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Environmental Assessment

Lake Vesuvius Fisheries And Recreation Improvement Project

Lawrence County, Ohio

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PREFACE

The Wayne National Forest completed a comprehensive land management planning effort with the publishing of the Wayne National Forest Land and Resource Management Plan (Forest Plan) in 1988. During this effort we made a concerted effort to seek out public involvement. With the public's help we identified issues and alternative approaches to managing the Wayne National Forest. An Environmental Impact Statement (EIS) was prepared in conjunction with the Forest Plan to document the analysis. The EIS was developed in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality implementing regulations for NEPA.

The approval for the Record of Decision for the final EIS on January 4, 1988, represents the first level of decision making related to land and resource management planning. This decision determined the desired future condition of the Wayne National Forest and established the guidance under which future projects would be implemented.

The second, and final, level of decision-making focuses on the analysis and implementation of management practices and projects designed to achieve the goals and objectives of the Forest Plan. This level involves site-specific analysis to meet the requirements of NEPA and implementation of projects to address specific on-site resource needs.

The Environmental Assessment (EA) for the proposed Lake Vesuvius Fisheries and Recreation Improvement Project documents the site-specific analysis for project implementation at the second level of decision-making. The environmental analysis of the proposed project was initiated in accordance with NEPA procedures. These procedures afforded interested and affected parties the opportunity to participate. The EA was prepared outlining the alternatives for carrying out the project, noting any needed mitigation measures, and predicting the relevant environmental consequences. The EA provides the decision maker with the information necessary to make an informed decision.

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INTRODUCTION

This Environmental Assessment (EA) analyzes and displays the direct, indirect, and cumulative effects of the proposed action and six alternatives, including a no-action alternative. The proposed project involves the improvement of fisheries habitat and the improvement of recreational facilities at Lake Vesuvius.

Lake Vesuvius is 143 acres in size, and is surrounded by dispersed and developed recreation facilities. It is located in Lawrence County, Ohio, about 6 miles north of Ironton (Figure 1).

This EA is tiered to the Record of Decision – Final EIS for the Wayne National Forest Land and Resource Management Plan (1988). The Forest Plan provides general direction for managing fisheries resources and recreation areas for various Management Areas. The projects addressed in this analysis are located in Management Areas 6.1, 6.2, and 7.1. A brief description of the three Management Areas, as they relate to the fisheries and recreation projects, is provided in Appendix 1.

PURPOSE AND NEED

The purpose and need for this project was developed after listening to the public and their desires for the general Vesuvius Area over a ten-year period. In 1991, the Forest Service completed an Opportunity Area Analysis for the Vesuvius Area (USDA Forest Service 1991). This Forest Plan-to-Project exercise documented issues, opportunities and concerns as they related to the Vesuvius Area. A desired future condition and project list for the area was developed after much public involvement. In 1994, the Forest Service took the Opportunity Area and developed a Master Plan for the Vesuvius Area. Other public involvement and planning activities included a general meeting with the Ohio Division of Wildlife in 1997 and with natural resource agencies and persons from recreational-type organizations in 2000 (R. Ewing project file memo, March 13, 1997; January 9, 2000).

The Forest Service saw a need to make improvements to fisheries habitat and recreation facilities/opportunities as a result of this planning

effort. The project is believed to be appropriate for this time because major repairs are being conducted at the Lake Vesuvius dam. The water in the lake has been drained and the lakebed is dry, making it easier to make some of the improvements. Because some of the proposed improvements would likely increase use at the Vesuvius Area, it is also an appropriate time to develop and/or make improvements to accommodate visitors.

Fisheries Habitat Improvements

Lake Vesuvius - Fishing was found to be the most popular recreational activity at Lake Vesuvius during a 1990 creel survey (Ohio Division of Wildlife 1991). Anglers, in general, perceive that fishing quality has declined over the years at the lake. Improving fisheries habitat can be an important step in improving the recreational fishing experiences at Lake Vesuvius. The lake has woody structure along its shoreline as a result of trees falling into the lake naturally, and as a result of beaver activity. However, the remainder of the basin is devoid of structure. There is a need to provide deepwater underwater structure for bass, sunfish, and catfish that will serve as cover, feeding areas, and/or nesting habitat.

Storms Creek - The stream flowing out of Lake Vesuvius (Storms Creek), is heavily fished by the public, and is often used by families with small children who are learning to fish. To maintain a self-sustaining fishery in this portion of Storms Creek, there is a need to protect and improve fisheries habitat in this stream. For example, a portion of the channel is entrenched, wide and shallow, and has poor fish habitat qualities (i.e., lack of pool habitat). Another section of the stream has banks with no woody riparian vegetation. This lack of vegetation, in combination with years of impact during the iron furnace era, has caused the banks to be unstable. Visual observations of slumping sod and soil on these banks show that these banks add increased amounts of sediment to the channel than do nearby vegetated banks. The Vesuvius Horse Trail crosses Storms Creek in this unstable section, and travels immediately adjacent to the channel for a distance. There is a need stabilize these banks and to relocate the horse trail away from these unstable areas to a site that is safe for horses and riders.

Figure 1. Vicinity Map of the Lake Vesuvius Recreation Area



Recreation Facilities Improvements

The Lake Vesuvius Recreation Area has gone through many changes over time. During the 1940's-1970's, the recreation area provided primitive camping, swimming, boating, hiking, horseback riding, and picnicking. The Oak Hill Campground was upgraded to include electrical sites, hot showers, flush toilets, and a dump station in the 1980's. Most of the improvements clustered around the lake were constructed between 1940-1960 and are over 40 years old at this time. There are upgrades needed to modernize certain facilities, as described below:

Boat Dock Area - The retaining walls (crib walls) at the boat dock are slumping and are in need of repair. This represents a public health and safety issue since boaters tie their boats in this area, as does the concessionaire. The boat dock parking area was not designed for safe trailer parking. Boaters must park their trailers off the parking lot and into the creek channel. There is a need to improve parking for boat trailers at the lake.

The boat dock needs periodic dredging to remove excessive silt. This activity is costly and is only a band-aid solution. Silt moves downstream from Rockhouse Hollow due to the geology of the area. During the mid-1960's, the Forest Service put in grade control structures in this stream (gabion basket structures) to stop the silt from entering the boat dock area. The structures were designed to store excess silt, which could be removed with periodic maintenance. The structures were not maintained, and were removed in the early-1990's. All of the silt stored behind the gabion baskets has since been moving downstream and depositing in the boat dock area of the lake. There is a need to stop the silt from entering the lake so as to avoid costly maintenance dredging.

A portion of the Lakeshore Trail, between the boat dock and the dam, is currently located on the Vesuvius Road (Forest Service Road 1955). Hikers must walk on the road, which is seasonally busy with cars and recreational vehicles. This is a public safety concern, and there is a need to improve hiker safety on this stretch of the Lakeshore Trail.

Beach – Swimming at the beach continues to occur, although numbers of users have appeared to drop over recent years (T. Eches project file memo, January 2, 2002). The lack of modern and clean facilities at the beach contributes to the decline in visitation.

