecological design concept called signature-based design, which is based on relationships displayed in a particular region, such as trees responding where additional moisture is present. Such relationships characterize an area and create a sense of recognition that invokes a sense of place and resulting human attachment. They are "signatures of a place" (Woodward 1997). A region's signatures can be identified through understanding the geomorphic, climatic, biotic, and cultural processes that shape an area's landscape, which ultimately guides new designs. Human needs are also factored into these processes, including needs for protection, production, and order (Woodward 1997). Signature-based design objectives that would apply to the proposed action alternatives are presented in table 2-3.

Table 2-3: Signature-based Design Objectives for Valles Caldera National Preserve

Design for natural flows	Minimize off-site water importation and runoff Minimize heating and cooling requirements Provide for wildlife movement and habitat needs Maintain soil nutrients Decrease generation of solid waste Incorporate natural remediation, such as wetlands Use products and services with minimal embodied energy
Respect cultural needs	Acknowledge historical, geographical, and cultural affiliations Seek input from local tribes and communities Design to reflect cultural influences
Provide sense of place	Provide comfort, visual, and sensory pleasure such as views and natural sounds Provide settings for interpretation and interaction Provide easy, immediate access and orientation Provide access to recreational opportunities
Incorporate financial sustainability	Create designs that are affordable to maintain over time Identify methods of reducing construction costs

After sustainable design objectives have been defined, they can be used to define design guidelines, which identify potential options to enhance site function, human response, and regional distinctiveness (Woodward 1997). Landscaping guidelines that would be considered include the following:

- Locate structures at the edges of clearings.
- Minimize site disturbance and surface grading by following the contours of the land and by locating facilities near existing roads and utilities.
- Minimize clearing of native vegetation.
- Minimize construction of new roads and parking.
- Avoid building in sensitive or wildlife or riparian areas.

- Incorporate plants used as wildlife habitat to enhance wildlife corridors and nesting/breeding functions.
- Incorporate plants to support reintroduction of extirpated species. For example, willow would encourage recolonization by beaver.
- Use native plants and restrict any use of nonnative plants only to areas where invasion is not possible and the nonnative species serves a specific functional purpose, such as improving water quality.
- Incorporate plants dispersed by wildlife.
- Use plants, such as native wetland species where appropriate, to help improve water quality.
- Use plants with cultural significance and/or potential for interpretation.
- Place larger plants at greater densities on north faces to demonstrate differences between northern and southern exposures.
- Place buildings on the south side of mountain slopes or dense vegetation to ensure adequate sun for heat and light.
- Use larger plants in areas of water concentration than on slopes.
- Where water concentrates, use plants with different moisture requirements to mark slope gradient changes.
- Use plants with different soil requirements where soils change from fine to coarse grained.
- Install porous paving to minimize erosion and recharge the groundwater (USFS 2001).

Sustainable design would also reflect temporal scales, considering how the site will change over time through such processes as the maturation of trees and self-perpetuation of grasses and wetlands. Future anticipated changes regarding land use, water availability, and energy costs and availability would also be factored into initial design. An example includes acknowledging the cooler microclimate that would exist on the north side of the visitor center, where water would evaporate less quickly. Larger, denser plants such as pine trees could be a good choice for such a location, carefully placed to avoid possible damage to the structure from falling branches as the trees mature in the future. Larger plants would also be used in areas of water concentration, such as between slope and toe of slope. Wetlands would be planted at the site's low point, surrounded by less mesic[2] species that are ringed by

Sustainable design considers how the site will change over time.

[2] Mesic species are those that require a moderate amount of moisture.

xeric[3] grass species. The resulting designs would be used to "begin to tell a story about climate, soil, landform, birds, plants, and the landowner" (Woodward 1997).

The following characteristics of sustainable design would be used for selecting specific design applications for the visitor center.

- **Energy source.** Use renewables where appropriate, such as wind, solar, biomass, or small-scale hydroelectricity.
- **Materials.** Include restorative materials cycles (where waste from one product becomes food for another), built-in reuse, recycling, durability, and ease of repair. Use natural, nontoxic building materials that require little maintenance.
- **Pollution.** Produce minimal output; waste types should conform to ecosystem absorption ability.
- **Toxic substances.** Use very sparingly and only in special circumstances, such as herbicides or paints or varnishes required for specific purposes. Employ materials that weather, rather than those must be painted or stained, when possible.
- **Embodied energy.** Consider ecological impacts over product life, from materials extraction to final recycling. Use materials that are energy efficient to produce and transport.
- **Sensitivity to ecological context.** Respond to the bioregion; integrate with native soils, vegetation, materials, culture, climate, and topography—e.g., use local stone if possible.
- **Sensitivity to cultural context.** Respect and incorporate traditional knowledge of place and local materials and technologies.
- **Diversity.** Maintain biodiversity and the locally adapted economies and cultures that support it.
- **Spatial scales.** Integrate design across multiple scales, respecting the influence of larger scales on smaller and vice versa. Design the massing and scale of structures to remain in harmony with the immediate natural setting.
- **Whole systems.** Provide greatest degree of internal integrity and coherence.
- **Role of nature.** Use nature's design intelligence instead of reliance on man-made materials and energy.
- **Types of learning.** Make nature and technology visible, highlighting sustainable systems used in the design.
- **Response to sustainability needs.** Incorporate designs that regenerate human and ecosystem health.

Sustainable design would incorporate natural processes and interactions into the human environment.

[3] Xeric species require only a small amount of moisture.

To the extent possible, the structure would connect people to the change and flow of climate, season, sun, and shadow to emphasize awareness of natural cycles. Sustainable design would incorporate natural processes and interactions into the human environment. The technology that supports human life, such as plumbing and electrical wiring, has become hidden in attempts to sanitize nature. Where possible and appropriate, designs would make nature visible to reacquaint visitors with nature's communities while teaching about ecological consequences of human activities (Van der Ryn, Sim, and Cowan 1996).

Water conservation is also crucial to sustainable building. Typical water usage requirements that apply to this plan are presented in the table 2-4.

Table 2-4: Water Usage by Facility Type

Facility	Water Use (gallons/person/day)
Campground	25
Drinking fountain	3
Faucet	11
Cafeteria	20
Restaurant	7–10*

Source: American Water Works Association (AWWA) 2010; Mancl n.d.
* Gallons per customer per day.

Water Conservation

Water conservation strategies can reduce water use below common practice.

Water conservation strategies can reduce water use below common practice by over 30 percent indoors and over 50 percent for landscaping (Kats 2003a). Strategies that would apply to this plan are described below.

Potable/Nonpotable Water Use

Make more efficient use of potable water through better design and technology. The supply of potable water and the disposal of rainwater would be addressed to reduce water consumption. The VCT would assess the potential for using nonpotable water sources, and would include measures to minimize the consumption of both. Potable water would be used only for human consumption.

Recycled/Reclaimed Water Use

Use recycled/reclaimed water; capture and use graywater (nonfecal wastewater from bathroom sinks, bathtubs, showers, etc.) for irrigation. Drawdown of aquifers would be minimized in anticipation of future changes in water availability. Rainwater harvesting is appropriate when groundwater supplies are limited or fragile, are polluted or significantly mineralized, or when stormwater runoff is a major concern (Kibert 2008). Because the preserve's groundwater may contain minerals due to the volcanic nature of the area, and summer monsoon storms could increase stormwater runoff, a rainwater harvesting system would be considered. Such a system usually includes a catchment area (typically the building's roof), a roof-wash system, prestorage filtration, a rainwater conveyance, a cistern, a water delivery

pump, and a water treatment area (Kibert 2008). A rainwater harvesting system can collect approximately 0.62 gallon of water per square foot of roof area, per inch of rainfall (Texas Water Development Board 2010). Nonpotable water, including graywater from sinks and drinking fountains, could be used in restroom toilets and would require a dual waste piping system. The graywater system could also be used for subsurface irrigation of flowers, trees, and shrubs. Such systems, if used, would be consistent with regulations and guidelines published by the New Mexico Environmental Department (NMED).

Sustainable Design/Construction Methods

Several sustainable design concepts also yield cost savings during construction.

Several sustainable design concepts also yield cost savings during construction ("first" costs). Design and construction methods of managing first costs that would be applied where appropriate are described below.

Site Optimization / Passive Solar Heating

Climate-responsive building characteristics would be implemented to promote solar gain in cold, dry climates through the use of passive design strategies (USFS 2001). Passive design strategies offer the most cost effective means of heating buildings. When included in initial building design, passive solar applications add little or nothing to the cost of a building, yet result in reduced operational costs and equipment demand. Passive solar technology is reliable and mechanically simple (Arizona Solar Center 2010). Passive design strategies, such as the use of clerestory windows, south-facing windows, berms to the north, and thermal mass, incorporate natural energy-saving resources into passive solar heating without introducing light and glare into the structure (USFS 2001; Torcellini and Pless 2004). Interior rooms receive slow, even heating for many hours after the sun sets, greatly reducing the need for conventional heating. A thermal storage and delivery system called a Trombe wall (or solar wall), could be used to reverse the structure's heating requirements from a net loss to a net gain and provide passive solar heating. A typical Trombe wall consists of a 4- to 16-inch-thick, south-facing masonry wall with a dark, heat-absorbing exterior surface fronted with a layer of glass placed 1 to 2 inches from the masonry wall to create a small airspace. The dark surface absorbs heat from sunlight passing through the glass and stores it in the wall, conducting it slowly inward through the masonry. Rooms heated by a Trombe wall often feel more comfortable than those heated by forced air due to the radiant comfort emitting from the large surface (Torcellini and Pless 2004).

Building Shape for Maximum Heat Gain

These passive design techniques would be augmented by designing the building shape for maximum heat gain. Passive design for structures in the northern United States in areas with cooler temperatures (like Valles Caldera) are typically square in shape, which minimizes the surface area through which heat can be transmitted. East- and west-facing surfaces experience the most sun load, and south-facing walls experience variable sun load throughout the day (Kibert 2008). Given the preserve's cool temperatures, maximizing the structure for optimal heat absorption and retention would help reduce heating costs. In addition, the structure would be

designed to focus heat on the bottom 6 feet of the building, where occupants are usually located. Doing so would also reduce building height, which in turn lowers material costs (Kibert 2008).

Active Solar Heating

In addition to incorporating a passive solar system, the visitor center would also incorporate an active solar system, if possible. Active solar space-heating systems consist of collectors that collect and absorb solar radiation and use electric fans or pumps to transfer and distribute the heat. Active systems usually have an energy-storage system to provide heat when the sun is not shining (Office of Energy Efficiency and Renewable Energy [EERE] 2008). Although placing solar collectors on the roof of the structure or close to it would result in visual impacts, the panels would provide an interpretive opportunity and a means of making nature and technology visible. In addition, the VCT may pursue net metering, which is a policy under which electricity customers that connect a renewable energy system with a utility company's power grid can feed excess site-generated power back into the grid. Net metering allows customers to receive retail prices for the excess electricity they generate. New Mexico allows customer-generators producing up to 80 megawatts of electricity to participate in net metering. New Mexico's three main utilities—PNM, Xcel Energy and El Paso Electric—all offer net-metering payments (Clean Energy Authority 2010).

Daylighting

Energy savings would be further enhanced through the use of daylighting. Daylighting uses natural light to illuminate a building, although there are tradeoffs between admitting light and admitting cool air. The cost of skylights and windows also increases costs compared to traditional construction. Proper design can help alleviate costs by assessing daylighting for each area of the building, designing daylighting for specific tasks, and installing light-activated controls. Daylighting can be optimized by orienting the building on an east–west axis, painting interior surfaces bright colors, organizing electric lighting to complement daylighting, and arranging spaces to optimize the use of daylighting (Kibert 2008).

In addition to optimizing energy use through daylighting and passive solar, windows would be placed to provide views of the valleys and wildlife. Spotting scopes would be placed outside along the porch or other pertinent locations.

Strategic Planting

The visitor center would be designed with the use of trees, which have an enormous capacity for stormwater uptake and can be used to control the amount of sunlight that falls on a building by shading it in the summer and providing more sunlight in winter after leaves have fallen. Trees would be strategically planted to contribute to stormwater uptake.

If possible, vegetation would be selected to support the reintroduction of extirpated species, such as the New Mexico meadow jumping mouse, which the preserve is interested in encouraging. Specific plant species would also be strategically planted

to encourage nesting and breeding functions, as well as seed dispersion by wildlife, which would help improve wildlife corridors and enhance visitors' visual experience.

Geothermal Design

The building would be designed to take advantage of the thermal properties of the ground and groundwater to help provide heating and cooling, thereby lowering energy consumption. A geothermal, or ground-source, heat pump (GHP), would be used to heat and cool the building. Although outside temperatures vary significantly by season, the temperature of the ground a few feet below the earth's surface remains at a relatively constant temperature, ranging from 45 to 75 degrees depending on location. Like a cave, the ground temperature is warmer than the air above during winter and cooler than the air in summer. It is therefore more efficient to heat or cool air from this constant temperature, rather than heating or cooling summer or winter outdoor air. The GHP would exchange heat with the earth through a ground heat exchanger, resulting in 25–50 percent less electricity use compared to conventional heating or cooling systems. GHPs can reduce energy consumption and corresponding emissions up to 44 percent compared to air-source heat pumps and up to 72 percent compared to electric resistance heating with standard air-conditioning equipment (U.S. Department of Energy [USDOE] 2011b).

Low-water Toilets

The facilities would use composting toilets, if possible. Composting toilets are being used successfully at national park facilities, particularly Grand Canyon National Park. Although these types of systems greatly increase water conservation, more site-specific details would be required to determine their feasibility. Alternatively, low-consumption toilets and waterless urinals would be considered for reducing water usage, which would require a septic system. If a septic system is used, graywater would be required. By separating blackwater (septic) from graywater, far less blackwater would be produced, which could be treated on site in individual septic tanks and leachfields. Soil surrounding the leachfield must be able to absorb and treat the effluent (North Carolina Cooperative Extension Service 1996). A septic system would require a large leachfield with monthly maintenance and occasional addition of chemicals. Insulation, such as leaves or bales of hay, would be placed on the ground to insulate the plumbing from the visitor center to the septic tank to prevent freezing. Septic systems would be located no closer than 100 feet to any well. All wastewater, graywater, and leachfields would be oriented toward existing drainages.

Use of Wetlands

The design would use existing or constructed wetlands for wastewater treatment and stormwater storage, reducing capital costs. Parking areas would be sized appropriately and designed with porous materials to reduce contaminated runoff. Runoff from paved roads and parking areas would be directed to islands in the parking area or natural low areas, where stormwater runoff would be collected and treated with a constructed wetlands filtration system and directed into toilets if composting toilets are not used. Graywater could then be treated by natural passive

systems such as constructed wetlands, which break down organic waste and minimize the need for complex infrastructure. Wetlands blend into the natural landscape and provide surge areas for stormwater, treating this often contaminated runoff (Kibert 2008). Graywater systems would be integrated into the surrounding landscape in a way that creates new wetland habitats. The preserve's natural wetland communities are dominated mostly by sedges and rushes (VCT 2009c), which could be incorporated into the constructed wetlands. Constructed wetlands would be planted at the site's low points, surrounded by less mesic species, which would be ringed by xeric grass species. Such an arrangement would also demonstrate different soil requirements and slope gradient changes, and "begin to tell a story" about the area that could be used interpretively to demonstrate nature and technology working together (Woodward 1997).

Project Size Reduction

Space-efficient design would be used, and certain spaces would be moved to the building exterior if possible. Systems that heat and cool only the bottom 6 feet of vertical zones, where occupants usually are located, would be considered to reduce overall building heights and lower material costs.

Elimination of Unnecessary Finishes and Features

Features such as dropped ceilings would be eliminated to allow more daylight penetration and reduce overall building dimensions. Unnecessary finishes and features would also be avoided to create a more natural environment.

Decrease in Site Infrastructure

The site would be carefully planned to minimize disturbance by using natural drainage rather than storm sewers, minimizing impervious surfaces, reducing the size of roads and parking lots, using natural landscaping, and reducing other man-made infrastructure where possible.

Interpretive Opportunities

The visitor center and/or visitor contact station would function interpretively as a model for sustainable design.

The visitor center and/or visitor contact station would function interpretively as a model for sustainable design, offering an educational opportunity to visitors. Preserve staff could conduct tours of the facility, explaining how the Trombe wall generates heat and how the wetlands clean wastewater. A "Sustainable Design Day" could be offered that expands on this idea, with contractors and suppliers available to offer more detailed explanation about how these systems work, what the payoffs are, and how to incorporate them into other settings.

USFS Guidelines

Although specific details of the visitor contact station / visitor center designs would be identified during the design phase, general guidelines that apply to the USFS Rocky Mountain Province would be incorporated. While standards and guidelines, directives, and policies that apply to the USFS or NPS do not necessarily apply to the VCT or the management of the preserve, such guidelines are reviewed and incorporated into this analysis as applicable. Such guidelines include using overscaled

building elements, such as oversized doors and windows, heavy timber structures, and boulders, to match the scale of the surrounding landscape. The design would incorporate a well-defined main entry, simple forms, and broad porches. The guidelines specifically call for open structure, daylighting, and natural materials for visitor centers (USFS 2001). These elements can be seen in the conceptual drawings prepared on the following pages for each alternative.

Sustainable design concepts would also be incorporated into the programmatic-level decisions identified in this plan. All structures would interrelate within a design theme that reflects the Rocky Mountain Province concepts and that would be consistently applied to everything from trash receptacles, water fountains, and fences to trails, campgrounds, and visitor centers. In addition, the USFS recreation opportunity spectrum would be implemented to help determine acceptable development for recreation sites based on remoteness, degree of naturalness, social setting, and managerial setting. To maintain a setting's integrity while creating a satisfying visitor experience, these factors would be applied consistently within each setting. For example, the width and surface of a road that leads to a campground would reflect the development size and type of facilities at the campground. The utilities and building materials would support the setting as well (USFS 2001).

Forest Service Manual (FSM) 2300—Recreation, Wilderness, and Related Resource Management Chapter 2330—Publicly Managed Recreation Opportunities (USFS 2006) addresses many of the sustainability concepts presented above, which were also incorporated into development of the alternatives. The recommendations in this manual include the following:

- Develop sites and facilities that will provide recreation experiences toward the primitive end of the opportunity spectrum, which involves minimum site modification and rustic or rudimentary improvements.
- Develop sites and facilities to enhance natural resource-based activities normally associated with a natural environment.
- Seriously consider the element of cost efficiency when developing and operating sites and facilities.
- Establish priorities for the development and management of sites in the following order:
    1. Ensure public health and safety.
    2. Protect the natural environment of the site.
    3. Manage and maintain sites and facilities to enhance users' interaction with the natural resource.
    4. Provide new developments that conform to the National Forest System recreation role.
- Design facilities, such as roads, barriers, paths, and water and sanitation systems, so that they are as natural, simple, and unobtrusive as possible.

Design and build rustic-looking facilities so that they become part of the attraction. Appearance must be appropriate to the forest environment and the development scale of the site. The form and general shape, construction materials, and colors must combine to produce a visually pleasing facility that presents a minimum of contrast with surroundings. No ornate, elaborate, or pretentious structures shall be designed for facilities on National Forest System lands. Strive for a rustic contrast to urbanization.

- Design and install facilities that are in close harmony with the surrounding environment.
- When selecting sites, select the most desirable and attractive lands available for development of recreation sites. Whenever possible, these lands must
  - *be closely associated with recreation features such as lakes, streams, meadows, or unusual scenery*
  - *be accessible by planned road development*
  - *have a good water supply*
  - *have attractive vegetative cover and shade*
  - *have gentle topography with less than a 10 percent slope*
  - *have sufficient capacity to allow economical operation and maintenance*
- To protect the site:
  - *Use facilities or techniques that confine vehicles to planned roads and parking locations.*
  - *Locate broad and direct, although not necessarily straight, paths or walks to concentrate pedestrian use where it would most naturally occur and can best be accommodated.*
  - *Harden sites in naturally appearing ways in the vicinity of heavily used improvements to protect the resource.*
  - *Avoid designs that concentrate people in the area directly adjacent to focal point of interest.*
  - *Locate and arrange facilities to serve their intended function with a minimum impact on the visual resource.*
  - *Design roads with the least possible intrusion onto the landscape.*
  - *Do not permit stores, restaurants, and other commercial developments within campgrounds and picnic grounds (USFS 2006).*

Alternative 2: Banco Bonito Visitor Contact Station

Alternative 2 addresses many public comments expressing the desire for minimal development within the preserve, especially in the Valle Grande, through the development of a visitor contact station. It would also minimize long-term

commitments in operational and maintenance costs associated with larger facilities and infrastructure. Components of alternative 2 are listed briefly in table 2-5 and described further below.

Table 2-5: Summary of Alternative 2 Components

Components	Description
Visitor Center / Visitor Contact Station (Implementation-level Components)	
Location and access	Banco Bonito Staging Area; visitors from the east pass the Valle Grande en route to the visitor contact station
Scale	2,500–5,000 square feet; ~50,000 visitors/year
Day-use recreation amenities	Minimal development; nonmotorized recreational access from visitor contact station (e.g., hiking, biking, horseback riding) would be generally open and unlimited (except for site-specific or seasonal restrictions for resource protection)
Contact station sustainability	Leadership in Energy and Environmental Design (LEED) Gold or Platinum[a]
Water, utilities availability	Water availability difficult; electrical and phone lines available; ~2,000,000 gallons/year required
Programmatic-level Components	
Sustainability	Described under "Elements Common to All Action Alternatives"
Transportation	Primarily personal vehicles, supplemented by shuttle as warranted, on Level 4 road[b] from NM-4 to Banco Bonito Staging Area, headquarters area, and south side of Valle Grande; Level 3 roads for remainder of preserve
Trail system	• Expanded preserve-wide to provide short day loops and multi-day backpacking opportunities • Hiking would continue to be primarily via Level 1 roads; new trail construction would only occur as necessary
Hunting and fishing	Current hunting and fishing programs would continue but may be adjusted annually as necessary to improve visitor experience, provide resource protection, increase revenue generation, or for other purposes
Equestrian facilities and programs	Equestrian facilities and programs based from the horse barn; access provided to Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio
Interpretive facilities and programs, ecotourism	Minimal education and ecotourism development, such as pole barn lecture area, bathrooms, outdoor kitchen area; no campus-style buildings or lodging
Recreational amenities	Fishing access, trailheads, overlooks, campgrounds, and picnic areas, including parking lots for up to 10 vehicles in the backcountry areas accessed by the single-lane, gravel (Level 3) roads; shuttle stops
Lodging	Continuation of existing group lodging at Casa de Baca Lodge and a bunkhouse in the headquarters area; no individual room rental or lodging development

[a] LEED was developed by the U.S. Green Building Council to provide standards for green building design. LEED identifies four levels of green building certification; Platinum is highest, followed by Gold.

[b] The USFS defines roads on its lands on a scale from 1 to 5 based on specific characteristics, such as surface type, travel speeds, number of lanes, etc. Level 1 roads are closed to vehicular use. Level 2 roads are the most primitive for vehicular use (e.g., high-clearance vehicles) and Level 5 roads are the most developed (USFS 2005b). More details are provided in the "Transportation" section of the "Affected Environment" chapter.

Alternative 2 addresses many public comments expressing the desire for minimal development.

The southwest location was chosen for alternative 2 because it has already been disturbed by historic logging and wood processing (the area is also currently used by equestrians and mountain bikers), and would result in minimal, if any, visual disturbance to the Valle Grande (figure 2-4). In addition, some utilities that could be used to serve the visitor contact station are located nearby. As described in the 2005 *Valles Caldera National Preserve Master Plan for Interpretation* (VCT 2005g), this alternative would be located in an area described as "High" under Conceptual Space and Capacity Zoning. Such areas are out of direct view of the visiting public and do not conflict with ecologically sensitive areas; Banco Bonito is listed as an example. This alternative meets the two "Location and Security" goals identified as a planning strategy for built interpretive facilities in the *Master Plan for Interpretation*, which are to restrict the visitor facility to the periphery of the preserve to minimize environmental impacts and subsequent visitor impacts, and to situate the facility in such as way as to control access to the rest of the preserve. As noted in the interpretive plan, the closer the facility is to the preserve's nucleus, the more difficult or expensive it will become to limit access.

The visitor contact station would be between 2,500 and 5,000 square feet (figure 2-5). It is expected that approximately 50,000 guests would visit this contact station each year based on the estimation process described above. Under alternative 2, visitation would be allowed to approximately double compared to existing conditions (almost 25,000 people participated in public programs offered by the preserve in 2010) (VCT 2010d).

Additional development at the Banco Bonito Staging Area would include day-use facilities (parking, toilets, picnic areas, trailheads, and interpretive information; see figure 2-6). A small gravel or paved parking area would be designed to accommodate the short-term parking by visitor contact station visitors, trail users, and picnickers.

The entrance road to the Banco Bonito area would serve as the only entrance to the preserve for visitors. The existing access to the preserve via VC01, south of the Valle Grande, would be maintained for administrative access only. The Banco Bonito entrance would require modifying NM-4 at this intersection to include acceleration and deceleration lanes. The VCT would work with the New Mexico Department of Transportation (NMDOT) on these changes during design and implementation.

The Banco Bonito Visitor Contact Station would capture visitors coming from Jemez Springs and Albuquerque before they reach the Valle Grande. Visitors coming from the east, such as those arriving from Los Alamos and Santa Fe, New Mexico, would have to pass the Valle Grande—the preserve's main attraction—in order to reach the preserve's entrance and the contact station. The casual visitor arriving from the west and not initially intending to visit the preserve might decide to do so after seeing the Valle Grande from the highway; in this case, the visitor would have to turn around to reach the visitor contact station and enter the preserve. Therefore, creating a sense of arrival at this southwestern corner of the preserve would be more challenging than the other alternatives because this location does not incorporate the preserve's signature natural feature, the Valle Grande. To

mitigate this, advance planning strategies incorporated into this alternative include prominent informational road signs along routes leading from Los Alamos and Santa Fe to direct drivers to the Banco Bonito Visitor Contact Station.

The preserve's primary attractions would not be visible from the Banco Bonito area. Therefore, a "sense of arrival" would be created to instill a desire to stay. A sense of arrival not only signifies the arrival itself, but defines the boundaries of a place. The first impression created by this sense of arrival would play a substantial role in shaping visitor opinions of the preserve and helping convey the preserve's identity. This would be achieved through options such as signs, a monument, or a gateway. This alternative would include a larger, more distinctive monument-type sign along NM-4 at the visitor contact station to identify the contact station as part of the preserve and to encourage drivers to enter. The access point on NM-4 would include acceleration and deceleration lanes and directional, regulatory, and warning signs along the road.

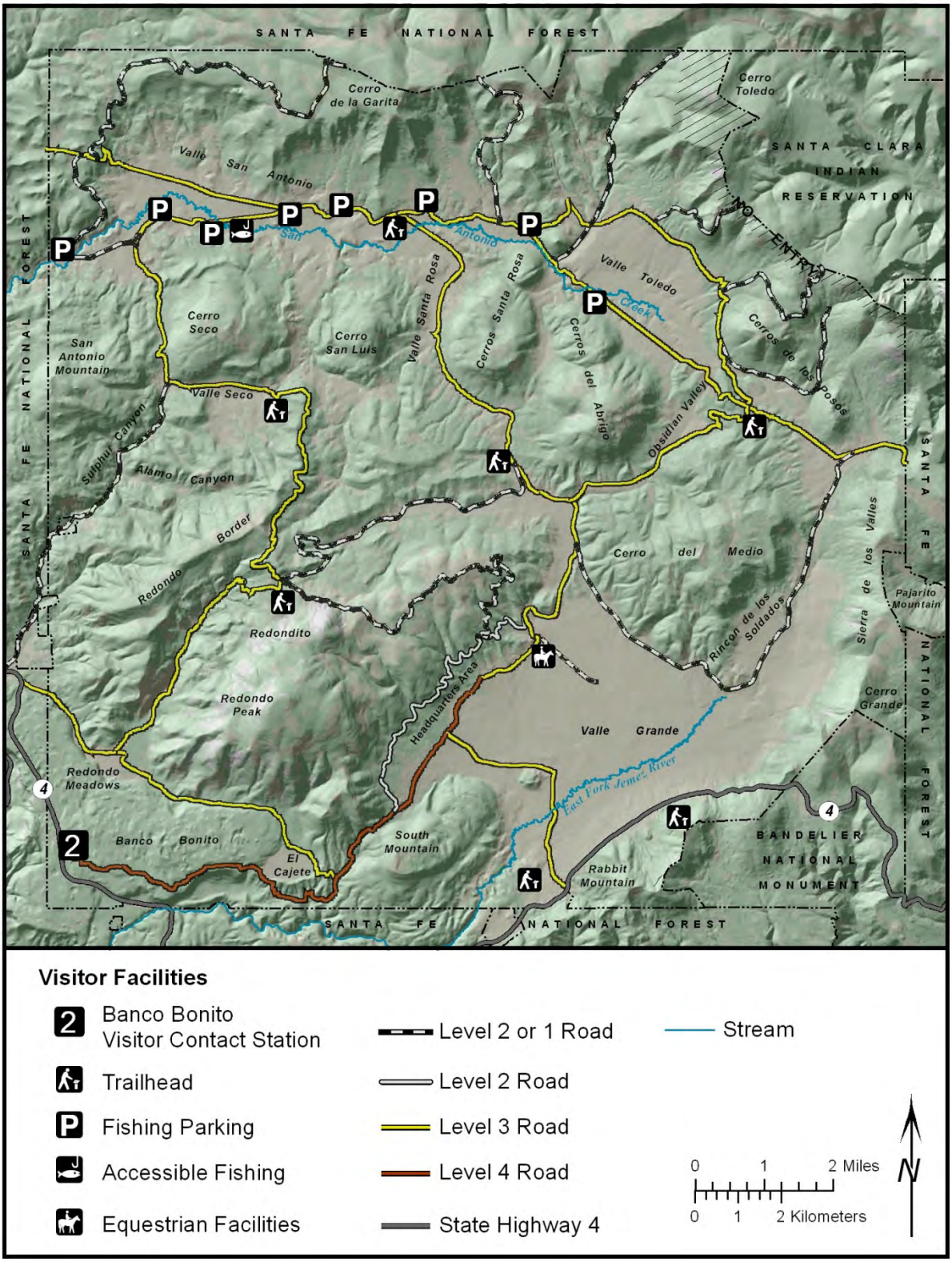


Figure 2-4: Alternative 2 Map—Banco Bonito

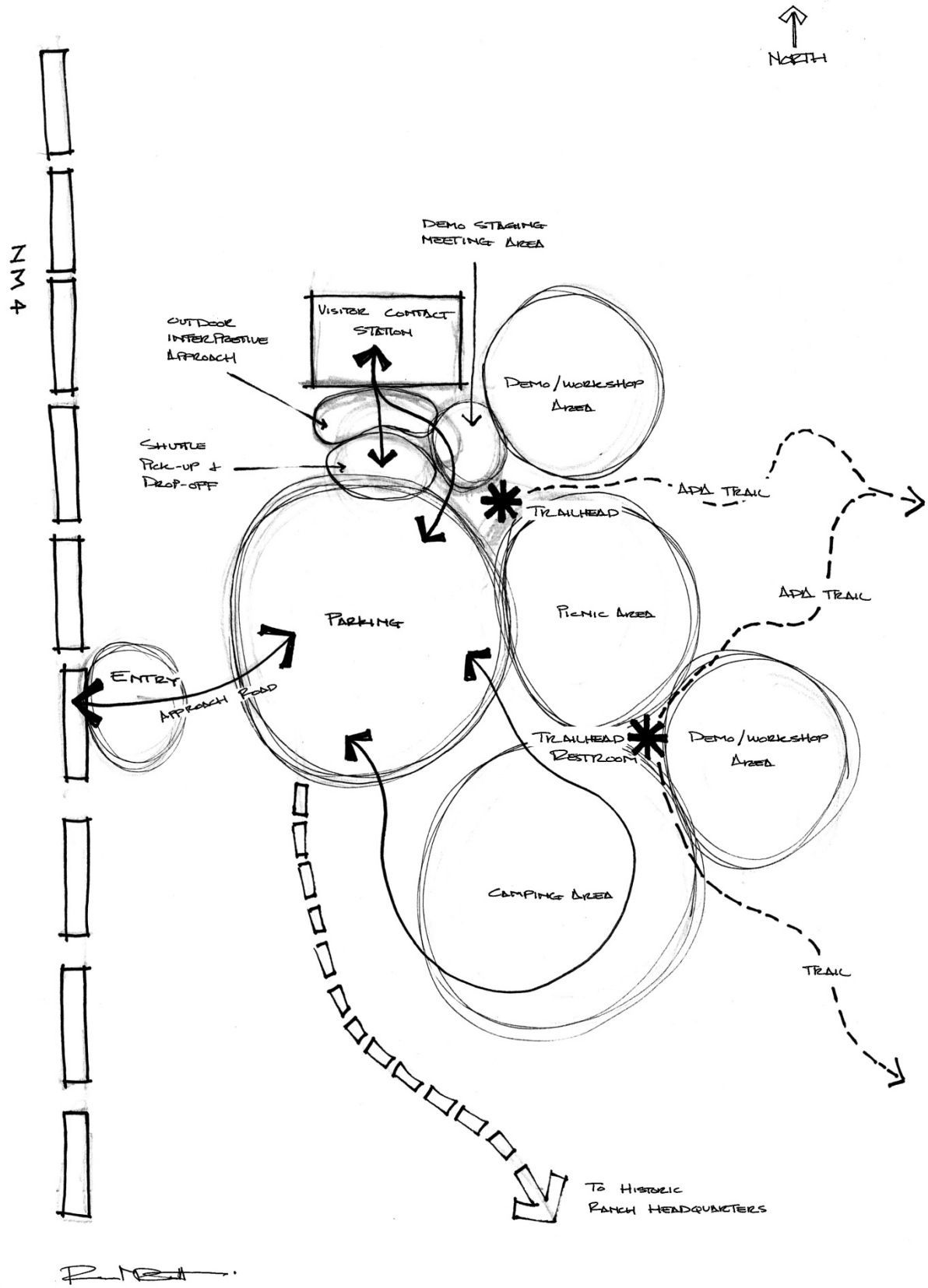


Figure 2-5: Alternative 2 Conceptual Layout—Banco Bonito Visitor Contact Station

Figure 2-6: Alternative 2 Visitor Contact Station Conceptual Rendering

Alternative 2 would provide access into the preserve for personal vehicles and/or shuttles from the Banco Bonito Staging Area.