The current beach house is in need of repairs in order to continue its use. At a minimum, the roof needs to be replaced. The plumbing is older and requires periodic maintenance and repairs. Rodents and bats can access the bathhouse through openings in the walls and eaves thus posing a health concern.

Debris, consisting of organic matter and trash from upstream tributaries floats in on the beach. Due to the safety hazard the debris creates, there is a need to take measures that will minimize or eliminate the problem.

Facilities for Persons with Disabilities - According to an article in the fall 1999 issue of *The Trail Companion*, "At any point in time only 43% of the population are able-bodied: 10% are elderly, 10% are temporarily disabled, and 37% are significantly impaired." As the elderly and disabled population increases so does the need for facilities meeting Americans with Disabilities Act (ADA) standards (USDA Forest Service 1991). There is only one trail on the Forest that partially meets current ADA standards (Rockhouse Trail). Designing a trail or facility to meet ADA standards ensures that all users, disabled as well as able bodied, will have access to it. Lake Vesuvius, located close to an urban area, has high potential to attract people with disabilities and the elderly. Development of accessible facilities was one of the management challenges carried through the Vesuvius Opportunity Area Analysis (USDA Forest Service 1991). There is a need to increase the number of recreational facilities that meet ADA standards.

Campground Improvements - While other quality campgrounds in the area offer showers, flush toilets and dump stations, the Iron Ridge Campground has all pit

toilets, and one is accessible to persons with disabilities.

Neither restroom in the Oak Hill Campground is fully accessible to people with disabilities. There is a need to offer restrooms, which are accessible to all persons.

The USDA Forest Service has recognized that emerging trends in recreation preferences are changing to include more developed activities closer to urban areas. Additionally the agency acknowledges that as minority and older age class populations increase, the mix of recreation demanded will change. People's attitudes and desires for recreation experiences at Lake Vesuvius have been documented in the Forest Service's 1991 Vesuvius Opportunity Area Analysis and through ongoing public interactions. The Forest Service has recognized a need to accommodate the changing desires of Lake Vesuvius' visitors by offering recreation opportunities not presently available, or by offering desired opportunities at an improved level of quality.

Bicycle Riding - Mountain biking is a recreational activity that has grown in popularity since the Forest Plan was completed. Local interest in general bicycle riding has increased with the formation of the Lawrence County Park Board. There is a local desire to connect the City of Ironton to Lake Vesuvius through a series of Rail-to-Trail paths in the future. According to Cordell (2000), the number of biking participants, nationally, is expected to grow by 70% by the middle of the next century. The percentage of growth in participants in the south is expected to double in the next 50 years. The highest growth in absolute numbers of biking participants is expected to occur in the northern regions. The number of days of biking participation, nationally, is expected to increase by nearly 70% by 2050. Residents of the north and south will continue to account for over two-thirds of all biking trips.

Mountain bikes are allowed on Wayne National Forest off road vehicle trails. These trails are often rutted and are difficult for a mountain bike to negotiate. Area mountain bike enthusiasts currently travel more than an hour to trails in West Virginia

and Kentucky. The International Mountain Biking Association issues an annual report card on mountain biking opportunities in every state. Ohio was one of only three states that received the lowest mark handed down in 2000, a "D". This poor rating, as well as the need to accommodate users' desires, illustrates the need to make mountain biking opportunities available. There are no trails available to general bicycle riders on the Wayne National Forest.

RV Camping - The Forest has seen an increase in recreational vehicle (RV) camping in recent years. Recent studies have shown that people are tending to utilize more convenient methods of camping. Forest employees have reported that RV sites in the Oak Hill Campground are constantly used during the summer season, and that visitors continue to ask for additional RV sites with modern conveniences like electricity, water, and sewage disposal (USDA Forest Service 1991; T. Eaches project file memo, January 2, 2002). This modernization of camping creates a need for newer, more modern camping facilities. On the other hand, primitive campers continue to use the campgrounds. There is a need to maintain primitive camping experiences in the recreation area.

Horse Camping - There are 47 miles of horse trails (Vesuvius Horse Trail) and four major trailheads on the Ironton Ranger District, two of which occur near Lake Vesuvius (Paddle Creek and Sand Hill). The Vesuvius Opportunity Area Analysis (USDA Forest Service 1991) found that horseback riding was on the increase on the Vesuvius Trail, with organized rides occurring regularly in addition to the heavy local use. According to Cordell (2000), participation in horseback riding is expected to increase faster than population growth in all regions of the country, with the biggest relative increase coming in the south at 82% by 2050. Likewise, primary-purpose trips and activity days of horseback riding are expected to increase faster than the population in all regions.

Both the local public, as well as tourists, use the trails. The number of extended day users is limited by the lack of camping sites for horse trailers. Campers with horses are prohibited

from the other developed camping areas in the Forest. A primitive horse camp exists at the Paddle Creek Trail Head. The only facilities provided to the users are a large amount of open space and horse tie-ups. The Forest Service is currently in the process of replacing a vandalized restroom with a vault toilet at the Paddle Creek Horse Camp.

The existing Paddle Creek camp is not meeting the needs of our horse users (USDA Forest Service 1991), thus the need for a developed (full service) horse-accessible campground. The Vesuvius Opportunity Area Analysis looked at sites for potential full service camps at the Johns Creek Trailhead, Sand Hill Trailhead and at the privately owned Ohio Center for Youth facility (now defunct). Of the two remaining sites, Sand Hill was more desirable because it was closer to the developed recreation area at Lake Vesuvius and offered a good site for camping.

PROPOSED ACTION

The USDA Forest Service proposes to make improvements to fisheries habitat and recreation facilities in the Lake Vesuvius Recreation Area. The proposed action is comprised of **six elements**; activities proposed are grouped together under the appropriate element.

Lake Habitat Improvements - The lake was drained in January 2001 to make repairs to the dam. It is expected to remain dry until August 2002, when the valve will be closed. While the lakebed is dry, the amount of underwater structure in the lake would be increased. Woody material like Christmas trees, discarded trees and limbs would be used. Concrete rubble piles would be created from material removed from the spillway during the current dam rehabilitation project. Non-treated lumber would be used to construct catfish nest boxes.

Storms Creek Habitat Improvements – Eroding streambanks would be stabilized by installing a peak stone dike made out of natural materials. The dike would be a small structure that would parallel the bank, and would only be about 2-3 feet high. The bank would be sloped back; the soil would be used to backfill behind the dike. Native vegetation would be planted behind the dike. By doing this, the channel would be put back in equilibrium and the

riparian corridor would be restored. The Vesuvius horse trail would cross where it currently crosses.

Trails and Associated Facilities - A bridge would be constructed across the narrows of the lake, near the beach. It would enhance the lakeshore trail and would serve as a connector between the Oak Hill and Iron Ridge campgrounds. The bridge would bisect the lake and offer visitors a 4-mile or an 8-mile trail. Constructing the bridge and widening and hardening the lakeshore trail with a dense graded aggregate (referred to as crushed stone throughout the rest of the EA), would encourage use by persons with disabilities and would create a trail experience not found in this part of Ohio. The lakeshore trail would become hiking and general bicycle trail.