Two-lane, Level 4 roads would provide access into the preserve for personal vehicles and/or shuttles from the Banco Bonito Staging Area to the headquarters historic district (referred to from now on as the headquarters area) and the south end of the Valle Grande. These roads would be paved or gravel surfaced and would accommodate two-way traffic at moderate speeds. Access from that point would be provided via single-lane, Level 3 roads with turnouts. These roads would be gravel surfaced and would accommodate two-way traffic at slow speeds. This level of development is expected to accommodate approximately 50,000 visitors annually, or about 330 visitors per day during the summer recreation season. Capacity could be increased by incorporating shuttles into the transportation system to provide primary access on high-use days and in support of special events and tours. High visitor use days would include summer weekends (Friday through Sunday) from Memorial Day through Labor Day, plus holidays. The shuttle may also run on fall weekends through October based on demand.

Under this alternative the VCT is proposing a one-way loop shuttle route. The shuttle route would begin at the Banco Bonito visitor contact station and follow the Level 4 road into the preserve's headquarters area, as shown in figure 2-4. The route would then follow Level 3 roads to the north and west, passing Valle Santa Rosa and Valle San Antonio before turning south to bypass Cerro Seco, Valles Seco, and the Redondo Border. The shuttle route would then travel along the Level 4 Road en route to the starting point at the Banco Bonito Staging Area. This route would access the preserve's fishing and hiking locations, and would accommodate a

variety of visitor uses. Picnic areas, overlooks, and other visitor amenities would be developed along the shuttle route. Visitors would be dropped off at popular locations, and the shuttle would return at predetermined times. The shuttle would not operate on an hourly or fixed basis. The specific route would be determined during design. For special events, the shuttle would access specific locations, not necessarily limited to the loop described above.

If shuttles are provided, the shuttle system's associated infrastructure would be required, along with additional parking spaces at the visitor contact station for long-term parking by shuttle users. Shuttle infrastructure would include, at a minimum, signs for shuttle stops, schedules, maps, and wayfinding to lead visitors to the shuttle, as well as infrastructure related to the maintenance and storage of the shuttles (potentially off site). Infrastructure could also include benches, trash cans, or shelters at shuttle stops, particularly at high-use areas. If shuttles are used exclusively on high-use days, gates and signs would be used to limit personal vehicles accessing the park.

Facilities and infrastructure developed to support this alternative would include fishing access, trailheads, overlooks, and picnic areas, including parking lots for up to 10 vehicles in the backcountry areas accessed by the single-lane, gravel (Level 3) roads. Restrooms, receptacles for trash and recycling, and interpretive signs would also be provided at these use areas. Hiking would be expanded to provide short day loops and multi-day backpacking opportunities. Hiking would continue to be primarily via Level 1 roads; new trail construction would only occur as necessary.

Nonmotorized access from the visitor contact station would be generally open and unlimited (except for site-specific or seasonal restrictions for resource protection). Based on demand, pedestrian, equestrian, camping, and mountain biking access would be managed in space and time to reduce conflicts while minimizing controls and restrictions. Reservations would continue to be an important tool for popular activities and for arranging group and educational access.

Electrical power and phone lines both run underground along NM-4 and are very close to the site. However, this site presents many obstacles in securing a viable water source. The closest known water source is at Jemez Falls Campgrounds in the Santa Fe National Forest, which is about 8,054 linear feet away and 180 feet lower in elevation. The volume and production of the well is currently unknown. If this water source can be accessed, a pumping system would be constructed to push water over the estimated 180-foot elevation. Solar energy would be the primary source of pumping power; however, electrical power could be obtained through an existing source along NM-4.

Nonmotorized access from the visitor contact station would be generally open and unlimited.

The preserve would use nonpotable water, such as graywater, in toilets or would use composting toilets. Therefore, water use would be limited to restroom and drinking faucets and campgrounds (no food service is being considered under this alternative). As shown in table 2-4, 25 gallons for one campground, 3 gallons for a drinking fountain, and 11 gallons for a faucet would total approximately 40 gallons of water per visitor per day. Assuming 50,000 annual visitors, a total of 2 million gallons would be needed per year (Mancl n.d.).

Implementation Decisions

1. location of a visitor contact station at Banco Bonito Staging Area
2. development of connected infrastructure and facilities at Banco Bonito Staging Area
    a. location and scale of solar energy system
    b. utilities, water, and wastewater
    c. access from NM-4 with prominent directional road signs at the Valle Grande and along routes from the north and east
    d. parking for short-term visitation at facilities
    e. visitor conveniences and day-use amenities (toilets, picnic tables)
    f. group staging and interpretive information

Programmatic Decisions

These actions would require additional planning and analysis in compliance with NEPA prior to implementation:

1. development of Level 4 (double-lane, paved or gravel) roads to the headquarters area; improvements to existing Level 3 (single-lane, gravel) roads for backcountry access
2. parking areas for up to 10 vehicles at fishing access sites and trailheads in backcountry areas
3. development of shuttle system infrastructure and parking when shuttles provide primary access on high-use days and for special events and tours (requires shuttle system infrastructure and larger parking area at visitor contact station)
4. recreation facilities, including trailheads, fishing access, picnic areas, campgrounds, and overlooks
5. additional nonmotorized access along the preserve's perimeter
6. additional staging / visitor contact areas
7. development of equestrian facilities and programs based from the horse barn, and equestrian access to the Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio
8. development of minimal education and ecotourism facilities, such as a pole barn lecture area, bathrooms, outdoor kitchen area; no campus-style buildings or lodging

Alternative 3A: Entrada del Valle Visitor Center—Primary Access via Shuttle System

The central feature of alternative 3A is the development of a full-service visitor center to provide interpretive and other services to visitors. This visitor center

would be located in the southwest area of the Valle Grande near the entrance of NM-4. The visitor center would be constructed either behind local hill topography or screened with vegetation to prevent it from being obviously visible from the Valle Grande and NM-4. Under this alternative, primary visitor access to the preserve would be via a shuttle system. A permit system would be used to allow limited managed access by personal vehicles. Components of alternative 3A are listed briefly in table 2-6 and described further below.

Table 2-6: Summary of Alternative 3A Components

Components	Description
Visitor Center / Visitor Contact Station (Implementation-level Components)	
Location and access	Southwestern Valle Grande near South Mountain; visitors directly access the Valle Grande from east and west
Scale	10,000 square feet plus 5,000 square feet administrative space; ~120,000 visitors per year
Day-use recreation amenities	Access to East Fork of the Jemez River and South Mountain for hiking and fishing
Visitor center sustainability	LEED Gold or Platinum
Water, utilities availability	Water available; electrical and phone lines available; ~4,400,000 gallons/year required
Programmatic-level Components	
Sustainability	Described under "Elements Common to All Action Alternatives"
Transportation	• Shuttles with personal vehicle access by permit on primarily single-lane Level 4 roads with shuttle stops and small parking lots at recreational facilities • Bicycle path would parallel the loop road as a separate facility or within the road shoulder area • No shuttle access to Banco Bonito Staging Area; visitors would be able to drive personal vehicles to Banco Bonito Staging Area
Trail system	• Hiking trails expanded preserve-wide to provide short day loops and multi-day backpacking opportunities • Hiking would continue to be primarily via Level 1 roads; new trail construction only as necessary
Hunting and fishing	• When the preserve is open to hunting, hunters would drive directly to their destinations • All other recreational use managed for public safety and success of the hunt • Fishing access provided primarily via shuttle
Equestrian facilities and programs	Same as alternative 2
Interpretive facilities and programs	Lecture areas, outdoor kitchens, primitive sleeping facilities, and restrooms

Components	Description
Recreational amenities	• From the visitor center: Americans with Disabilities Act (ADA)-compliant day-use area, including access to the East Fork of the Jemez River, overlooks, picnic areas, staging for groups and special events, trails, and interpretive sites • Beyond the visitor center: fishing access, trailheads, overlooks, campgrounds, and picnic areas, including shuttle stops, small gravel or paved parking areas for up to five vehicles, restrooms, trash and recycling receptacles, and interpretive signs • Banco Bonito Staging Area would remain and would continue to provide access for horseback riding and special events • Additional points of nonmotorized access along preserve's perimeter identified in the future
Lodging	Same as alternative 2

Although the proposed alternative 3A site is undisturbed, it was chosen because of its proximity to NM-4 and the Valle Grande. This location would not restrict the visitor facility to the periphery of the preserve, as called for in the 2005 *Master Plan for Interpretation* (VCT 2005g); however, the structure would be situated behind a small, partially vegetated rise that would primarily conceal it from NM-4. Views of the Valle Grande would not be affected. This alternative would meet the *Master Plan for Interpretation*'s goal to situate the site to control access to the rest of the preserve. Furthermore, visitors traveling from any direction would not be required to backtrack to the preserve from the visitor center. In addition, this location would draw visitors into the preserve, helping entice them to stay and explore rather than stop along the highway and continue driving past the preserve. This location would be zoned "Medium" based on definitions in the 2005 *Master Plan for Interpretation*, which would allow for more group activities and special events, and includes areas that are suitable for moderate use along forest edges (VCT 2005g).

The full-service visitor center would be up to 10,000 square feet, with supporting administrative facilities of up to an additional 5,000 square feet of space. It is expected that approximately 120,000 guests would visit this facility each year. *A Plan for Revenue Enhancement on the Valles Caldera National Preserve: Opportunities and Alternatives* suggests that overall visitation not exceed 120,000 annually (Entrix 2009). Annual capacity and visitation are not precise numbers; they vary in both time and space and relate to the types of activities available, transportation methods, and many other factors. Alternative 3A would accommodate this maximum number of visitors. In addition, traffic counts conducted at the Valle Grande and Banco Bonito staging areas in 2011 indicate that approximately 47,000 people indicated interest in visiting the preserve by driving to the staging areas without having signed up for a program (VCT 2011c). This figure supports the inclusion of an alternative that can accommodate the maximum number of suggested visitors.

Alternative 3A includes development of a full-service visitor center to provide interpretive and other services to visitors near South Mountain on the edge of the Valle Grande.

A new entrance road from NM-4 would be created to access the visitor center to improve sight distance for travelers. (Sight distance is the length of roadway ahead that is visible to a driver.) The new road would require a large permeable fill and two 24- to 36-inch culverts to address 100-year flood events where the road

Under alternative 3A, a new entrance road from NM-4 would be created to access the visitor center to improve sight distance for travelers.

changes from east–west to north–south. Further analysis to identify seasonal runoff and 100-year flood events would be completed before the permeable fill and culverts are designed. The new road would require a slight realignment of NM-4 near the access road. Like under alternative 2, NM-4 would be modified to include acceleration and deceleration lanes. The VCT would work with NMDOT on these changes during design and implementation. The existing access road (VC01) that is currently used to reach the temporary facilities at the Valle Grande Staging Area would be closed to visitors. VC01 would initially be maintained as an administrative road.

As under alternative 2, a "sense of arrival" would be created to instill in visitors the desire to continue exploring the preserve. Due to its proximity to the Valle Grande, a typical entrance sign on NM-4 would be sufficient to encourage drivers to stop at the visitor center. The facility could be powered by a pole-mounted photo-voltaic system and would be constructed to LEED Platinum or Gold ratings.

The footprint of the visitor center would include the development of the Level 4 paved access road from NM-4 described above, as well as parking for approximately 100 vehicles (visitors only), recreational vehicle (RV) and bus parking, and overflow parking to support high-use days and special events. The access point on NM-4 would include acceleration and deceleration lanes and directional, regulatory, and warning signs along the road. From the visitor center, an ADA-compliant day-use area would be developed, including access to the East Fork of the Jemez River, overlooks, picnic areas, staging for groups and special events, and interpretive sites. Hikers could access a variety of trails directly from this day-use area.

Alternative 3A would intercept visitors from any location, because the facility would be within the preserve's boundaries and accessible from the main entrance road. This location would readily serve both casual visitors and those who have made advance preparations to visit the preserve without the need for additional directional signs along routes leading to the area.

Services and amenities offered to the public would include a covered dropoff, a lobby, reception and orientation areas, a theater, a main exhibit hall, a temporary exhibit hall, classroom/meeting space, retail and food service space, restrooms, and indoor/outdoor observation decks. Administrative space would include offices for interpretive staff and volunteers, secure office space for law enforcement, a staff break area, and restrooms; storage areas specific to retail, law enforcement, administration, operations, and food service; access for deliveries; and a work area for building maintenance. Administrative space would increase the amount of parking needed at the site to accommodate staff and volunteers, in addition to the parking needed for visitors. Carpooling and similar programs would be encouraged in an effort to reduce driving by administrative staff.

As noted in the preserve's interpretive plan, the closer the facility is to the preserve's nucleus, the more difficult or expensive it would become to limit access (VCT 2005g). To address this potential issue, the visitor center would provide staging for visitors wanting to access the preserve's interior for activities such as hiking, fishing, and picnicking. Access, primarily by shuttle, would be via a Level 4

Access, primarily by shuttle, would be via a paved or gravel loop road; some access by personal vehicles would be allowed by permit.

paved or gravel road; some access by personal vehicles would be allowed by permit. Like under alternative 2, the shuttle route under alternative 3A would follow a loop, shown in figure 2-7 as the Level 4 roads in the preserve. However, the shuttle would operate daily during summer months and the first part of fall, instead of weekends only. The shuttle would operate at lower capacity on weekdays. No shuttle or private vehicle access would be permitted farther into the preserve. A shuttle transfer station would be developed near Valle San Antonio to accommodate visitors traveling in different directions. For example, visitors wishing to recreate near San Antonio Creek would not need to ride the shuttle through the entire preserve to access and return from their desired destination. Shelters would be provided at specific locations to accommodate visitors when the weather changes. Shuttles would also be used to provide special tours, and may access additional locations outside the shuttle loop.

The shuttle route would be primarily a single-lane road with two-way operations of shuttles and permitted personal vehicles. The VCT would base the shuttle operating schedule on visitation, with more frequency during summer weekends than on weekdays or during non–peak seasons. Two lanes may be developed at congested areas to meet national forest safety standards. Upgrading to a Level 4 road would permit the VCT to upgrade its current fleet of vans to shuttles designed to provide comfortable transportation and tours for groups and individuals. As the solar energy system is developed, the VCT could phase electric shuttles into its fleet. A bicycle path would parallel the loop road, either as a separate facility or within the road shoulder area; shuttles would be equipped with trailers to transport biking, backpacking, and other recreational gear to provide broad access to the preserve. Cyclists would be required either to park at the visitor center and access the bicycle path via the shuttle or to ride directly into the preserve. Demand for parking at the visitor center for cyclists may increase the size of the parking area. When the preserve is open to hunting, hunters would be able to drive directly to their destinations, although no motorized, off-road access for hunting would be allowed. Other recreation activities would be managed to ensure the safety of the public and the quality and success of the hunt.

Facilities and infrastructure developed to support the proposed action would include fishing access, trailheads, overlooks, campgrounds, and picnic areas. These areas would include shuttle stops, small gravel or paved parking areas for up to five vehicles, restrooms, trash and recycling receptacles, and interpretive signs. Hiking trails would be expanded to provide short day loops and multi-day backpacking opportunities. Hiking would continue to be primarily via Level 1 roads; new trail construction would only occur as necessary.

The temporary visitor contact station currently located at the Valle Grande Staging Area would be relocated to the Banco Bonito Staging Area. The Banco Bonito Staging Area would continue to provide access for horseback riding and staging for special events. Visitors would be able to drive their personal vehicles to the Banco Bonito Staging Area; the shuttle would not provide access to this location.

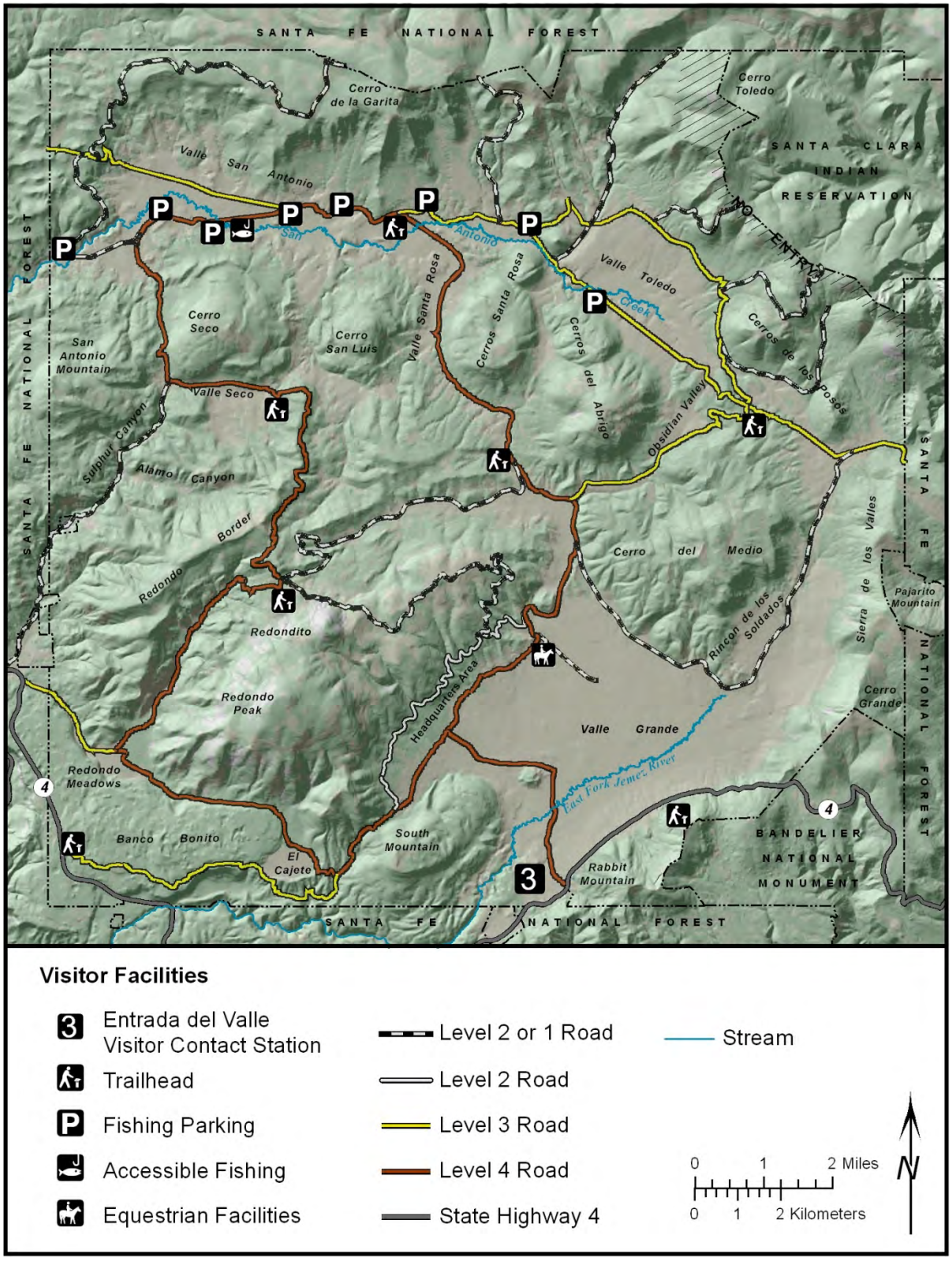


Figure 2-7: Alternative 3A and 3B Map—Entrada del Valle

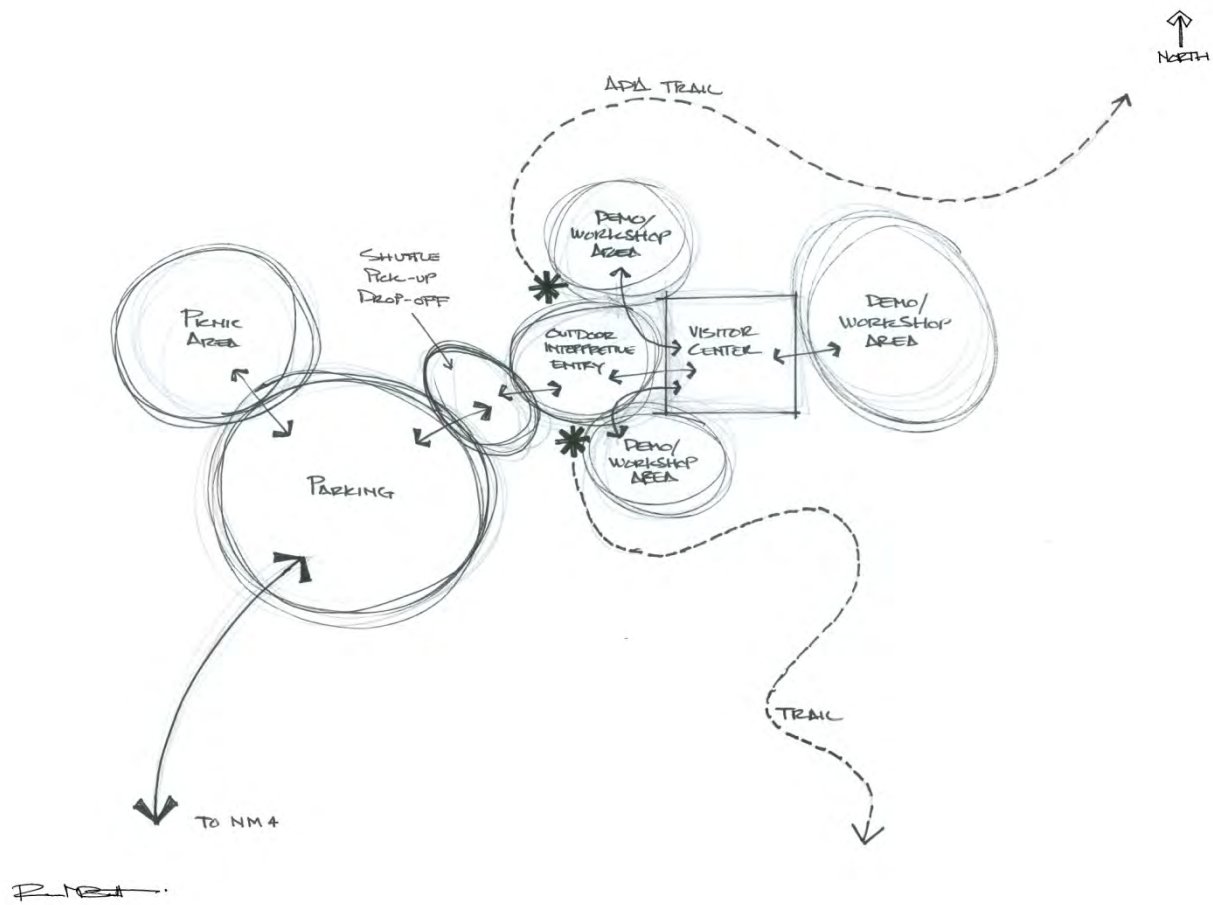


Figure 2-8: Alternative 3A and 3B Conceptual Layout—Entrada del Valle

The VCT would also develop areas to support environmental education and ecotourism to connect visitors with the environment. These areas would include lecture areas, outdoor kitchens, primitive sleeping facilities, and restrooms. The location and scale of this development would be decided in the future based on a site-specific analysis and additional public outreach. Sites would be managed to protect the environment from impacts due to repeated use over time.

Recreational and educational sites would be managed to protect the environment from impacts due to repeated use over time.

In the future, the VCT would identify additional points of nonmotorized access along the preserve's perimeter, emphasizing access to the caldera rim. The VCT would also seek to expand programs and facilities for horseback riding based on additional site-specific assessment.

This site has good water sources and options for creating viable and reliable water and utility supplies to the visitor center. If a cafeteria were implemented under this alternative, an additional 20 gallons of water per visitor per day would be required compared to alternative 2. Assuming 120,000 visitors per year, an additional 2,400,000 gallons would be required, for a total of 4,400,000. A restaurant may require slightly less (see table 2-4) (Mancl n.d.).

Figure 2-9: Alternative 3A and 3B Visitor Center Conceptual Rendering

The closest water source to this site is a series of three springs at the toe of the slope north of the visitor center location. These springs are about 1,300 feet away and 130 feet lower in elevation. If the springs are not viable, a well would be drilled. However, further analysis is required to determine the production volume of the springs or the best location to drill a well. A water pumping system would be constructed, and solar energy would be the primary source of pumping power. Water would be pumped to a holding tank at the top of the hill, from which water would be filtered and gravity-fed to the visitor center. Solar panels would be placed outside of desired viewsheds, which may place them too far from the pumping system to provide reliable power. In this case, electrical power would be provided through an existing transmission line located 1,000 feet from the springs. If electrical power is used, all new power lines would be placed underground. Alternatively, visible solar panels could be designed in such a way as to provide educational opportunities. Such possibilities would be further explored during the design phase.

Implementation Decisions

1. location of a visitor and interpretive center in the Valle Grande
2. development of connected infrastructure and facilities
    a. location and scale of solar energy system
    b. utilities, water, and wastewater

c. access from NM-4 with typical road signs

d. short-term parking for approximately 100 vehicles at the visitor center, plus long-term parking for administrative staff, volunteers, shuttle users, and cyclists

e. day-use recreation amenities and visitor conveniences, including restrooms, picnic area, overlook, and access to the East Fork of the Jemez River

f. group staging and interpretive information (at visitor center)

g. relocation of temporary visitor contact station from Valle Grande to Banco Bonito Staging Area

Programmatic Decisions

These actions would require additional planning and analysis in compliance with NEPA prior to implementation:

1. development of Level 4 single-lane (paved or gravel) transportation system with bicycle path
2. shuttle system and associated infrastructure on Level 4 roads
3. parking areas for up to five vehicles at fishing access and trailheads in backcountry areas
4. recreation facilities, including trailheads, fishing access, picnic areas, campgrounds, and overlooks
5. additional nonmotorized access along the preserve's perimeter
6. additional staging / visitor contact areas
7. development of equestrian facilities and programs based from the horse barn, and equestrian access to the Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio
8. development of primitive education and ecotourism facilities

Alternative 3B: Entrada del Valle Visitor Center—Primary Access via Personal Vehicle

Alternative 3B would be similar to alternative 3A; the primary difference is visitors would access the preserve using their personal vehicles.

As described above, a shuttle system would serve as the primary mode of access under alternative 3A, and personal vehicle access would be by special permit for specific activities only. Under alternative 3B, the primary difference would be the mode of transportation onto the preserve; visitors would access the preserve using their personal vehicles. Shuttles would only be used for tours and group events, or to reduce congestion on high-use days, similar to alternative 2. Personal vehicles would follow the same loop route described for the shuttle under alternative 3A. The associated transportation system would include development of a double-lane, two-way, Level 4 paved or gravel road to accommodate the increased number of vehicles due to the mix of shuttles and personal vehicles using the roads. Parking areas at the visitor centers would be smaller than those under alternative 3A

because they would not have to accommodate the long-term parking required by the use of a shuttle system. Larger parking lots would be warranted in the preserve's interior at trailheads, fishing access sites, picnic areas, and overlooks to accommodate the use of personal vehicles in the preserve. Components of alternative 3B are listed briefly in table 2-7 and described further below.

Similar to alternative 3A, a bicycle path would parallel the loop road, either as a separate facility or within the road shoulder area. Cyclists would be able to park at the visitor center or parking lots in the preserve to access the bicycle path. Parking demand at the visitor center by cyclists would be less under alternative 3B than alternative 3A because cyclists would be able to drive to their desired destinations to unload their bikes and ride, rather than parking at the visitor center and taking a shuttle to their biking destinations.

Table 2-7: Summary of Alternative 3B Components

Components	Description
Visitor Center / Visitor Contact Station (Implementation-level Components)	
Location and access	Same as alternative 3A
Scale	
Day-use recreation amenities	
Visitor center sustainability	
Programmatic-level Components	
Sustainability	Same as alternative 3A
Transportation	• Emphasis on personal vehicle use on double-lane, two-way Level 4 road, with shuttle use based on visitation and conditions • Bicycle path same as alternative 3A
Trail system	Same as alternative 3A
Hunting and fishing	
Equestrian facilities and programs	
Interpretive facilities and programs	
Recreational amenities	
Lodging	

Implementation Decisions

1. location of a visitor and interpretive center at Entrada del Valle
2. development of connected infrastructure and facilities
   a. location and scale of solar energy system
   b. utilities, water, and wastewater

c. access from NM-4 with prominent road signs directing visitors to the visitor center

d. short-term parking at the visitor center, plus long-term parking for administrative staff and volunteers (fewer parking spaces compared to alternative 3A)

e. group staging and interpretive information

f. recreation amenities as described for alternative 3A

g. relocation of temporary visitor contact station from Valle Grande to Banco Bonito Staging Area

Programmatic Decisions

1. development of Level 4 two-lane (paved or gravel) transportation system with bicycle path
2. parking areas at fishing access sites and trailheads in backcountry areas (larger parking areas compared to alternative 3A)
3. development of shuttle system infrastructure and parking when shuttles provide primary access on high-use days and for special events and tours (would require shuttle system infrastructure and larger parking area at visitor contact station)
4. recreation facilities, including trailheads, fishing access, picnic areas, campgrounds, and overlooks
5. additional nonmotorized access along the preserve's perimeter
6. additional staging areas / visitor contact areas
7. development of equestrian facilities and programs based from the horse barn, and equestrian access to the Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio
8. development of primitive education and ecotourism facilities

Alternative 4A: Vista del Valle Visitor Center—Primary Access via Shuttle System

Alternative 4A would locate the full-service visitor center south of NM-4 below Rabbit Mountain.

This alternative is similar to alternative 3A but would locate the full-service visitor center south of NM-4 below Rabbit Mountain. Where alternative 3A focuses on day-use experience around access to the East Fork of the Jemez River and hiking at South Mountain, alternative 4 would develop a day-use area focused on views of the Valle Grande, interpretation of geology, and proximity to the adjacent day-use area at Bandelier National Monument, which consists of a cross-country ski trail and hiking trail leading from the preserve boundary. An underpass that allows nonmotorized use for a mixture of bicycles and pedestrians would be developed to provide access below NM-4 for wildlife viewing. Interpretive trails and picnic areas would be developed south of NM-4, also emphasizing views of the Valle Grande. Like alternatives 2, 3A, and 3B, NM-4 would be modified to include acceleration and

deceleration lanes. The VCT would work with NMDOT on these changes during design and implementation. Also like alternative 3A, under alternative 4A a shuttle system would serve as the primary mode of access into the preserve, following the same Level 4 loop road. However, shuttles would also be required to travel a short distance on NM-4 between the visitor center and the preserve's main entrance road. Components of alternative 4A are listed briefly in table 2-8 and described further below.

Table 2-8: Summary of Alternative 4A Components

Components	Description
Visitor Center / Visitor Contact Station (Implementation-level Components)	
Location and access	Rabbit Mountain; visitors from the west would pass the entrance en route to the visitor center
Scale	Same as alternative 3A
Day use recreation amenities	Access to Bandelier National Monument, views of Valle Grande, interpretation of geology
Visitor center sustainability	LEED Gold or Platinum
Water, utilities availability	Water availability difficult; electrical and phone line availability difficult
Programmatic-level Components	
Sustainability	Described under "Elements Common to All Action Alternatives"
Transportation	Same as alternative 3A
Trail system	Same as alternative 3A
Hunting and fishing	Same as alternative 3A
Equestrian facilities and programs	Same as alternative 2
Interpretive facilities and programs	Same as alternative 3A
Recreational amenities	• From the visitor center: ADA-compliant day-use area providing overlooks of the Valle Grande, interpretive trails, and picnic areas south of NM-4; underpass below NM-4 for nonmotorized use by bicycles and pedestrians for wildlife viewing • Beyond the visitor center: same as alternative 3A
Lodging	Same as alternative 2

Although the alternative 4A location is undisturbed, it was chosen because it would be readily visible from NM-4 and would take the most advantage of the Valle Grande "stopping power" by providing views of the preserve's sweeping valleys (figure 2-10). The preserve's 2005 *Master Plan for Interpretation* (VCT 2005g) notes that views of the Valle Grande provide the casual visitor the highest motivation to stop at a visitor center along the highway to investigate the preserve. The visitor center would be visible from NM-4; however, the building would be restricted to

The alternative 4A site would provide views of the Valle Grande and the preserve's sweeping valleys.

the periphery of the site and would be situated to control access to the rest of the preserve, as called for in the 2005 *Master Plan for Interpretation*. Like under alternative 3A, this location would be zoned "Medium" based on definitions in the 2005 *Master Plan for Interpretation* and described under alternative 3A.

Similar to alternative 3A, a full-service visitor center of up to 10,000 square feet with supporting administrative facilities of up to an additional 5,000 square feet would be developed (figure 2-11). Services and amenities provided at the visitor center, as well as administrative space, would be the same as alternative 3A. It is expected that over 120,000 guests would visit this facility each year, as described for alternative 3A. The facility could be powered by a pole-mounted solar energy system and would otherwise be constructed to LEED Platinum or Gold ratings.

The footprint of the visitor center would also include the development of a Level 4 paved access road from NM-4, parking for approximately 100 vehicles (visitors only), RV and bus parking, and overflow parking to support high-use days and special events. The access point on NM-4 would include acceleration and deceleration lanes and directional, regulatory, and warning signs along the road. From the visitor center an ADA-compliant day-use area would be developed that would provide overlooks of the Valle Grande, and interpretive trails and picnic areas south of NM-4 would also be designed to take advantage of views into the preserve. An underpass below NM-4 for nonmotorized use by bicycles and pedestrians would be developed to allow access to the edge of the Valle Grande for wildlife viewing.