Access to water-related activities would be improved by constructing up to six fishing piers at points around the lower half of the lake that would be accessible to persons with disabilities. These points would be located between the old and new beach, and between the dam and swimming rock. In addition, we would construct a boardwalk (approximately 1600 feet long and up to 8 feet wide) from the boat dock to the dam to improve safety for lakeshore trail users, as well as provide fishing access to persons with disabilities. Currently, the Lakeshore Trail hikers must walk on the beach road, which can be seasonally busy with vehicle and camper traffic. The boardwalk would be located partially over the water surface.

Boat Dock Improvements - The boat dock would remain at its current location, however the parking lot would be enlarged to better handle trailer parking. The old restrooms would be upgraded to flush toilets. A septic system would be constructed. Grade control structures would be reconstructed where they existed previously in upper Rockhouse Hollow. These structures would be designed to settle out sediment, thereby eliminating the need to periodically dredge the boat dock.

Beach Improvements - The swimming beach would remain open at its current location, but a breakwater structure would be constructed to keep trash and debris from floating in on the beach. This breakwater structure would serve as an access point for wildlife viewing and fishing. The bathhouse would be maintained,

Figure 2. Management Area Boundaries in the Vicinity of the Lake Vesuvius Fisheries and Recreation Improvement Project

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with repairs done as needed. A playground would be added to the beach area.

Campground Improvements – A shower building, flush toilets, and a dump station would be added to the Iron Ridge campground. Up to 12 campsites would be added to the Oak Hill Campground in the existing Pine Knob-Rockhouse areas. A small playground would replace the existing swing sets in the Oak Hill Campground. Water and electric service are already present in the two campgrounds, but would be run to the new facilities. The septic system would be upgraded at the Oak Hill Campground and a septic system would be constructed at the Iron Ridge Campground. Up to 6 boat-in primitive camping sites would be constructed in the old beach area. These sites, although referred to as “boat-in sites”, would also be available for use by hikers and bicycle riders. A vault toilet would be constructed in this area. A full-service horse camp, with up to 24 campsites, would be constructed at the Sand Hill trailhead, located on the Vesuvius Horse Trail. Water and electric are available near Sand Hill, and would be brought into the area. Restrooms would be constructed. A septic system would be constructed to service the horse camp.

MANAGEMENT DIRECTION

Management of Lake Vesuvius, the Lake Vesuvius Recreation Area, and associated facilities is guided by direction in the Forest Plan for Management Areas 6.1, 6.2, and 7.1 (Forest Plan pages 4-114 through 4-128, and 4-142 through 4-145). Figure 2 shows where the Management Areas are located. Appendix 1 provides a summary of applicable Forest Plan management direction for the Management Areas.

Detailed direction for transforming Forest Plan decisions involving trails management into specific ground activities is provided in Forest Service Trails Management Handbook 2309.18 (FSH 1991). Management direction for developed recreation sites such as campgrounds and swimming sites is provided in the Forest Service Manual (FSM 2330, 1996) and the Forest Plan.

DECISION TO BE MADE

This project involves several elements. The decision to be made is whether or not to improve fisheries habitat and recreation facilities at Lake Vesuvius, and if so, what improvements would be made.

OTHER RELATED PROJECTS

There are other projects planned or ongoing in the Lake Vesuvius area. The Lake Vesuvius Dam Rehabilitation Project is underway and is expected to continue until early-summer 2002. The decision for that project was made on May 1, 1998. For that project, the dam is being upgraded to meet current dam safety standards. Roller-compacted concrete is to be applied to provide armoring in the event of a probable maximum flood event (37 inches of rain in 72 hours). The spillway and outlet works are also being improved. The lake was drained in order to conduct the dam improvements. The lakebed is expected to be dry until late-summer 2002, when the valve will be closed and the lake allowed to fill to its normal pool level.

A silt removal project is planned for Lake Vesuvius. The decision for that project was made on August 29, 2001. Silt that had built up over the years in the boat ramp area and in the upper end of Lake Vesuvius had been affecting recreational use in portions of the lake.

Planning has been initiated on a project that would make safety and design repairs to two township roads in the Paddle Creek drainage, in the headwaters of the Lake Vesuvius drainage. The Forest Service is proposing to work with the township to replace and repair culverts and ditch lines to reduce erosion and sedimentation of aquatic habitats, and to widen sections of the shoulder to allow traffic to pass safely on the road.

PUBLIC INVOLVEMENT

A scoping letter was signed on February 23, 2001 describing several proposed fisheries habitat and recreation improvement projects proposed for the Lake Vesuvius area. This letter was sent out to 282 people who have shown an interest in Wayne National Forest activities. Specifically, we queried our mailing list to get a list of people who wanted to receive information about recreation projects, watershed projects, wildlife and fisheries projects, Ironton Ranger District projects, and those who wanted to receive information on all projects. We also sent the letter to all Forest partners who have previously assisted the Forest Service with projects at Lake Vesuvius. Finally, we identified local people and businesses that have an interest in the Lake Vesuvius projects and sent them the scoping letter.

The scoping letter was faxed to eleven media contacts. To date, stories about the Lake Vesuvius proposed projects have run in the Ironton *Tribune*, the Huntington *Herald-Dispatch*, and Ashland *Daily Independent*.

A display was constructed for the Ironton Ranger District office reception area. The display described the Lake Vesuvius proposed projects, and it encouraged people to comment. It was displayed between March 13, 2001 and May 31, 2001.

Forest Service employees attended various meetings to describe the proposed Vesuvius projects, and how people can provide comments to the Forest Service. Meetings attended include Izaak Walton League February meeting, Symmes Creek Restoration February meeting, and Lawrence County Park Board February meeting.

A "planning charette" was conducted on May 19, 2001, at the Ohio University Southern Campus. The planning charette was a tool used to acquire additional public input for the Lake Vesuvius Fisheries and Recreation Improvements Project. A total of thirty people were invited to attend, each representing a different recreational or resource interest area. The Forest Service described the proposed action and asked the participants to take part in three exercises. Information was gathered about what kind of activities they took part in at Lake Vesuvius, and what type of setting people liked to experience

when taking part in the activities. The participants also mapped out locations for the activities they liked to participate in, on a map of the Lake Vesuvius Recreation Area.

On June 4, 2001, a project update letter was sent out to 313 people (same mailing list used for the February 23, 2001 scoping letter, plus additional people who had become interested in the project). The letter summarized the planning charette and gave some general information about the progress on the Lake Vesuvius dam. The proposed action and preliminary issues for the Lake Vesuvius Fisheries and Recreation Improvement Project were also included, as was a request for additional comments about the project. People were asked to return an enclosed postcard if they wished to remain on the Lake Vesuvius mailing list. A total of 74 people wished to remain on the mailing list to receive general progress notes about the project, while 34 people asked to receive copies of the environmental analysis documents and any decision document.

In the end, a total of 29 people responded to our request for comments about the proposed action, as a result of the various methods we employed.