This alternative would intercept visitors primarily from the north and east, such as those arriving from Los Alamos and Santa Fe, New Mexico. Visitors traveling from the west and south, for instance from Jemez Springs and Albuquerque, New Mexico, would be required to drive approximately 2 miles past the preserve's entrance road (which currently accesses the Valle Grande Staging Area in the Valle Grande) to reach the visitor center. Although the visitor center would be in view as visitors approach from the west, they might turn onto the preserve's entrance road before reaching the visitor center. Because access to the preserve would be primarily by shuttle (by permit only for personal vehicles), visitors would then have to turn around, leave the preserve, and travel 2 miles farther northeast to board a shuttle at the visitor center to enter the preserve. Therefore, visitors from the west would be directed past the preserve's main access road to reach the visitor center and shuttles. In case visitors do turn onto the entrance road, a gate or other obstacle would prevent access, with additional signs directing visitors to the visitor center. Advance planning strategies, including prominent road signs along the approach from the west directing drivers to the visitor center, would be used to guide visitors to the visitor center past the main access road. Due to the facility's proximity to the Valle Grande, a typical entrance sign at the visitor center would be sufficient to encourage visitors to enter the visitor center.

In keeping with USFS sustainable design guidelines for the Rocky Mountain Province (USFS 2001), the overlook would provide unobstructed views of the Valle Grande and would be constructed of natural materials. The type and setting of stones used would match the local formations, and a flowing, natural pathway would be integrated into the site (figure 2-12).

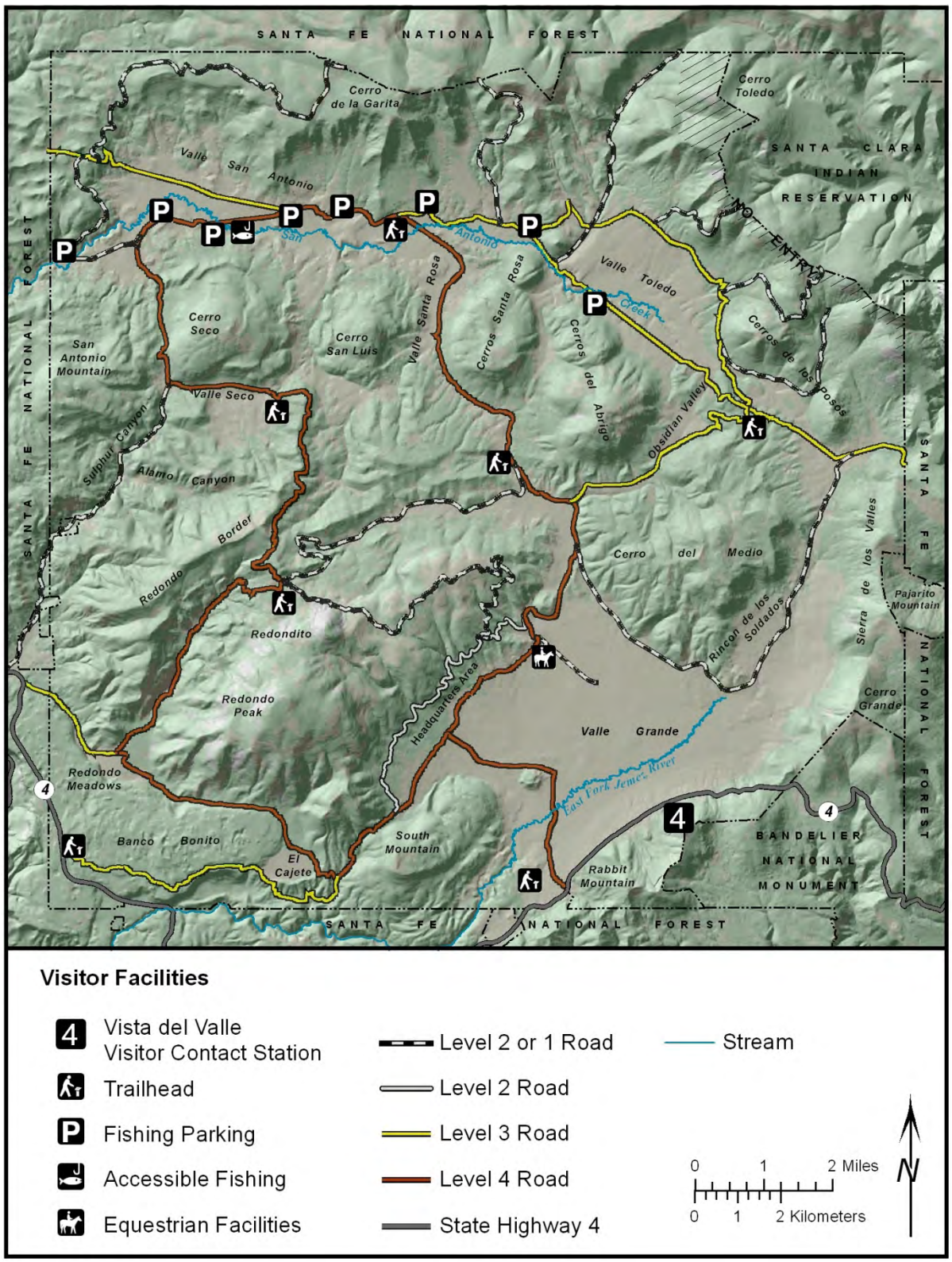


Figure 2-10: Alternative 4A and 4B Map—Vista del Valle

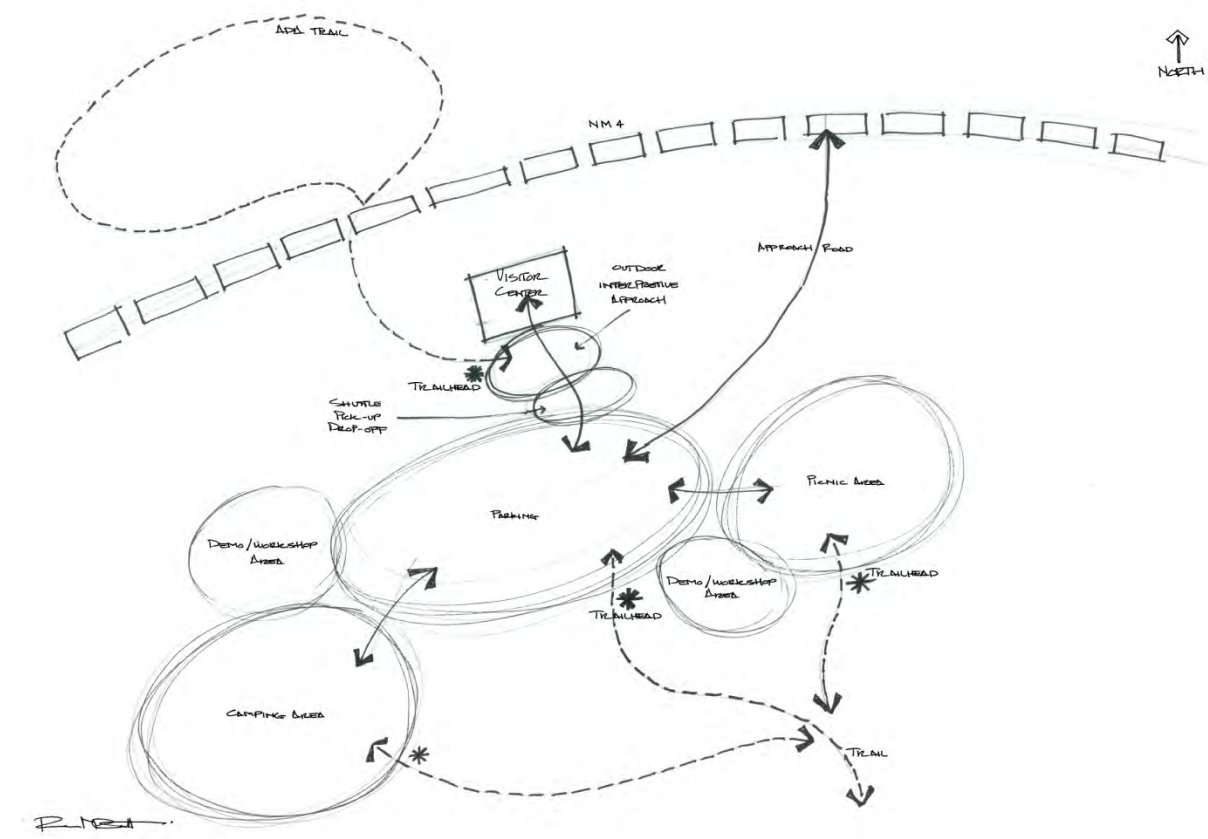


Figure 2-11: Alternative 4A and 4B Conceptual Layout

Like under alternative 3A, access from the visitor center into the preserve would be primarily by shuttle for alternative 4A.

Like under alternative 3A, access from the visitor center into the preserve would be primarily by shuttle, via a Level 4 paved or gravel road, with access by permit allowed for personal vehicles. Facilities and infrastructure, including road development, shuttle operations, and cycling facilities, would be the same as under alternative 3A. Environmental education and ecotourism activities, additional nonmotorized access points, and expanded programs and facilities for horseback riding would be included as described for alternative 3A. The temporary visitor contact station currently located at the Valle Grande Staging Area would be relocated to Banco Bonito Staging Area as described for alternative 3A.

As noted in the interpretive plan, the closer the facility is to the preserve's nucleus, the more difficult or expensive it will become to limit access (VCT 2005g). To address this potential issue, the visitor center would provide staging for visitors wanting to access the preserve's interior for activities such as hiking, fishing, and picnicking.

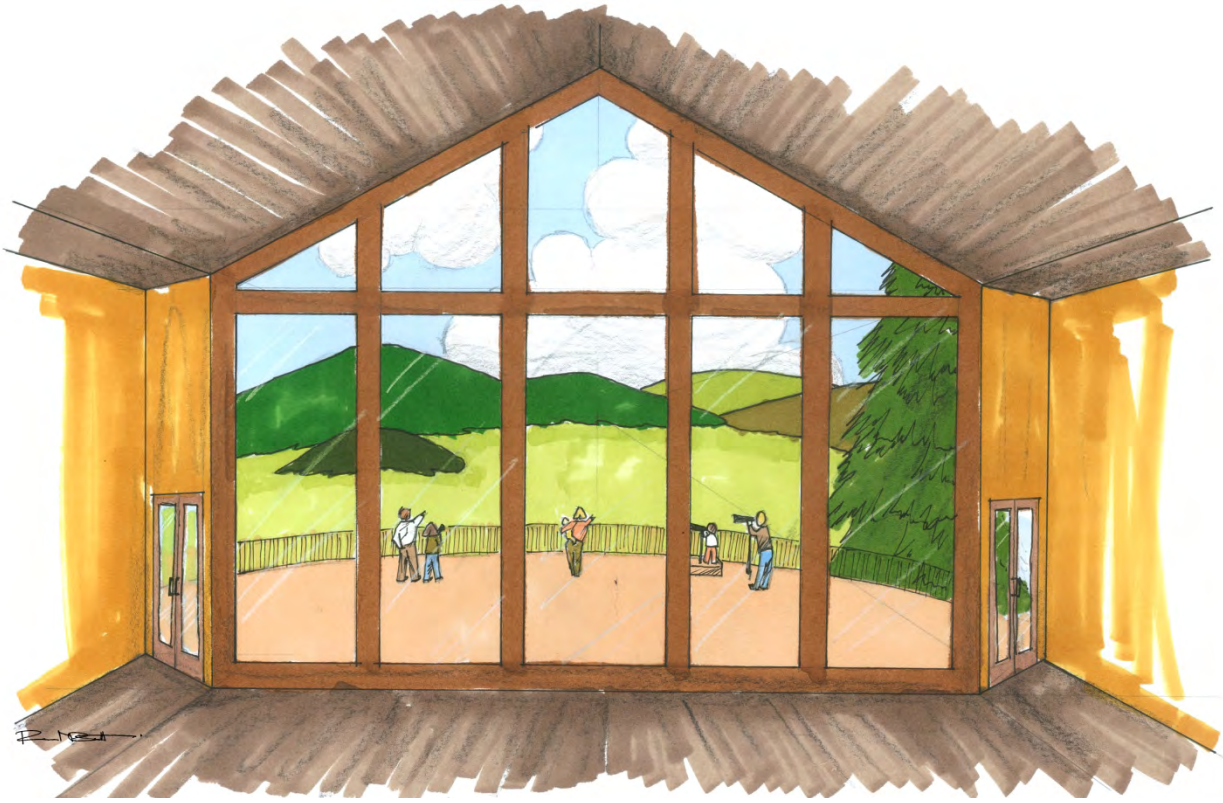


Figure 2-12: Alternative 4A and 4B Visitor Center Conceptual Rendering

This site poses many obstacles to securing a viable water source, and the nearest source of electrical power is almost 2 miles away. This alternative would require the same amount of water as alternative 3A. The closest water source to this site is a spring just under 1 mile (0.92 mile) away and 100 feet lower in elevation. The spring's production volume is unknown and further analysis would be required to determine its viability and reliability as a water source. A pumping system would be required in the open grasslands of the Valle Grande, which would create a visual impact on travelers along NM-4. Permeable fills and/or larger culverts crossing NM-4 would be constructed to direct runoff created by the new wet habitats and areas from these systems.

It would be costly to create the systems and infrastructure needed to supply water to this site, and the cost associated with providing electrical power to the site could be high. However, solar panels could be discreetly accommodated at this location, although the distance from the solar panels to the visitor center might be too great to provide reliable power. Further analysis would be required. Existing phone lines along NM-4 could be accessed.

Implementation Decisions

1. location of a visitor and interpretive center south of NM-4 below Rabbit Mountain
2. development of connected infrastructure and facilities

a. location and scale of solar energy system

b. utilities, water, and wastewater

c. access from NM-4 with prominent road signs directing visitors to the visitor center

d. short-term parking for approximately 100 vehicles at the visitor center, plus long-term parking for administrative staff, volunteers, shuttle users, and cyclists

e. day-use recreation amenities including picnic area, overlook, and access to the Valle Grande beneath NM-4

f. group staging and interpretive information (at the visitor center)

g. relocation of temporary visitor contact station from Valle Grande to Banco Bonito Staging Area

Programmatic Decisions

Programmatic decisions for alternative 4A would be the same as alternative 3A.

Alternative 4B: Vista del Valle Visitor Center—Primary Access via Personal Vehicle

Alternative 4B would be similar to alternative 4A; the primary difference is visitors would access the preserve using their personal vehicles.

As described above, a shuttle system would serve as the primary mode of access under alternative 4A, and personal vehicle access would be by special permit for specific activities only. Under alternative 4B, the primary difference would be the mode of transportation onto the preserve; visitors would access the preserve using their personal vehicles. Shuttles would only be used for tours and group events, or to reduce congestion on high-use days, similar to alternative 2. Personal vehicles would follow the same loop route described for the shuttle under alternative 4A. The associated transportation system would include development of a double-lane, two-way, Level 4 paved or gravel road to accommodate the increased number of vehicles due to the mix of shuttles and personal vehicles using the roads. Parking areas at the visitor center would be smaller than those under alternative 4A because they would not have to accommodate the long-term parking required by the use of a shuttle system. Larger parking lots would be warranted in the preserve's interior at trailheads, fishing access sites, picnic areas, and overlooks to accommodate the use of personal vehicles in the preserve. Alternative 4B is summarized in the table below.

Table 2-9: Summary of Alternative 4B Components

Components	Description
Visitor Center / Visitor Contact Station (Implementation-level Components)	
Location and access	Same as alternative 4A
Scale	
Day-use recreation amenities	
Visitor center sustainability	
Programmatic-level Components	
Sustainability	Same as alternative 4A
Transportation	• Emphasis on personal vehicle use on double-lane, two-way Level 4 road, with shuttle use based on visitation and conditions • Bicycle path same as alternative 4A
Trail system	Same as alternative 4A
Hunting and fishing	
Equestrian facilities and programs	
Interpretive facilities and programs	
Recreational amenities	
Lodging	

Similar to alternative 4A, a bicycle path would parallel the loop road, either as a separate facility or within the road shoulder area. Cyclists would be able to park at the visitor center or parking lots in the preserve to access the bicycle path. Parking demand at the visitor center by cyclists would be less under alternative 4B than alternative 4A because cyclists would be able to drive to their desired destinations to unload their bikes and ride, rather than parking at the visitor center and taking a shuttle to their biking destinations.

Alternative 4B would include two personal vehicle entry points along NM-4 on opposite sides of the highway: one into the preserve, and one into the visitor center.

Under alternative 4B, the visitor center would be located on the south side of NM-4, and the main access road into the preserve would be on the north side of the highway. Visitors would be able to enter the preserve's main access road and bypass the visitor center, particularly if approaching from the west. To mitigate this potential lack of access to orientation and interpretive information, prominent road signs along the approach to the main access road would provide directional information to the visitor center. Mitigation may also include additional signs along the preserve's main access road to direct traffic and discourage dispersed use.

Alternative 4B would also include two personal vehicle entry points along NM-4 on opposite sides of the highway: one into the preserve, and one into the visitor center. These entry points would be developed with full intersection improvements, including acceleration and deceleration lanes and directional, regulatory, and

warning signs along the road to help mitigate potential congestion resulting from visitors traveling between the preserve's main access road and the visitor center.