ISSUES

The interdisciplinary team reviewed all comments from the 29 people. Some comments offered ideas that could be incorporated into the development of the alternatives, while others were outside the scope of the project. Some comments raised an issue. All scoping comments and summaries of interdisciplinary teamwork, in relation to issues, is found in the project file. The interdisciplinary team identified ten significant issues and placed them within six categories:

- Natural Resources
- Federal Proposed, Threatened, and Endangered Species and Regional Forester Sensitive Species
- Heritage Resources
- Economic Impacts
- Safety
- Recreation

The District Ranger reviewed and approved the issues (M. Baines project file memo, July 9, 2001).

Natural Resources

Issue 1: Bicycle activity on the Lakeshore Trail may cause potential impacts to resources. Specific concerns include:

- a. Bicycle use on the Lakeshore Trail may cause erosion leading to impacts to water quality and the health of aquatic communities.
- b. Bicycle use on the Lakeshore Trail may damage rare wildflowers and other vegetation.
- c. Bicycle use on the Lakeshore Trail may disturb wildlife communities.
- d. Bicycle use on the Lakeshore Trail may cause impacts to existing natural features.

Issue 2: The project may affect state-listed plant species and unique plant communities.

Federal Proposed, Threatened and Endangered Species, and Regional Forester Sensitive Species

Issue 3: The project may cause potential impacts to Federal Proposed, Threatened and Endangered Species, and Regional Forester Sensitive Species.

Heritage Resources

Issue 4: The project may impact heritage resources in the Lake Vesuvius Recreation Area.

Economic Impacts

Issue 5: The recreational improvements could impact the local economy.

Safety

Issue 6: Visitor safety to Lake Vesuvius should be considered in the improvement or development of facilities.

Recreation

Issue 7: Locate and construct campsites that will provide campers the opportunity to achieve their desired camping experiences. Specific concerns expressed the desire to segregate the primitive and developed campsites.

Issue 8: Ensure there is adequate administrative access and increased law enforcement at the Vesuvius Recreation Area.

Issue 9: Ensure recreation improvements and developments are constructed in an aesthetically pleasing manner.

Issue 10: The presence of bicycles on the Lakeshore Trail may interfere with those wishing to enjoy a serene hiking experience.

There was one non-significant issue that was outside the scope of analysis or decision to be made: Effects to Management Indicator Species. The Forest's wildlife and fisheries biologists have reviewed inventory data for their presence in the project area, and have made predictions as to the effects on each management indicator species as a result of implementing any of the alternatives (Appendix 2).

ALTERNATIVES

PROCESS USED TO DEVELOP THE ALTERNATIVES

The proposed action was developed from information gathered in various planning efforts (USDA Forest Service 1991, R. Ewing project file memo, January 9, 2000). It was designed so that it was compatible with the Forest Plan. The proposed action contains several **elements** within it that addressed fisheries habitat needs and recreation needs. These **elements** include:

- *Lake Habitat Improvements*
- *Storms Creek Habitat Improvements*
- *Trails and Associated Facilities*
- *Boat Dock Area Improvements*
- *Beach Area Improvements*
- *Campground Development & Improvements*

As information was received from the public, the interdisciplinary team had numerous discussions about alternatives to the proposed action. Based on issues, suggestions from the public, and mitigation, six alternatives were developed, including a no action alternative (Alternative 2). Each alternative contains the same mix of elements, as listed above. A summary of the alternative development process is found in the project file (R. Ewing project file memo, July 9, 2001). The District Ranger reviewed and approved the range of alternatives (M. Baines project file memo, July 23, 2001). The alternatives are in compliance with the Wayne National Forest Plan.

The alternatives will be described in two ways. Table 1 shows a summary of each alternative and the elements contained within them. In addition, each alternative is described in narrative form (Tables 2a-2g). Figure 3 is a graphic depiction of the general locations of the elements discussed in the EA. It is designed to help the reader locate where activities would occur.

Tables 2a-2g include mitigation measures developed by the interdisciplinary team after discussing the significant issues (R. Ewing project file memo, July 9, 2001). Forest specialists raised additional mitigation measures, and these are included in the Environmental Effects section of this EA.

ALTERNATIVES CONSIDERED BUT NOT IN DETAIL

The following were considered as alternatives were developed, but were dropped from detailed consideration, as discussed below.

Construction of Lodge or Cabin – People wanted to see a cabin or a lodge constructed at Lake Vesuvius. However, the Forest Service does not construct such facilities. An entrepreneur could propose such a project and administer the structures under a special use permit. Until such a project is proposed, there is not enough site-specific detail to analyze the effects of having a lodge and/or cabins at Lake Vesuvius.

Rock Climbing Areas – People wanted rock climbing areas established at Lake Vesuvius. Rock climbing has been and is currently allowed at Lake Vesuvius.

Table 1. Summary of Proposed Action and Alternatives

Element	Proposed Action	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Trails and Associated Facilities							
Lakeshore Trail	Widen/harden all 8 miles with crushed stone; All 8 miles would be managed for hiking and bicycle riding	Routine maintenance	The lower 4 miles would be widened & hardened with asphalt; only minor improvements would be made to the upper 4 miles; The Lower 4 miles would be managed for bicycles and hikers, The Upper 4 miles would be managed for mountain bikes and hiking	Same as Alternative 3, except crushed stone would be used to harden the lower 4 miles of the trail	Only 3 miles of trail would be widened & hardened with asphalt (beach to boat dock/dam to Whiskey Run Tr.); only minor improvements would be made to the rest of the trail; Asphalt section of trail would be managed for bicycles and hiking, rest of trail open to hiking only	Same as Alternative 3 except lower 4 miles of trail would be managed for bicycles and hiking, remainder of trail open to hiking only	Same as Alternative 5
Boardwalk and Accessible Fishing Piers	Yes	No	Yes	Yes	Yes	Yes	Yes
Bridge	Yes	No	Yes	Yes	No	Yes	No
Whiskey Run Trail & Bald Knob-Rockhouse Trail	Routine Maintenance	Routine Maintenance	Widen/harden the existing portion of trails with asphalt; Stabilize Bald Knob Road; Construct Bald Knob-Rockhouse connector; Both trails open to bicycles and hikers	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3
Backpack Trail & Office Trail	Routine Maintenance	Routine Maintenance	Minor Improvements; Both trails open to mountain bikes and hikers	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3 Same as Alternative 3

Table 1 (continued). Summary of Proposed Action and Alternatives

Element	Proposed Action	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Lake Habitat	Add woody structure, rock piles, and catfish nests to lower half of lake	No Action	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Storms Creek Habitat	Stabilize streambanks with peak stone dike w/ riparian plantings	No Action	Same as Alternative 1, plus pools would be constructed with v-dams, and the Vesuvius horse trail crossing would be relocated	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3
Boat Dock Area Improvements	Repair crib walls; enlarge parking lot; upgrade restrooms; silt deposition control by reconstructing existing grade control structures	Minimal repair to crib walls for public safety; no other actions	Same as Alternative 1 except silt deposition control would occur in the lower part of the channel using natural channel design	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3
Beach Area Improvements	Make repairs to bathhouse; Construct breakwater; Construct playground	Maintain bathhouse; no other actions	New bathhouse; Construct breakwater; Construct playground; Second boat ramp; Construct up to 10 campsites near upper beach parking lot	New bathhouse; Construct breakwater; Construct playground; Second boat ramp	Close beach; Construct campground; Second boat ramp	Same as Alternative 3	Same as Alternative 3