Implementation Decisions

1. location of a visitor and interpretive center at Vista del Valle
2. development of connected infrastructure and facilities
    a. location and scale of solar energy system
    b. utilities, water, and wastewater
    c. access from NM-4 with prominent road signs directing visitors to the visitor center
    d. short-term parking at the visitor center, plus long-term parking for administrative staff and volunteers (fewer parking spaces compared to alternative 4A)
    e. group staging and interpretive information
    f. recreation amenities as described for alternative 4A
    g. relocation of temporary visitor contact station from Valle Grande to Banco Bonito Staging Area

Programmatic Decisions

1. development of Level 4 two-lane (paved or gravel) transportation system with bicycle path
2. parking areas at fishing access sites and trailheads in backcountry areas (larger parking areas compared to alternative 4A)
3. development of shuttle system infrastructure and parking when shuttles provide primary access on high-use days and for special events and tours (would require shuttle system infrastructure and larger parking area at visitor contact station)
4. recreation facilities, including trailheads, fishing access, picnic areas, campgrounds, and overlooks
5. additional nonmotorized access along the preserve's perimeter
6. additional staging areas / visitor contact areas
7. development of equestrian facilities and programs based from the horse barn, and equestrian access to the Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio
8. development of primitive education and ecotourism facilities

Comparison of Alternatives Selected for Detailed Analysis

Table 2-10 provides a comparison of the elements of the no-action alternative and the five action alternatives. The Council for Environmental Quality *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* direct

federal agencies to "present the environmental impacts of the proposal and the alternatives in comparative form" under the discussion of the alternatives (*Code of Federal Regulations* [CFR], title 40, sec. 1502.14 [1996]); this is depicted in Table 2-11. Figure 2-13 depicts this information visually, stressing the primary differences in order to "sharply defin[e] the issues and provide a clear basis for choice among options" (CFR, title 40, section 1502.14 [1996]).

Table 2-10: Comparison of Alternatives

Feature	Alternative 1 No Action	Alternative 2 Banco Bonito	Alternative 3 Entrada del Valle		Alternative 4 Vista del Valle	
			3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Implementation-level Components						
Visitor Center / Visitor Contact Station						
Location	None	Visitor contact station at Banco Bonito Staging Area	Visitor center at southwestern Valle Grande near South Mountain		Visitor center at south side of NM-4 at base of Rabbit Mountain	
Scale	None	2,500–5,000 sq. ft.; ~50,000 visitors/yr	10,000 sq. ft. plus 5,000 sq. ft. administrative space; ~120,000 visitors/yr			
Day-use recreation emphasis	None	Minimal development	Access to East Fork of the Jemez River and South Mountain for hiking and fishing		Views of Valle Grande; hiking access to Valle Grande via an underpass under NM-4	
Sustainability	N/A	LEED Platinum or Gold standards				
Water, utilities availability	N/A	Water availability difficult; electrical and phone lines available; ~2 million gal/yr required	Water available; electrical and phone lines available; approximately 4.4 million gal/yr required		Water availability difficult; electrical and phone line availability difficult; approximately 4.4 million gal/yr required	
Programmatic-level Components						
Visitor Center / Visitor Contact Station						
Sustainability	None	As described under "Elements Common to All Action Alternatives"				
Transportation						
Vehicle type	None	Primarily personal vehicles supplemented by shuttle as warranted	Primarily shuttles with personal vehicle access by permit only	Primarily personal vehicles supplemented by shuttle as warranted	Primarily shuttles with personal vehicle access by permit only	Primarily personal vehicles supplemented by shuttle as warranted

Feature	Alternative 1 No Action	Alternative 2 Banco Bonito	Alternative 3 Entrada del Valle		Alternative 4 Vista del Valle	
			3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Road system	None	Level 4 road from NM-4 to Banco Bonito Staging Area, headquarters area, and south end of Valle Grande; Level 3 roads for remainder of preserve	Primarily single-lane, Level 4 roads	Primarily double-lane, Level 4 roads	Primarily single-lane, Level 4 roads	Primarily double-lane, Level 4 roads
Recreation						
Trails	No access	Short day loops and multi-day backpacking via Level 1 roads				
Hunting and fishing	No access	• Current programs continue (may be adjusted to improve visitor experience and resource protection, increase revenue generation, or for other purposes) • When the preserve is open for hunting, hunters would drive directly to their destinations, although no motorized, off-road access for hunting would be allowed				
Interpretive facilities and programs, ecotourism	None	Primitive education and ecotourism developed in areas by increasing resilience to repeated use without creating an obviously improved or developed site	Lecture areas, outdoor kitchens, primitive sleeping facilities, and restroom		Same as alternatives 3A/3B	
Equestrian	No access	• Development of equestrian facilities and programs based from the horse barn • Access provided to the Valle Grande, Rincon de los Soldados, the Posos, and Cerro del Medio				

Feature	Alternative 1 No Action	Alternative 2 Banco Bonito	Alternative 3 Entrada del Valle		Alternative 4 Vista del Valle	
			3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Other amenities	None	Fishing access, trailheads, overlooks, and picnic areas, including parking lots for up to 10 vehicles in the backcountry areas accessed by the single-lane, gravel (Level 3) roads	• From the visitor center: ADA-compliant day-use area, including access to the East Fork of the Jemez River, overlooks, picnic areas, staging for groups and special events, trails, and interpretive sites • Beyond the visitor center: fishing access, trailheads, overlooks, and picnic areas, including shuttle stops, small gravel or paved parking areas, restrooms, trash and recycling receptacles, and interpretive signs • Banco Bonito Staging Area would continue to provide access for horseback riding and special events • Additional points of nonmotorized access along preserve's perimeter identified in the future		• From the visitor center: ADA-compliant day-use area providing overlooks of the Valle Grande; interpretive trails and picnic areas south of NM-4; an underpass below NM-4 to allow for wildlife viewing • Beyond the visitor center: same as alternative 3A	
Lodging						
New commercial indoor lodging	None					
Group indoor lodging in existing facilities	None	• Continuation of current program of group lodging at Casa de Baca Lodge and a bunkhouse in the headquarters area • No individual room rental				

Table 2-11: Summary of Environmental Consequences

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Visitor Experience	*Implementation* Short term	Moderate adverse	Negligible adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Moderate adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Programmatic Short term	Major adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Major adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Cumulative	Minor adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Summary of Impacts	No recreational activities from existing staging area. No spontaneous access.	Limited day-use activities at visitor contact station. Improved roads and expanded access throughout preserve. Visitor contact station location would be disassociated with the Valle Grande, potentially resulting in visitors backtracking to the visitor contract station.	Full service visitor center with views of Valle Grande. Visitor center would be an attractive destination. Shuttle system would control access and minimize traffic-related impacts.	Implementation-level impacts similar to alternative 3A. Visitors allowed personal vehicle access, increasing potential for accidents, congestion, and noise.	Full service visitor center with wide views of Valle Grande, attracting visitors traveling on NM-4. Visitors may pass visitor center to access entrance road and have to return to visitor center for shuttle pickup. Other impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level similar to alternative 3B.
Visual	*Implementation* Short term	Beneficial	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Beneficial	Minor adverse	Minor adverse	Minor to moderate adverse	Minor adverse
	Programmatic Short term	Beneficial	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Negligible to minor adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse
	Cumulative	Beneficial	Beneficial	Beneficial	Beneficial	Negligible adverse	Beneficial

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Visual cont'd	Summary of Impacts	Portable buildings at staging areas would be removed (all alternatives).	Visitor contact station would not likely be visible from public roads or recreational amenities; site has a high capacity for visual absorption. Vehicles and visitors would be seen across valles; at other locations, taller vegetation and high slopes would shield these views (all action alternatives).	Visitor center would provide scenic views of Valle Grande to the north but would introduce a human-made structure where one does not currently exist. Natural features would help obscure views of the visitor center from NM-4. Shuttle buses would be visible while traveling preserve roads.	Similar to 3A, except substantially higher number of personal vehicles and shuttles on high-use days would be visible on preserve roads.	Visitor center would be visible from headquarters area across Valle Grande; would introduce a new human-made structure where one currently does not exist. Water pumping system would be visible in Valle Grande. Shuttle buses would be visible while traveling preserve roads.	Implementation-level impacts same as alternative 4A. Programmatic-level impacts same as alternative 3B.
Transport-ation	*Implementation* Short term	Negligible adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Long term	Beneficial	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Programmatic Short term	None	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Beneficial	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Cumulative	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Transport-ation cont'd	Summary of Impacts	Decrease in traffic volumes on preserve roads and NM-4.	Planned road and parking improvements would accommodate increased traffic volumes. Highway performance would primarily be LOS B or better, potentially degrading to LOS C during summer holidays or high-use weekends (all action alternatives).	New access road and central location would minimize likelihood of visitors backtracking along NM-4 to reach visitor center. Highway performance similar to alternative 2. Shuttle system would minimize potential traffic congestion, vehicle conflicts, and accidents.	Implementation-level impacts similar to alternative 3A. Increased safety concerns due to increased traffic volume and mix of vehicles within preserve.	Shuttle system would contribute to increased traffic along NM-4 between visitor center access road and Valle Grande access road. Highway performance similar to alternative 2. Shuttle system would minimize potential traffic congestion, vehicle conflicts, and accidents.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Vegetation	*Implementation* Short term	Negligible adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Beneficial	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Programmatic Short term	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Cumulative	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Summary of Impacts	Beneficial throughout preserve from reduced human activity.	Visitor center construction would affect approximately 3 acres of grassland and forested land, but would not likely affect rare plants. Increased human activity would increase risk of spreading noxious weeds.	Visitor center construction would affect 5-10 acres of previously undisturbed habitat, including rare wet meadow habitat. Greater increase of spreading noxious weeds.	Implementation-level impacts similar to alternative 3A. Personal vehicle access could increase spread of noxious weeds compared to shuttle use.	Visitor center construction would disturb 5-10 acres of grassland and forested land primarily near NM-4, which is already affected by human use. Several slope wetlands could be affected by trail or utility construction.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Fish and Wildlife	*Implementation* Short term	Negligible adverse	Moderate to major adverse	Moderate to major adverse	Moderate to major adverse	Moderate to major adverse	Moderate to major adverse
	Long term	Beneficial	Moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Minor adverse	Minor adverse
	Programmatic Short term	Beneficial	Minor adverse	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse
	Long term	Beneficial	Minor to moderate adverse	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse
	Cumulative	Beneficial	Minor to moderate adverse	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse
	Summary of Impacts	Beneficial throughout preserve from reduced human activity.	Construction noise could affect feeding and breeding behaviors (all action alternatives). Some wildlife may become habituated to human presence at visitor center; noise from increased visitation would reduce likelihood that wildlife would use the area (all action alternatives). Most programmatic-level impacts expected from disturbance rather than direct impacts to habitat (all action alternatives).	A variety of wildlife species could use some area around visitor center as breeding or foraging habitat, or as cover. Elk using the area for summer foraging and calving habitat may be disturbed. If facilities are located in riparian or wetland habitats, impacts may affect fish and aquatic wildlife.	Personal vehicle use would create more frequent, persistent, and widespread disturbance to terrestrial wildlife than a shuttle system.	Most of the affected habitat is relatively close to NM-4, which reduces its value to wildlife. Area around the visitor center is not widely used by large game due to its exposure and proximity to NM-4.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Special-status Species	*Implementation* Short term	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Minor adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse
	Programmatic Short term	Beneficial	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Minor adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse
	Cumulative	Beneficial	Negligible adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Summary of Impacts	Beneficial throughout preserve from reduced human activity, including for Mexican spotted owl.	Visitor contact station location is generally not suitable for special-status species. VCT would avoid situating recreational amenities where habitats for special-status species exist (all action alternatives).	Several special-status species could be present around proposed visitor center and associated facilities.	Implementation-level impacts same as alternative 3B. Increased access via personal vehicles could result in increased collection or illegal hunting of special-status species.	Visitor center location is near area designated as critical habitat for Mexican spotted owl, but insignificant impacts expected. Jemez Mountains salamander has been found within one mile of the proposed visitor center and peregrine falcon may nest nearby.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Geology and Soils	*Implementation* Short term	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Minor adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Programmatic Short term	Beneficial	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Cumulative	Beneficial	Negligible adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Geology and Soils cont'd	Summary of Impacts	Beneficial impact from removal of structures and cessation of trampling and soil disturbance. No change at programmatic level.	Soil types around visitor contact station have very limited suitability for commercial building, are compactable and erosion-prone, but would be suitable for a geothermal heat pump. Flooding at the visitor contact station site is a serious limitation but rare. Recreational activities throughout the preserve would continue on existing roads, which have already been disturbed and compacted, as has the visitor contact station site.	Soil types around visitor center have no limitations for commercial building, have low susceptibility to water erosion, moderate susceptibility to wind erosion, and would be somewhat suitable for a geothermal heat pump. Flooding at the visitor center site is rare. Minimal programmatic-level impacts expected, particularly after initial use has occurred and areas become established.	Implementation and programmatic-level impacts similar to alternative 3A.	Soil types at visitor center site have very limited suitability for commercial buildings, local roads, shallow excavation, and septic tank absorption, but would be somewhat suitable for a geothermal heat pump. Impacts from potential flooding are unknown at the visitor center site. Flooding may be minimal due to hillside slope. Programmatic-level impacts similar to alternative 3A.	Implementation- and programmatic-level impacts similar to alternative 4A.
Water	*Implementation* Short term	Beneficial	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Minor to moderate adverse	Moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse
	Programmatic Short term	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Beneficial	Negligible adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Cumulative	Beneficial	Minor adverse	Negligible to minor adverse	Minor adverse	Minor adverse	Minor adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Water cont'd	Summary of Impacts	Water use on preserve would decrease due to reduced visitor use. Reduced fishing would result in decreased riparian impacts, though not likely measurable.	No wetlands, streams, or wet meadows would be affected by construction of visitor contact station. Visitor use would increase water use to 2 million gallons of water per year. Increases in automobile traffic could increase contaminants and road runoff from roads in the preserve.	Between 0.5 and 1 acre of wet meadows could be affected by construction of new access road and facilities. Culverts would be constructed on the new 1-mile long access road. Visitors would use an estimated 4.4 million gallons of water each year. Shuttle buses could release contaminants into waterways within the preserve.	Personal vehicles could release contaminants into waterways within the preserve, along roads, in parking areas, and at trailheads, more so than shuttles due to substantial number of personal vehicles.	Construction of visitor center and facilities could affect wet meadows. Visitors would use an estimated 4.4 million gallons of water per year. Potential long-term impacts by reducing available water for local wetlands and streams. Programmatic-level impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Natural Sounds	*Implementation* Short term	Negligible adverse	Negligible adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	Beneficial	Minor adverse	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
	Programmatic Short term	None	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial	Moderate adverse	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse
	Cumulative	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse	Minor to moderate adverse	Moderate adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Natural Sounds cont'd	Summary of Impacts	Reduction in sounds from removal of existing structures and cessation of associated human-caused sounds.	Vegetation around visitor contact station would partially absorb noise generated at the site. Vehicular noise would be noticeable, particularly along loop road from use by personal vehicles and shuttles on high-use days. Sound would dissipate across large valles (all action alternatives).	Electric shuttle buses would eventually be used, which would be quieter than conventional gasoline-powered vehicles. Shuttle traffic noise would be noticeable.	Impacts similar to alternative 3A, although higher due to more frequent motor vehicle traffic. A wide variety of engine types would result in a mixture of noise levels. Engine noise would vary based on driving style.	Noise from visitor center site would be concentrated outside the preserve's main landscape on its boundary, south of NM-4. Programmatic-level impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Cultural Resources	*Implementation* Short term	NA	NA	NA	NA	NA	NA
	Long term	Beneficial	Major adverse	Major adverse	Major adverse	Major adverse	Major adverse
	Programmatic Short term	NA	NA	NA	NA	NA	NA
	Long term	Beneficial	Major adverse	Major adverse	Major adverse	Major adverse	Major adverse
	Cumulative	Beneficial	Minor adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle		Vista del Valle	
		No Action	Banco Bonito	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Cultural Resources cont'd	Summary of Impacts	Removal of existing staging areas would help restore the historic cultural landscape. Reduced visitation would reduce educational opportunities.	Construction of visitor contact station would disturb approximately 3 acres of land. 13 archeological sites are on or near the proposed visitor contact station site (primarily agricultural features from early Pueblo peoples). Increased visitation would increase risk of disturbing cultural resources, especially those exposed on the surface or above ground (all action alternatives).	Construction of visitor center would disturb approximately 5-10 acres of land. 11 archeological sites are on or near the proposed visitor contact station site (lithic scatters and trash and livestock pens). Shuttle system would allow more control over public access to sensitive cultural resources compared to personal vehicle use.	Use of personal vehicles within the preserve could require a smaller footprint at the visitor center location, but would require larger parking areas and associated facilities throughout the preserve compared to shuttle system.	Construction of visitor center would disturb approximately 5-10 acres of land. 11 archeological sites are on or near the proposed visitor contact station site (lithic scatters and ceramic pottery pieces). Programmatic-level impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Socio-economics	*Implementation* Short term	Negligible (economic) Moderate adverse (social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)
	Long term	Negligible (economic) Moderate adverse (social)	Beneficial (economic/social)	Beneficial (economic/social	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)
	Programmatic Short term	Minor to moderate adverse (economic) Moderate adverse (social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)
	Long term	Minor to moderate adverse (economic) Moderate adverse (social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)	Beneficial (economic/social)