Table 1 (continued). Summary of Proposed Action and Alternatives

Element	Proposed Action	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Campground Development & Improvements							
<i>Iron Ridge Campground</i>	Replace pit toilets with showers, flush toilets; Add dump station; Add septic system	No Action	Same as Alternative 1 except individual sewer hookups would be added @ sites 2-7	Same as Alternative 1 except no dump station would be added	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
<i>Oak Hill Campground</i>	Add up to 12 campsites; Add flush toilets and showers; Upgrade septic system; Add playground	No Action	Same as Alternative 1 except individual sewer hookups would be added to all existing sites	Same as Alternative 1 except no playground would be added	Upgrade existing shower/restroom facilities to ADA standards; Add playground	Same as Alternative 4	Same as Alternative 4
<i>Boat-in Campsites</i>	Up to 8 sites at old beach	No Action	Up to 12 sites between old & new beach; Construct vault toilet; Stabilize Bald Knob Road	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3
<i>Horse Camp</i>	Construct full-service facilities at Sand Hill (up to 24 units); Maintain Paddle Creek as primitive horse camp	No Action	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1

Table 2a. Description of Alternative 1 (Proposed Action) by individual project element.

Lake Habitat Improvements	The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Non-treated lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.
Storms Creek Habitat Improvements	To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing. The Vesuvius Horse Trail would cross Storms Creek at its current location, with routine maintenance performed to keep the trail safe for riders and to reduce soil erosion as much as possible.
Trails and Associated Facilities	<p>The 8-mile Lakeshore Trail would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet in width to allow for safe passing, and would be hardened with crushed stone. Stream crossings would be improved as the trail was improved.</p> <p>A bridge would be constructed across the narrows of the lake, near the beach. The bridge would enable the 8-mile Lakeshore Trail to be converted into two loop trails.</p> <p>A boardwalk, approximately 1600 feet x 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>Whiskey Run Trail and Rockhouse Trail would be maintained as hiking trails that connect the two campgrounds to the Lakeshore Trail. Routine maintenance would be performed on the trail (i.e., replace culverts, remove fallen trees from the trail).</p> <p>The Backpack Trail and the Office Trail would be maintained as hiking trails. Routine maintenance would be performed on the trail (i.e., replace culverts, remove fallen trees from the trail).</p>

Table 2a (Continued). Description of Alternative 1 (Proposed Action) by individual project element.

Boat Dock Area Improvements	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be reconstructed where they previously existed in Rockhouse Hollow, above the boat dock parking lot. These structures would hold silt back from entering the lake; silt removal maintenance would need to occur at the grade control structures periodically with a tractor. Silt removed from these structures would be disposed of in a manner consistent with Ohio regulations.</p>
Beach Area Improvements	<p>The swimming beach would be maintained at its current location.</p> <p>The existing bathhouse would remain at the beach. Repairs to the bathhouse would be made when necessary. For example, the roof needs replacement to prevent water damage from occurring to the building.</p> <p>A breakwater structure would be constructed above the beach to keep trash and debris from floating onto the beach.</p> <p>A playground would be constructed at the beach.</p>
Campground Developments & Improvements	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Septic systems would be constructed for the campground.</p> <p>Up to 12 campsites would be added to the Oak Hill-Pine-Knob Campground in the existing Pine Knob-Rockhouse areas. Showers and flush toilets would be added in the area around these new campsites. Water, electric, and sewage treatment is available, but would be extended to these new facilities and campsites. Septic systems would be upgraded and constructed for the campground. A small playground would be constructed where the existing swing sets occur.</p> <p>Up to 8 boat-in, primitive campsites would be added to the old beach. A vault toilet would be constructed to serve these sites. Administrative access to these sites would be from the Lakeshore Trail or by boat.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

Table 2b. Description of Alternative 2 (No Action) by individual project element.

Lake Habitat Improvements	No deepwater fisheries habitat improvements would be made to the lake.
Storms Creek Habitat Improvements	There would be no riparian restoration efforts made along Storms Creek. The three banks would continue to move outwards. The Vesuvius Horse Trail would cross Storms Creek at its current location, with routine maintenance performed to keep the trail safe for riders and to reduce soil erosion as much as possible.
Trails and Associated Facilities	<p>The 8-mile Lakeshore Trail would be maintained as a hiking trail. Routine maintenance would be performed on the trail (i.e., replace culverts, remove fallen trees from the trail), but no footbridges would be constructed across wet areas. The section of trail between the boat dock and the dam would continue to be located on the Beach Road.</p> <p>Whiskey Run and Rockhouse Trail would be maintained as hiking trails that connect the two campgrounds to the Lakeshore Trail. Routine maintenance would be performed on the trails (i.e., replace culverts, remove fallen trees from the trail).</p> <p>The Backpack Trail and Office Trail would be maintained as hiking trails. Routine maintenance would be performed on the trails (i.e., replace culverts, remove fallen trees from the trail).</p>
Boat Dock Area Improvements	The boat dock would remain at its current location. Minimal maintenance would occur on the crib walls to prevent further deterioration and to ensure public safety. The parking lot would remain in its current condition. The boat dock would periodically need to be dredged since no silt management would occur in Rockhouse Hollow. The lake would need to be lowered about 5-6 feet for a few months each time the silt is dredged from the boat dock. Silt removed from the boat dock would be disposed of in a manner consistent with Ohio regulations.
Beach Area Improvements	<p>The swimming beach would be maintained at its current location.</p> <p>The bathhouse would be maintained. Repairs to the bathhouse would be made when necessary for public health and safety. For example, the roof needs replacement to prevent water damage from occurring to the building.</p> <p>No breakwater would be constructed. Trash and debris that continued to float onto the beach would be removed by hand prior to the opening of the beach and during routine shoreline maintenance thereafter.</p> <p>No playground would be constructed at the beach.</p>
Campground Developments & Improvements	<p>The Iron Ridge Campground would continue to serve RV and primitive campers. There would be no improvements to the campground. Pit toilets and drinking water would be available for use by campers (one pit toilet is accessible to people with disabilities).</p> <p>The Oak Hill Campground would continue to serve RV and primitive campers. There would be no improvements made to the campground. Showers, flush toilets, and electricity would remain available for use by campers, as would the Oak Hill dump station, however the restrooms would remain inaccessible to persons with disabilities.</p> <p>There would be no boat-in campsites added to the recreation area. However, boaters could still set up primitive campsites in the upper end of the lake, outside the recreation area boundary.</p> <p>The Paddle Creek Horse Camp would continue to be available to horse riders. Paddle Creek Horse Camp would remain as a primitive camp, i.e., no water or electricity. Sand Hill would remain as a Vesuvius Horse Trailhead.</p>

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Table 2c. Description of Alternative 3 by individual project element.

<p>Lake Habitat Improvements</p>	<p>The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Discarded lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.</p>
<p>Storms Creek Habitat Improvements</p>	<p>To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing.</p> <p>The Vesuvius Horse Trail would be re-routed so that it crossed Storms Creek above the existing crossing. The trail would come out of the woods at its present location, cross the county road, travel less than 200 feet upstream through the woods between the road and stream, and then cross about 100 feet above the existing crossing. The banks are gently sloped, but would be hardened with rock to prevent erosion from occurring with continued hoof action. The existing crossing would be closed and revegetated with a native seed mix deemed appropriate by the Forest's botanist.</p> <p>Up to two pools would be created in the section of stream below the stone bridge. V-dams, constructed with logs, would scour deep pools in the stream for improved fisheries habitat. Four logs would be needed for the structures; these could be brought in from off-site, or would be felled on-site from the riparian area. A wildlife biologist and fisheries biologist would determine what trees to fell if they are obtained from on-site.</p>
<p>Trails and Associated Facilities</p>	<p>The lower half of the Lakeshore Trail (about 4 miles) would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet in width to allow for passing, and would be hardened with asphalt. The upper half of the Lakeshore Trail (about 4 miles) would not be widened, but would have minor improvements made in order to accommodate hikers and bicycle riders. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into the lake. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>A bridge would be constructed across the narrows of the lake, near the beach. The bridge would enable the 8-mile Lakeshore Trail to be converted into two loop trails.</p> <p>A boardwalk, approximately 1600 feet by 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>The Whiskey Run Trail would be widened and hardened to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet wide and would be hardened with asphalt. Bald Knob Road would be stabilized and converted into a bike/hike trail. A short connector between the end of Bald Knob Road and the Rockhouse Trail and the Lakeshore Trail would be constructed and hardened with asphalt. These trails would serve as connectors between the campgrounds and the Lakeshore Trail. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>Minor improvements would be made to the Backpack Trail and the Office Trail so hikers and mountain bike riders could jointly use the trails. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into streams. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p>

Table 2c (continued). Description of Alternative 3 by individual project element.

Boat Dock Area Improvements	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old, pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be constructed in the lower portion of Rockhouse Hollow, using natural channel design concepts. These natural channel design concepts will encourage silt to settle out onto the stream's floodplain, above where the stream enters the lake. Periodic silt removal could easily be conducted from the parking lot. Silt removed from the stream's floodplain would be disposed of in a manner consistent with Ohio regulations. The grade control structures that were located in the upper and mid reaches of Rockhouse Hollow would not be reconstructed.</p>
Beach Area Improvements	<p>The swimming beach would be maintained at its current location.</p> <p>The bathhouse would be replaced with a modernized facility.</p> <p>A breakwater structure would be constructed above the beach to keep trash and debris from floating onto the beach.</p> <p>A playground would be constructed at the beach.</p> <p>A second boat ramp would be constructed at the beach. The channel along the beach would be widened and deepened so that boats could be launched from the channel. Boat mooring facilities would be added near the channel. Parking would be improved to accommodate trailers.</p> <p>Up to 10 campsites would be added to the area in and around the upper beach parking lot, including the picnic sites nearest to the upper parking area. Water and electricity is available, and would be run to each campsite.</p>
Campground Developments & Improvements	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Individual sewer hook-ups would be added to Iron Ridge Campsites #2-#7. Septic systems would be constructed for the campground.</p> <p>Up to 12 campsites would be added to the Oak Hill Campground, in the Pine Knob-Rockhouse areas. Showers and flush toilets would be added in the area around these new campsites. Water, electric, and sewage treatment is available, but would be extended to these new facilities and campsites. Individual sewer hook-ups would be added to all existing Oak Hill Campground sites. Septic systems would be upgraded and constructed for the campground. A small playground would be constructed where the existing swing sets are located.</p> <p>Up to 12 boat-in, primitive campsites would be added to the area between the old beach and existing beach. A vault toilet would be constructed to serve these sites. Bald Knob Road would be stabilized as part of the Bald Knob-Rockhouse Hike/Bike Trail, and would serve as the administrative access to these boat-in sites.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

Table 2d. Description of Alternative 4 by individual project element.

<p>Lake Habitat Improvements</p>	<p>The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Discarded lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.</p>
<p>Storms Creek Habitat Improvements</p>	<p>To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing.</p> <p>The Vesuvius Horse Trail would be re-routed so that it crossed Storms Creek above the existing crossing. The trail would come out of the woods at its present location, cross the county road, travel less than 200 feet upstream through the woods between the road and stream, and then cross about 100 feet above the existing crossing. The banks are gently sloped, but would be hardened with rock to prevent erosion from occurring with continued hoof action. The existing crossing would be closed and revegetated with a native seed mix deemed appropriate by the Forest's botanist.</p> <p>Up to two pools would be created in the section of stream below the stone bridge. V-dams, constructed with logs, would scour deep pools in the stream for improved fisheries habitat. Four logs would be needed for the structures; these could be brought in from off-site, or would be felled on-site from the riparian area. A wildlife biologist and fisheries biologist would determine what trees to fell if they are obtained from on-site.</p>
<p>Trails and Associated Facilities</p>	<p>The lower half of the Lakeshore Trail (about 4 miles) would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet in width to allow for passing, and would be hardened with crushed stone. The upper half of the Lakeshore Trail (about 4 miles) would not be widened, but would have minor improvements made in order to accommodate hikers and mountain bike riders. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into the lake. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>A bridge would be constructed across the narrows of the lake, near the beach. The bridge would enable the 8-mile Lakeshore Trail to be converted into two loop trails.</p> <p>A boardwalk, approximately 1600 feet by 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>The Whiskey Run Trail would be widened and hardened to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet wide and would be hardened with crushed stone. Bald Knob Road would be stabilized and converted into a bike/hike trail. A short connector between the end of Bald Knob Road and the Rockhouse Trail and the Lakeshore Trail would be constructed and hardened with crushed stone. These trails would serve as connectors between the campgrounds and the Lakeshore Trail. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>Minor improvements would be made to the Backpack Trail and the Office Trail so hikers and mountain bike riders could jointly use the trails. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into streams. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p>

Table 2d (continued). Description of Alternative 4 by individual project element.

<p>Boat Dock Area Improvements</p>	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old, pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be constructed in the lower portion of Rockhouse Hollow, using natural channel design concepts. These natural channel design concepts will encourage silt to settle out onto the stream's floodplain, above where the stream enters the lake. Periodic silt removal could easily be conducted from the parking lot. Silt removed from the stream's floodplain would be disposed of in a manner consistent with Ohio regulations. The grade control structures that were located in the upper and mid reaches of Rockhouse Hollow would not be reconstructed.</p>
<p>Beach Area Improvements</p>	<p>The swimming beach would be maintained at its current location.</p> <p>The bathhouse would be replaced with a modernized facility.</p> <p>A breakwater structure would be constructed above the beach to keep trash and debris from floating onto the beach.</p> <p>A playground would be constructed at the beach.</p> <p>A second boat ramp would be constructed at the beach. The channel along the beach would be widened and deepened so that boats could be launched from the channel. Boat mooring facilities would be added near the channel. Parking would be improved to accommodate trailers.</p>
<p>Campground Developments & Improvements</p>	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Septic systems would be constructed for the campground.</p> <p>Up to 12 campsites would be added to the Oak Hill Campground in the Pine Knob-Rockhouse area. Showers and flush toilets would be added in the area around these new campsites. Water, electric, and sewage treatment is available, but would be extended to these new facilities and campsites. Septic systems would be upgraded and constructed for the campground. No playground would be constructed, but the swing sets would remain.</p> <p>Up to 12 boat-in, primitive campsites would be added to the area between the old beach and existing beach. A vault toilet would be constructed to serve these sites. Bald Knob Road would be stabilized as part of the Bald-Knob-Rockhouse Hike/Bike Trail, and would serve as the administrative access to these boat-in sites.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

Table 2e. Description of Alternative 5 by individual project element.