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle Visitor Center		Vista del Valle Visitor Center	
		No Action	Banco Bonito Visitor Contact Station	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Socio-economics cont'd	Cumulative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Summary of Impacts	Minimal social or economic impacts. Decreased visitation would result in fewer tourist revenues and related jobs for the local community. Public attitudes and beliefs that access to the preserve is too restricted would be intensified.	50,000 visitors expected annually. Additional employees may be needed, resulting in local economic benefits, e.g., increased spending on food, lodging, other services. Expanding access would support public interest in participating in recreational activities in the preserve, with limits to protect resources (all action alternatives).	Up to 120,000 visitors expected annually, benefiting local economies through spending on food, lodging, and other services. Full-service visitor center would provide greatly expanded opportunities for access, interpretation, and enjoyment of the preserve. Jobs would be generated to support these services.	Impacts similar to Alternative 3A, except that local gas stations may experience more business due to increased gasoline use by personal vehicles.	Implementation and programmatic-level impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Environ-mental Justice	*Implementation* Short term	None	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Long term	Negligible adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Programmatic Short term	Negligible adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Long term	Negligible adverse	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Cumulative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle Visitor Center		Vista del Valle Visitor Center	
		No Action	Banco Bonito Visitor Contact Station	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Environ-mental Justice cont'd	Summary of Impacts	Negligible economic impacts due to reduction in public services and access. No change to landscape features that are important to the local Pueblos. Native American groups would have continued access for game hunting, plant gathering, mineral collecting, and ceremonial pilgrimage.	Increased visitation would increase tourism spending and generate jobs potentially benefiting environmental justice populations. Bilingual staff may be needed to serve visitors. VCT would work with local Pueblos to protect culturally important features (all action alternatives).	Same economic benefits as alternative 2 but to greater degree due to higher visitation levels. Bilingual staff may be needed to serve visitors.	Same as alternative 3A plus increased visitor access could affect landscapes that are important to local Tribes and use of the preserve for cultural and religious practices. VCT staff would work with Tribes to mitigate this possibility.	Implementation and programmatic-level impacts similar to alternative 3A.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Carbon Footprint/ Air Quality	*Implementation* Short term	Beneficial to negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial to negligible adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Minor to moderate adverse	Moderate adverse
	Programmatic Short term	Beneficial adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	Beneficial adverse	Moderate adverse	Moderate adverse	Major adverse	Moderate adverse	Major adverse
	Cumulative	Moderate adverse	Moderate adverse	Moderate adverse	Major adverse	Moderate adverse	Major adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle Visitor Center		Vista del Valle Visitor Center	
		No Action	Banco Bonito Visitor Contact Station	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Carbon Footprint/ Air Quality cont'd	Summary of Impacts	Energy consumption would decrease, but no opportunity to communicate the VCT's vision for sustainable operations.	Carbon and criteria pollutant emissions would increase due to development of visitor contact station, activities associated with the increased number of guests, and increased services. Vehicles used in the preserve would emit approximately 113.6 tons of CO^2 per year.	Emissions would increase due to development of the visitor center, activities associated with the increased number of guests, and increased services. Substantially increased visitation would increase regional mobile combustion sources from people traveling to the preserve. Use of shuttles in lieu of personal vehicles expected to reduce total emissions.	Implementation-level impacts same as alternative 3A. Vehicles used in the preserve would emit approximately 284 tons of CO^2 per year.	Same as alternative 3A. Also, visitor center location presents obstacles for water provision, and existing electrical power is almost two miles away. VCT may have to expand utilities to serve the visitor center.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.
Preserve Manage-ment and Operations	*Implementation* Short term	None	Negligible adverse	Minor adverse	Minor adverse	Minor adverse	Minor adverse
	Long term	None	Moderate adverse	Major adverse	Major adverse	Major adverse	Major adverse
	Programmatic Short term	None	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
	Long term	None	Moderate adverse	Major adverse	Major adverse	Major adverse	Major adverse
	Cumulative	None	Moderate adverse	Major adverse	Major adverse	Major adverse	Major adverse

Resource	Analysis Level	Alternative 1	Alternative 2	Alternatives 3A/3B		Alternatives 4A/4B	
				Entrada del Valle Visitor Center		Vista del Valle Visitor Center	
		No Action	Banco Bonito Visitor Contact Station	3A—Shuttle System Access	3B—Personal Vehicle Access	4A—Shuttle System Access	4B—Personal Vehicle Access
Preserve Manage-ment and Operations cont'd	Summary of Impacts	Reduced administrative support needed due to reduced visitor use. No public benefit.	Expanded operations and maintenance activities would be required. VCT would enforce traffic law, investigate traffic accidents, and prosecute criminal offenses committed in the preserve. Shuttle use on high-use days would require staff to operate the shuttles, and development of maintenance and storage facilities. Positive public benefit (all action alternatives).	Additional management and operations activities would be required for the full-sized visitor center and substantial increase in visitors. New facilities throughout the preserve would require inspection, maintenance, and law enforcement activities. VCT would provide interpretive services and other visitor programs, requiring additional staff.	Implementation-level impacts same as alternative 3A. Personal vehicle use instead of shuttles would increase traffic and law enforcement issues, and staffing requirements.	Impacts similar to 3A; possible additional challenges in securing water source and electricity for visitor center, resulting in potentially higher costs.	Implementation-level impacts similar to alternative 4A. Programmatic-level impacts similar to alternative 3B.

NA = not applicable.

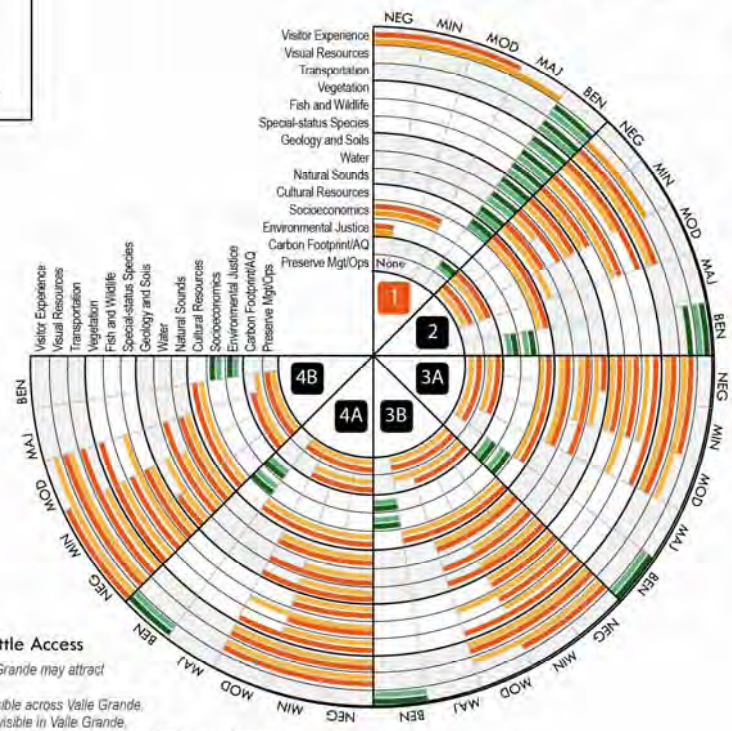
Figure 2-13: Comparison of Environmental Consequences

LEGEND

- Implementation Level (Long Term Adverse)
- Programmatic Level (Long Term Adverse)
- Implementation Level (Long Term Beneficial)
- Programmatic Level (Long Term Beneficial)

NEG = Negligible
MIN = Minor
MOD = Moderate
MAJ = Major
BEN = Beneficial

Alternative does not meet project purpose and need



1 No Action

Visitor Experience: No recreational activities from existing staging areas; no spontaneous access.
Beneficial impact to most resources from decreased human presence.
Social: Negative public attitudes and beliefs continue based on lack of access.
Economic: Fewer tourist revenues and related jobs.

2 Banco Bonito

Visitor Experience: Increased public access and recreational activities. Visitor contact station (VCS) location would be disassociated from Valle Grande, resulting in potential backtracking to VCS.
Visual Resources: Visitors and vehicles visible across valles (all action alternatives); VCS site has high capacity for visual absorption; existing visual conditions improve.
Transportation: Highway performance good, potentially degrading during peak visitor use (all action alternatives). No backtracking to reach VCS.
Vegetation: ~3 acres of grassland/forest land affected at VCS site. No rare plants affected; location previously disturbed.
Geology and Soils: VCS site soils have very limited suitability for commercial building.
Water: No wetlands, streams or wet meadows affected by VCS. Water use increase to 2 million gallons/year.
Economics: Increased visitor spending.
Social: Positive public attitudes and beliefs.
Carbon Footprint/Air Quality: ~113.6 tons carbon dioxide/year from personal vehicles.

3A Entrada del Valle: Shuttle Access

Visitor Experience: Substantially increased public access and recreational activities.
Visual Resources: Visitor center visible in undisturbed location; some shielding from natural elements.
Transportation: Highway performance similar to alternative 2 but substantially more visitors. No backtracking required to reach visitor center.
Vegetation: ~5-10 acres undisturbed habitat affected by visitor center, including rare wet meadow.
Special-status Species: Several special-status species could be present near visitor center.
Geology and Soils: Visitor center site soils have no limitations for commercial building.
Water: ~0.5-1.0 acre of wet meadows affected by visitor center facilities. Water use increase to 4.4 million gallons/year.
Economics: Substantially increased visitor spending.
Social: Positive public attitudes and beliefs (all action alternatives).
Carbon Footprint/Air Quality: Increased emissions from shuttle use and visitation (specific tons of carbon dioxide not calculated for shuttle alternatives).

3B Entrada del Valle: Personal Vehicle Access

Similar to alternative 3A; differences include:
Visitor Experience: More spontaneous public access.
Visual Resources: Personal vehicles visible throughout preserve.
Transportation: Increased safety concerns with substantial traffic increase from personal vehicle use.
Fish and Wildlife: Increased disturbance to wildlife from personal vehicle use.
Special-status Species: Increased potential for collection of special-status species.
Water: Increased release of contaminants into waterways from personal vehicle use.
Natural Sounds: Noise from variety of engine types and substantial traffic increase.
Carbon Footprint/Air Quality: ~284 tons carbon dioxide/year from personal vehicles; air quality impacts from emissions.

4A Vista del Valle: Shuttle Access

Visitor Experience: Views of Valle Grande may attract spontaneous visitors.
Visual Resources: Visitor center visible across Valle Grande. Water pumping system may be visible in Valle Grande.
Transportation: Increased traffic on NM-4 from shuttle system. Highway performance similar to alternative 3A. Backtracking may be required to reach visitor center.
Vegetation: ~5-10 acres undisturbed grassland/forest near NM-4. Several slope wetlands (relatively rare) could be affected by construction at visitor center site.
Fish and Wildlife: Proximity to NM-4 has reduced wildlife value.
Special-status Species: Visitor center site near critical habitat for Mexican spotted owl; Jemez Mountains salamander within 1.0 mile; peregrine falcon may nest nearby.
Soils and Geology: Visitor center site soils have very limited suitability for commercial building.
Water: Water use increase to 4.4 million gallons/year; potential decreased water availability to wetlands and streams.
Natural Sounds: Noise from visitor center concentrated outside preserve's main landscape.
Carbon Footprint/Air Quality: Increased emissions from shuttle use and visitation.

4B Vista del Valle: Personal Vehicle Access

Implementation level (i.e., visitor center) impacts similar to alternative 4A.
Programmatic level (i.e., personal vehicle access) impacts similar to alternative 3B.

Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives were eliminated from detailed analysis because they did not meet the purpose of and need for action or were not technically or economically feasible.

Continuation of the Interim Recreation Program

The current interim recreation program does not meet the purpose of and need for action (expanding access, protecting and preserving resources, and contributing to financial self-sufficiency). The program has not provided a satisfactory experience to the broader public and is not cost effective. Therefore, it was eliminated from detailed analysis.

Open Access for Dispersed Recreation: the Valle Vidal Model

The Valle Vidal, which is managed by the Carson National Forest in northern New Mexico, was cited as a potential model for management of the preserve at public meetings held in September of 2009. The Valle Vidal is currently managed under a multiple-use area guide approved in 1982 and amended in 1985 (USFS 1985).

Similarities exist between the Valle Vidal and the preserve, especially the values people have for these landscapes. Public comments describing the values they hold for the Valle Vidal mirror comments regarding Valles Caldera. The Valle Vidal is managed for open access for dispersed recreation. Compared to Valle Vidal, the preserve's closer proximity to population centers such as Albuquerque, Santa Fe, White Rock, and Los Alamos, New Mexico, make it likely that the preserve would receive much higher visitation than the Valle Vidal. Without managed access, this higher rate of visitation would likely exceed the capacity of the land, resulting in damage to natural resources and substantial impairment of the quality of recreational experiences. Specific elements of the Valle Vidal management model were considered inappropriate for management of the preserve based on the Valles Caldera Preservation Act, such as permitting open access to all-terrain vehicles (ATVs) on all open roads, permitting open access for snowmobiles during the winter, permitting parking within 30 feet of all open roads, and allowing area-wide firewood collection.

Although the Valles Caldera Preservation Act calls for multiple uses of the preserve, it requires that such uses be consistent with resource protection and preservation. Furthermore, two of the objectives of this plan explicitly address motorized access by encouraging nonmotorized access and enjoyment, and minimizing the impacts and disturbance of motorized vehicles on resources, wildlife, and recreational enjoyment of the preserve. Thus, the Valle Vidal model of land management would be inconsistent with the purpose of and need for action.

Wilderness/Roadless Management Emphasis: San Pedro Parks Wilderness Model

Although no areas of the preserve are officially designed as wilderness under the 1964 Wilderness Act, the desire for dispersed, unmanaged, nonmotorized access and minimal development was frequently expressed in public comments. VCT staff

developed an alternative that included closing motorized access, removing or preserving in situ all facilities, and providing access points for dispersed, unregulated, nonmotorized use along the preserve's perimeter. This option would manage the preserve similar to San Pedro Parks Wilderness northeast of Cuba, New Mexico. The wilderness is nonmotorized but permits grazing and hunting. There are no developed facilities beyond informational and directional signs, as required for designated wilderness areas.

While technically and economically feasible, this alternative would not meet the purpose of and need for action. It would limit access to a narrow demographic as opposed to expanding or broadening access. In addition, this alternative would not meet the spirit of the preserve's enabling legislation, which promotes a multiple-use landscape as opposed to wilderness or roadless management.

Smaller-scale Development at Valle Grande Locations

This alternative proposed the development of a small-scale visitor facility in the Valle Grande; however, this alternative had economical and technical feasibility issues. It would not be economically feasible to invest in a facility designed to serve only a small number of visitors and provide limited service in the Valle Grande. Further, based on the anticipated level of visitation, the capacity of a smaller-scale facility situated in a highly visible and attractive location would likely be exceeded during peak visitation. However, because the preserve recognizes the merits of smaller-scale development, a smaller facility was considered for alternative 2 at Banco Bonito.

Visitor Center at the Current Valle Grande Staging Area

The current staging area in the Valle Grande, which consists of multiple portable buildings, outhouses, and parking areas, is already disturbed and therefore a possible location for a visitor center or visitor contact station. However, the facilities at the staging area can be viewed from many locations both inside and outside the preserve, interfering with the primarily unspoiled view of the Valle Grande from NM-4, which provides "stopping power" for visitors traveling through the area. The view entices people to enter the preserve and learn more about it. As noted in chapter 1, the purpose of the preserve, as defined by the Valles Caldera Preservation Act, includes protecting and preserving its scenic values. The VCT believes it is imperative to leave this view as untouched as possible. As mentioned above, the preserve's 2005 *Master Plan for Interpretation* (VCT 2005g) calls for restricting built interpretive facilities to the periphery of the preserve to minimize environmental and visitor impacts. For these reasons, building a permanent visitor facility in the location of the current staging area has been dismissed from further analysis.

Visitor Center at the Headquarters Area

The VCT considered developing visitor services at the headquarters area located farther west of alternative 3. This alternative was eliminated for several reasons. The ranch headquarters site is eligible as a historic district under the National Historic Preservation Act. Increasing access to and construction of modern buildings

in this area could compromise the historic integrity of the site, as well as its eligibility. These actions would not support the protection and preservation of the preserve's historic and cultural values as called for under the Valles Caldera Preservation Act (PL 106-248) (16 USC 698v). In addition, the location is not technically feasible from a maintenance standpoint. It would not be possible to maintain access to the area year-round due to the amount of snow the access road receives. The electrical power supply at this location is also insufficient for supporting a visitor center. Furthermore, the water table in this location is very high, making treatment of wastewater difficult. For these reasons, creating a visitor center at the headquarters area was eliminated from further analysis.

Estimated Costs for Alternatives

Cost estimates include only capital costs of construction, and do not factor in long-term operational cost savings resulting from incorporating sustainable design features.

The following cost estimates were developed for each action alternative described above. These estimates include only capital, or "first," costs of construction, and do not factor in long-term operational cost savings resulting from incorporating sustainable design features. Financial benefits are between $50 and $70 per square foot in a LEED building, over 10 times the additional cost associated with building green as a result of lower energy, waste and water costs, lower environmental and emissions costs, lower operational and maintenance costs, and increased productivity and health (Kats 2003b). Cost savings associated with green buildings are typically demonstrated during operations, such as through increased energy savings.