<p>Lake Habitat Improvements</p>	<p>The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Discarded lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.</p>
<p>Storms Creek Habitat Improvements</p>	<p>To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing.</p> <p>The Vesuvius Horse Trail would be re-routed so that it crossed Storms Creek above the existing crossing. The trail would come out of the woods at its present location, cross the county road, travel less than 200 feet upstream through the woods between the road and stream, and then cross about 100 feet above the existing crossing. The banks are gently sloped, but would be hardened with rock to prevent erosion from occurring with continued hoof action. The existing crossing would be closed and revegetated with a native seed mix deemed appropriate by the Forest's botanist.</p> <p>Up to two pools would be created in the section of stream below the stone bridge. V-dams, constructed with logs, would scour deep pools in the stream for improved fisheries habitat. Four logs would be needed for the structures; these could be brought in from off-site, or would be felled on-site from the riparian area. A wildlife biologist and fisheries biologist would determine what trees to fell if they are obtained from on-site.</p>
<p>Trails and Associated Facilities</p>	<p>Portions of the Lakeshore Trail (about 3 miles) would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The sections of trail from the beach to the boat dock, and from the dam to the junction of the Whiskey Run Trail, would be up to 8 feet in width to allow for passing, and would be hardened with asphalt. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail. The remainder of the Lakeshore Trail (about 5 miles) would not be widened, but would have minor improvements made to it. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into the lake. This portion of the Lakeshore Trail would be open to hikers only.</p> <p>A boardwalk, approximately 1600 feet by 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>The Whiskey Run Trail would be widened and hardened to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet wide and would be hardened with asphalt. Bald Knob Road would be stabilized and converted into a bike/hike trail. A short connector between the end of Bald Knob Road and the Rockhouse Trail and the Lakeshore Trail would be constructed and hardened with asphalt. These trails would serve as connectors between the campgrounds and the Lakeshore Trail. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>Minor improvements would be made to the Backpack Trail and the Office Trail so hikers and mountain bike riders could jointly use the trails. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into streams. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p>

Table 2e (continued). Description of Alternative 5 by individual project element.

<p>Boat Dock Area Improvements</p>	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old, pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be constructed in the lower portion of Rockhouse Hollow, using natural channel design concepts. These natural channel design concepts will encourage silt to settle out onto the stream’s floodplain, above where the stream enters the lake. Periodic silt removal could easily be conducted from the parking lot. Silt removed from the stream’s floodplain would be disposed of in a manner consistent with Ohio regulations. The grade control structures that were located in the upper and mid reaches of Rockhouse Hollow would not be reconstructed.</p>
<p>Beach Area Improvements</p>	<p>The swimming beach and its associated facilities would be closed and removed. A campground with up to 24 sites would be constructed in its place. Showers and toilets would be constructed. The existing septic system would be maintained.</p> <p>A playground would be constructed.</p> <p>A second boat ramp would be constructed. The channel along the beach would be widened and deepened so that boats could be launched from the channel. Boat mooring facilities would be added near the channel. Parking would be improved to accommodate trailers.</p>
<p>Campground Developments & Improvements</p>	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Septic systems would be constructed for the campground.</p> <p>Existing showers and restroom facilities would be upgraded to meet ADA standards in the Oak Hill Campground. A small playground would be constructed where the existing swing sets are located.</p> <p>Up to 12 boat-in, primitive campsites would be added to the area between the old beach and existing beach. A restroom would be constructed to serve these sites. Bald Knob Road would be stabilized as part of the Bald Knob-Rockhouse Hike/Bike Trail, and would serve as the administrative access to these boat-in sites.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

Table 2f. Description of Alternative 6 by individual project element.

<p>Lake Habitat Improvements</p>	<p>The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Discarded lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.</p>
<p>Storms Creek Habitat Improvements</p>	<p>To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing.</p> <p>The Vesuvius Horse Trail would be re-routed so that it crossed Storms Creek above the existing crossing. The trail would come out of the woods at its present location, cross the county road, travel less than 200 feet upstream through the woods between the road and stream, and then cross about 100 feet above the existing crossing. The banks are gently sloped, but would be hardened with rock to prevent erosion from occurring with continued hoof action. The existing crossing would be closed and revegetated with a native seed mix deemed appropriate by the Forest's botanist.</p> <p>Up to two pools would be created in the section of stream below the stone bridge. V-dams, constructed with logs, would scour deep pools in the stream for improved fisheries habitat. Four logs would be needed for the structures; these could be brought in from off-site, or would be felled on-site from the riparian area. A wildlife biologist and fisheries biologist would determine what trees to fell if they are obtained from on-site.</p>
<p>Trails and Associated Facilities</p>	<p>The lower half of the Lakeshore Trail (about 4 miles) would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The sections of trail from the beach to the boat dock, and from the dam to the junction of the Whiskey Run Trail, would be up to 8 feet in width to allow for passing, and would be hardened with asphalt. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail. The upper half of the of the Lakeshore Trail (about 4 miles) would not be widened, but would have minor improvements made to it. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into the lake. This portion of the Lakeshore Trail would be open to hikers only.</p> <p>A bridge would be constructed across the narrows of the lake, near the beach. The bridge would enable the 8-mile Lakeshore Trail to be converted into two loop trails.</p> <p>A boardwalk, approximately 1600 feet x 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>The Whiskey Run Trail would be widened and hardened to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet wide and would be hardened with asphalt. Bald Knob Road would be stabilized and converted into a bike/hike trail. A short connector between the end of Bald Knob Road and the Rockhouse Trail and the Lakeshore Trail would be constructed and hardened with asphalt. These trails would serve as connectors between the campgrounds and the Lakeshore Trail. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>Minor improvements would be made to the Backpack Trail and the Office Trail so hikers and mountain bike riders could jointly use the trails. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into streams. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p>

Table 2f (continued). Description of Alternative 6 by individual project element.