There is a perception that thicker insulation, better windows, and efficient appliances cost more than less efficient versions. Yet when intelligent design is applied, thick insulation can eliminate the need for a furnace, which would require more capital investment than the superior insulation. This "more-for-less" outcome can be achieved by integrating an entire package of measures into design, each of which achieves multiple benefits, such as saving both energy and equipment costs (Hawken, Lovins, and Lovins 1999). In addition, reduced costs do not have to come at the expense of higher capital costs. "Through integrated design and innovative use of sustainable materials and equipment, the first cost of a sustainable building can be the same as, or lower than, that of a traditional building" (EERE 2003). Certain materials and fixtures that reduce environmental impacts have lower first costs compared to traditional options. Such low-cost materials and fixtures include concrete with slag content or fly ash, low-emitting paint, and no-water urinals. Potential cost reductions from long-term operations are shown in table 2-12.

The VCT acknowledges that it may not be able to obtain a single payment to implement the plan in its entirety, and that funding may be acquired over time instead. Therefore, the VCT has prioritized elements of the plan to develop incrementally, with the final goal being the implementation of the entire plan, as listed below:

1. Remove existing temporary staging facilities from the Valle Grande and establish a portal for the public to access the preserve.

2. Develop a facility to greet and orient visitors and offer a day-use experience (i.e., the visitor contact station / visitor center).
3. Develop a transportation system and associated infrastructure to allow visitors to access the preserve for recreational activities while protecting the preserve's resources.
4. Expand services provided at the visitor contact station / visitor center to meet the interpretive and experiential goals of the 2005 *Valles Caldera National Preserve Master Plan for Interpretation*.

Table 2-12: Operational Reductions

Operational Requirement	Approach	Example Annual Reductions	Source
Heat	Trombe wall	20%	Torcellini and Pless 2004
	Geothermal radiant heat	30%–70%	Toolbase Services 2008
	Passive solar	70%	Green Energy News 2008
	Active solar	30%–70%	EERE 2006
Electricity	Daylighting	32%	Energy Center of Wisconsin n.d.
	Solar	30%–70%	EERE 2008
Water	Consumption reduction	92% for waterless urinals 20% for high-efficiency toilets	AWWA 2010
	Rainwater harvesting	9,000 gal. rainwater/yr (based on 8.5 in./yr)	Texas Water Development Board 2010

The cost estimates shown in table 2-13 include construction materials costs only and do not include construction labor costs or operating costs for providing interpretive services, maintenance, etc. Such costs would be determined when the details of the alternatives are refined. Based on capital costs expected for site improvements, building construction, information and interpretation materials, and a transportation system, total estimated costs are as follows:

- Alternative 2: Banco Bonito (mixed access): $18,741,210
- Alternative 3A: Entrada del Valle (shuttle access): $27,615,260
- Alternative 3B: Entrada del Valle (personal vehicle access): $25,043,760
- Alternative 4A: Vista del Valle (shuttle access): $27,701,510
- Alternative 4A: Vista del Valle (personal vehicle access): $25,130,010

Table 2-13: Alternatives Construction/Capital Cost Estimates

Improvement	Unit Cost	Unit	Alternative 2 Banco Bonito		Alternative 3 Entrada del Valle				Alternative 4 Vista del Valle			
					3A: Shuttle		3B: Personal Vehicle		4A: Shuttle		4B: Personal Vehicle	
			Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)
Site Improvements												
Improve existing gravel road	$110,000	mile	49.7	5,467,000	26.8	2,948,000	26.8	2,948,000	26.8	2,948,000	26.8	2,948,000
Loop trail	$120,000	mile	9	1,350,000	35.9	5,385,000	35.9	5,385,000	35.9	5,385,000	35.9	5,385,000
Paved entrance road	$500,000	N/A	1	500,000	1	500,000	1	500,000	1	500,000	1	500,000
Parking (visitor and staff)	$1,500	stall	50	75,000	110	165,000	70	105,000	110	165,000	70	105,000
Overflow parking	$1,000	stall	50	50,000	100	100,000	50	50,000	100	100,000	50	50,000
RV/bus parking	$12,500	stall	3	37,500	6	75,000	6	75,000	6	75,000	6	75,000
Landscaping and walks	$125,000	each	1	125,000	1	125,000	1	125,000	1	125,000	1	125,000
Trailheads (hiking, fishing, equestrian facilities)	$100,000	each	17	1,700,000	16	1,600,000	16	1,600,000	16	1,600,000	16	1,600,000
Additional trailhead parking	$22,500	each	17	382,500	0	0	16	360,000	0	0	16	360,000
Total contract cost	N/A	N/A	N/A	9,687,000	N/A	10,898,000	N/A	11,148,000	N/A	10,898,000	N/A	11,148,000
Design	8%	N/A	N/A	774,960	N/A	871,840	N/A	891,840	N/A	871,840	N/A	891,840
Contract overhead and profit	20%	N/A	N/A	1,937,400	N/A	2,179,600	N/A	2,229,600	N/A	2,179,600	N/A	2,229,600
Contingency	5%	N/A	N/A	484,350	N/A	544,900	N/A	557,400	N/A	544,900	N/A	557,400
Construction administration	5%	N/A	N/A	484,350	N/A	544,900	N/A	557,400	N/A	544,900	N/A	557,400
Total site improvements construction cost	*N/A*	*N/A*	*N/A*	*13,368,060*	*N/A*	*15,039,240*	*N/A*	*15,384,240*	*N/A*	*15,039,240*	*N/A*	*15,384,240*
Building Improvements												
Interior building areas	$260	sq. ft.	5,000	1,300,000	15,000	3,900,000	15,000	3,900,000	15,000	3,900,000	15,000	3,900,000
Covered dropoff	$10	sq. ft.	—	0	700	7,000	700	7,000	700	7,000	700	7,000
Loading dock	$15	sq. ft.	—	0	300	4,500	300	4,500	300	4,500	300	4,500

Improvement	Unit Cost	Unit	Alternative 2 Banco Bonito		Alternative 3 Entrada del Valle				Alternative 4 Vista del Valle			
					3A: Shuttle		3B: Personal Vehicle		4A: Shuttle		4B: Personal Vehicle	
			Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)
Observation deck (inside/outside)	$20	sq. ft.	—	0	2,000	40,000	2,000	40,000	2,000	40,000	2,000	40,000
Water	$250,000	N/A	1	250,000	1	250,000	1	250,000	1.25	312,500	1.25	312,500
Electric	$200,000	N/A	0.75	120,000	1	200,000	1	200,000	1	200,000	1	200,000
Communication	$30,000	N/A	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000
LEED Platinum/Gold	$1,000,000	N/A	0.75	750,000	1	1,000,000	1	1,000,000	1	1,000,000	1	1,000,000
Total contract cost	N/A	N/A	N/A	2,480,000	N/A	5,431,500	N/A	5,431,500	N/A	5,494,000	N/A	5,494,000
Design	8%	N/A	N/A	198,400	N/A	434,520	N/A	434,520	N/A	439,520	N/A	439,520
Contract overhead and profit	20%	N/A	N/A	496,000	N/A	1,086,300	N/A	1,086,300	N/A	1,098,800	N/A	1,098,800
Contingency	5%	N/A	N/A	124,000	N/A	271,575	N/A	271,575	N/A	274,700	N/A	274,700
Construction administration	5%	N/A	N/A	124,000	N/A	271,575	N/A	271,575	N/A	274,700	N/A	274,700
Total building improvements construction cost	*N/A*	*N/A*	*N/A*	*3,422,400*	*N/A*	*7,495,470*	*N/A*	*7,495,470*	*N/A*	*7,581,720*	*N/A*	*7,581,720*
Information and Interpretation												
Information												
Sign design plan	$10,000	N/A	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000
Property boundary sign	$12,500	each	2	25,000	2	25,000	2	25,000	2	25,000	2	25,000
Entrance advisory signs (prior to entrance drive)	$1,250	each	4	5,000	4	5,000	4	5,000	4	5,000	4	5,000
Entrance road identification	$15,000	each	1	15,000	1	15,000	1	15,000	1	15,000	1	15,000
Visitor information at or near entrance roads	$3,750	each	6	22,500	4	15,000	4	15,000	4	15,000	4	15,000
Directional signs to parking, deliveries, dropoff	$670	each	15	10,050	15	10,050	15	10,050	15	10,050	15	10,050

Improvement	Unit Cost	Unit	Alternative 2 Banco Bonito		Alternative 3 Entrada del Valle				Alternative 4 Vista del Valle			
					3A: Shuttle		3B: Personal Vehicle		4A: Shuttle		4B: Personal Vehicle	
			Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)
Gateway monument	$50,000	N/A	1	50,000	—	0	—	0	—	0	—	0
Building identification	$15,000	N/A	1	15,000	1	15,000	1	15,000	1	15,000	1	15,000
Changeable activities display	$5,000	each	—	0	1	5,000	1	5,000	1	5,000	1	5,000
Interior room / exit identification signs	$250	each	20	5,000	20	5,000	20	5,000	20	5,000	20	5,000
Directional signs for auto tour roads	$1,000	each	10	10,000	—	0	10	10,000	—	0	10	10,000
Regulatory signs and/or gates for interior roads	$1,000	each	10	10,000	—	0	10	10,000	—	0	10	10,000
Interpretation												
Exhibit design plan	$125,000	N/A	1	125,000	1	125,000	1	125,000	1	125,000	1	125,000
Mapscape of Jemez Mtns and Caldera	$100,000	each	1	100,000	1	100,000	1	100,000	1	100,000	1	100,000
Regional tourism exhibit	$200,000	each	1	200,000	1	200,000	1	200,000	1	200,000	1	200,000
Exhibits in VC/VCS	$500	sq. ft.	750	375,000	1,500	750,000	1,500	750,000	1,500	750,000	1,500	750,000
Orientation video	$250,000	N/A	1	250,000	1	250,000	1	250,000	1	250,000	1	250,000
Brochures for auto tour and hiking trails	$25,000	N/A	1	25,000	1	25,000	1	25,000	1	25,000	1	25,000
Children's activity booklet	$10,000	N/A	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000
Wayside exhibits for auto tour	$5,000	each	10	50,000	—	0	10	50,000	—	0	10	50,000
Auto tour CD and location signs	$30,000	N/A	1	30,000	—	0	1	30,000	—	0	1	30,000
Trailhead signs for hiking trails	$6,000	each	10	60,000	9	54,000	9	54,000	9	54,000	9	54,000
Wayside exhibits for hiking trails	$5,000	each	10	50,000	9	45,000	9	45,000	9	45,000	9	45,000

Improvement	Unit Cost	Unit	Alternative 2 Banco Bonito		Alternative 3 Entrada del Valle				Alternative 4 Vista del Valle			
					3A: Shuttle		3B: Personal Vehicle		4A: Shuttle		4B: Personal Vehicle	
			Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)	Qty	Est. Cost (US$)
NM-4 pullouts	$25,000	each	4	100,000	3	75,000	3	75,000	3	75,000	3	75,000
Web-based interpretation information	$125,000	N/A	1	125,000	1	125,000	1	125,000	1	125,000	1	125,000
Total information and interpretation cost	*N/A*	*N/A*	*N/A*	*1,677,550*	*N/A*	*1,864,050*	*N/A*	*1,964,050*	*N/A*	*1,864,050*	*N/A*	*1,964,050*
Transportation												
Public transport vehicles	varies	N/A	1	73,200	1	3,016,500	—	0	1	3,016,500	—	0
Other transportation system infrastructure, contingency	$200,000	N/A	1	200,000	1	200,000	1	200,000	1	200,000	1	200,000
Total transportation cost	*N/A*	*N/A*	*N/A*	*273,200*	*N/A*	*3,216,500*	*N/A*	*200,000*	*N/A*	*3,216,500*	*N/A*	*200,000*
Total capital costs per alternative	***N/A***	***N/A***	***N/A***	***18,741,210***	***N/A***	***27,615,260***	***N/A***	***25,043,760***	***N/A***	***27,701,510***	***N/A***	***25,130,010***

N/A = not applicable

Consistency with the Purposes of the National Environmental Policy Act

NEPA requires an analysis of how each alternative meets or achieves the purposes of the act, as stated in section 101(b). Each alternative analyzed in a NEPA document must be assessed as to how it

1. fulfills the responsibilities of each generation as trustee of the environment for succeeding generations
2. assures for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings
3. attains the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. preserves important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice
5. achieves a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
6. enhances the quality of renewable resources and approaches the maximum attainable recycling of depletable resources

Alternative 1: No Action

The no-action alternative would meet the purpose of NEPA to some degree. It would maintain the preserve for future generations (purpose 1), although public access would be severely limited. Restricting public access would ensure public safety and preserve the health and productivity of the preserve's natural environment (purpose 2). Landscapes would remain aesthetically and culturally pleasing, but would be viewed from limited locations, such as NM-4 (purpose 2). Similarly, restricting public access would protect the public's health and safety, as well as protecting the preserve's environment from degradation or other undesirable and unintended consequences (purpose 3). The no-action alternative would preserve important historic, cultural, and natural resources, but would not support diversity and variety of individual choice, because access would be severely restricted. The no-action alternative would not achieve a balance between population and resource use that would permit a wide sharing of life's amenities (purpose 5) because visitor use would be drastically curtailed. Under alternative 1, the quality of the preserve's renewable resources would not measurably change (purpose 6).

Alternative 2: Banco Bonito Visitor Contact Station

Alternative 2 would meet many of the purposes in NEPA to some degree. It would maintain or enhance the preserve in such a way that it would be available for future generations (purpose 1). Although alternative 2 would increase access over existing conditions, it would provide safe, healthful, productive, and aesthetically and

culturally pleasing surroundings (purpose 2). Degradation or undesirable or unintended consequences could occur from additional noise, pollution, and potential resource damage from personal vehicle use (purpose 3). Because the primary means of visitor access would be via personal vehicle, safety risks from potential motor vehicle accidents would increase (purposes 2 and 3). Alternative 2 would continue to preserve important historic, cultural, and natural resources and would provide the public with a variety of recreational options (i.e., individual choice) (purpose 4). Expanding access to the public would provide greater benefits to visitors compared to existing conditions, potentially better balancing population and resource use with a high standard of living and sharing of amenities (purpose 5). Although alternative 2 would do little to enhance the quality of renewable resources (purpose 6), the implementation of sustainable design concepts and a recycling program would include recycling depletable resources to the maximum extent possible. Thus, alternative 2 would be consistent with the purposes of NEPA.

Alternative 3A: Entrada del Valle Visitor Center—Primary Access via Shuttle System

Alternative 3A would meet most of the purposes in NEPA to a moderate degree. It would maintain or enhance the preserve in such a way that it would be available for future generations (purpose 1). Alternative 3A would promote substantially increased visitor access by the development of a visitor center with enhanced amenities. The use of a shuttle system to transport visitors through the preserve would limit degradation or undesirable or unintended consequences from additional noise, pollution, and potential resource damage from personal vehicles (purpose 3). There would be minimal potential for motor vehicle accidents, thus minimizing safety risks (purposes 2 and 3). Alternative 3A would continue to preserve important historic, cultural, and natural resources, and would provide the public with a variety of recreational options (i.e., individual choice) (purpose 4). Expanding access to the public would provide greater benefits to visitors compared to existing conditions, potentially better balancing population and resource use with a high standard of living and sharing of amenities (purpose 5). The implementation of a shuttle system would not enhance the quality of renewable resources, but would help reduce reliance on depletable resources such as fossil fuels (purpose 6). The implementation of sustainable design concepts and a recycling program would include recycling depletable resources to the maximum extent possible (purpose 6).

Alternative 3B: Entrada del Valle Visitor Center—Primary Access via Shuttle System

Alternative 3B would meet most of the purposes in NEPA to some degree. It would maintain or enhance the preserve in such a way that it would be available for future generations (purpose 1). Because the primary means of visitor access would be via personal vehicle, safety risks would increase from potential motor vehicle accidents (purposes 2 and 3). Degradation or undesirable or unintended consequences could occur from additional noise, pollution, and potential resource damage from widespread personal vehicle use (purpose 3). Alternative 3B would continue to

preserve important historic, cultural, and natural resources and would provide the public with a variety of recreational options (i.e., individual choice) (purpose 4). Expanding access to the public would provide greater benefits to visitors compared to existing conditions, potentially better balancing population and resource use with a high standard of living and sharing of amenities (purpose 5). Widespread motor vehicle use throughout the preserve would result in increased burning of fossil fuels, which would not enhance the quality of renewable resources (purpose 6). The implementation of sustainable design concepts and a recycling program would include recycling depletable resources to the maximum extent possible (purpose 6).

Alternative 4A: Vista del Valle Visitor Center—Primary Access via Shuttle System

Alternative 4A would meet most of the purposes in NEPA to a moderate degree, as described for alternative 3A. Alternative 4A differs from alternative 3A in the location of the visitor center, which would not affect the alternative's consistency with the purposes of NEPA.

Alternative 4B: Vista del Valle Visitor Center—Primary Access via Personal Vehicle

Alternative 4B would meet most of the purposes in NEPA to some degree, as described for alternative 3B. Alternative 4B differs from alternative 3B in the location of the visitor center, which would not affect the alternative's consistency with the purposes of NEPA.