Boat Dock Area Improvements	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old, pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be constructed in the lower portion of Rockhouse Hollow, using natural channel design concepts. These natural channel design concepts will encourage silt to settle out onto the stream's floodplain, above where the stream enters the lake. Periodic silt removal could easily be conducted from the parking lot. Silt removed from the stream's floodplain would be disposed of in a manner consistent with Ohio regulations. The grade control structures that were located in the upper and mid reaches of Rockhouse Hollow would not be reconstructed.</p>
Beach Area Improvements	<p>The swimming beach would be maintained at its current location.</p> <p>The bathhouse would be replaced with a modernized facility.</p> <p>A breakwater structure would be constructed above the beach to keep trash and debris from floating onto the beach.</p> <p>A playground would be constructed at the beach.</p> <p>A second boat ramp would be constructed at the beach. The channel along the beach would be widened and deepened so that boats could be launched from the channel. Boat mooring facilities would be added near the channel. Parking would be improved to accommodate trailers.</p> <p>Up to 10 campsites would be added to the area in and around the upper beach parking lot, including the picnic sites nearest to the upper parking area. Water and electricity is available, and would be run to each campsite.</p>
Campground Developments & Improvements	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Septic systems would be constructed for the campground.</p> <p>Showers and restroom facilities would be upgraded to meet ADA standards in the Oak Hill Campground. No playground would be constructed, but the swing sets would remain.</p> <p>Up to 12 boat-in, primitive campsites would be added to the area between the old beach and existing beach. A restroom would be constructed to serve these sites. Bald Knob Road would be stabilized as part of the Bald Knob-Rockhouse Hike/Bike Trail, and would serve as the administrative access to these boat-in sites.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

Table 2g. Description of Alternative 7 by individual project element.

Lake Habitat Improvements	<p>The amount of underwater fisheries habitat in the lake would be increased. Structure would be placed in the lower part of the lake (Management Area 7.1). Woody material like Christmas trees, and discarded trees and limbs, would be used to construct artificial habitat structures. Discarded lumber would be used to construct catfish nest boxes. These artificial structures would be constructed by hand, and placed on the dry lakebed with the aid of an ATV or tractor. Concrete rubble piles would be created from material removed from the spillway during its repair (an activity that is part of the larger Lake Vesuvius Dam Rehabilitation Project). This material would be placed on the dry lakebed by a backhoe, excavator or some similar type of equipment.</p>
Storms Creek Habitat Improvements	<p>To reduce sediment input into Storms Creek, and to slow the lateral migration of the banks, a peak stone dike would be constructed along three bends of the creek, below the dam. The dike would be a small structure that would parallel the bank, about 2-3 feet high. Wood slabs from a sawmill would be used to make cylindrical bundles for the dike. Rock would be used for the dike in the extreme bend of the channel for added protection. The bank would be sloped back to a 2:1 slope; the soil would be used to backfill the dike. Native vegetation would be planted behind the dike. It is expected that the wood slabs would rot over time, but would remain long enough to give the riparian vegetation a chance to take root and begin growing.</p> <p>The Vesuvius Horse Trail would be re-routed so that it crossed Storms Creek above the existing crossing. The trail would come out of the woods at its present location, cross the county road, travel less than 200 feet upstream through the woods between the road and stream, and then cross about 100 feet above the existing crossing. The banks are gently sloped, but would be hardened with rock to prevent erosion from occurring with continued hoof action. The existing crossing would be closed and revegetated with a native seed mix deemed appropriate by the Forest's botanist.</p> <p>Up to two pools would be created in the section of stream below the stone bridge. V-dams, constructed with logs, would scour deep pools in the stream for improved fisheries habitat. Four logs would be needed for the structures; these could be brought in from off-site, or would be felled on-site from the riparian area. A wildlife biologist and fisheries biologist would determine what trees to fell if they are obtained from on-site.</p>
Trails and Associated Facilities	<p>Portions of the Lakeshore Trail (about 3 miles) would be widened and hardened to create an accessible trail for persons with disabilities, and to enable both hikers and bicycle riders to jointly use the trail. The sections of trail from the beach to the boat dock, and from the dam to the junction of the Whiskey Run Trail, would be up to 8 feet in width to allow for passing, and would be hardened with asphalt. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail. The remainder of the Lakeshore Trail (about 5 miles) would not be widened, but would have minor improvements made to it. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into the lake. This portion of the Lakeshore Trail would be open to hikers only.</p> <p>A boardwalk, approximately 1600 feet x 8 feet, would be constructed as a connector for the Lakeshore Trail, between the boat dock and the dam. The boardwalk would be accessible to persons with disabilities.</p> <p>Up to 6 fishing piers would be constructed along the shoreline, and would tie into the Lakeshore Trail. They would be located in the areas between the old and new beaches, and between the dam and the swimming rock. The fishing piers would be accessible to persons with disabilities.</p> <p>The Whiskey Run Trail would be widened and hardened to enable both hikers and bicycle riders to jointly use the trail. The trail would be up to 8 feet wide and would be hardened with asphalt. Bald Knob Road would be stabilized and converted into a bike/hike trail. A short connector between the end of Bald Knob Road and the Rockhouse Trail and the Lakeshore Trail would be constructed and hardened with asphalt. These trails would serve as connectors between the campgrounds and the Lakeshore Trail. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p> <p>Minor improvements would be made to the Backpack Trail and the Office Trail so hikers and mountain bike riders could jointly use the trails. These improvements would include stabilizing trail-stream crossings, and construction of small bridges to prevent sediment input into streams. Interpretive signing would be placed at trailheads and along the trail to remind hikers and bicycle riders of the importance of staying on the trails to protect natural resources, and to remind them to practice safe riding practices while on the trail.</p>

Table 2g (continued). Description of Alternative 7 by individual project element.

Boat Dock Area Improvements	<p>The boat dock would remain at its current location, and the crib walls along the boat dock area would be repaired. Damaged portions of the wall would need to be removed with the aid of a backhoe or excavator, and then reconstructed. The parking lot would be enlarged to accommodate trailer parking. The old, pit toilets would be upgraded to flush toilets. A septic system would be constructed.</p> <p>Grade control structures would be constructed in the lower portion of Rockhouse Hollow, using natural channel design concepts. These natural channel design concepts will encourage silt to settle out onto the stream's floodplain, above where the stream enters the lake. Periodic silt removal could easily be conducted from the parking lot. Silt removed from the stream's floodplain would be disposed of in a manner consistent with Ohio regulations. The grade control structures that were located in the upper and mid reaches of Rockhouse Hollow would not be reconstructed.</p>
Beach Area Improvements	<p>The swimming beach would be maintained at its current location.</p> <p>The bathhouse would be replaced with a modernized facility.</p> <p>A breakwater structure would be constructed above the beach to keep trash and debris from floating onto the beach.</p> <p>A playground would be constructed at the beach.</p> <p>A second boat ramp would be constructed at the beach. The channel along the beach would be widened and deepened so that boats could be launched from the channel. Boat mooring facilities would be added near the channel. Parking would be improved to accommodate trailers.</p> <p>Up to 10 campsites would be added to the area in and around the upper beach parking lot, including the picnic sites nearest to the upper parking area. Water and electricity is available, and would be run to each campsite.</p>
Campground Developments & Improvements	<p>Showers, flush toilets, and a dump station would be added to the Iron Ridge Campground. The dump station would be placed near the entrance to the campground, near Campsite #1. The showers and restrooms would be placed where the existing pit toilets are located. Water, electric, and sewer lines would be connected to these features. Septic systems would be constructed for the campground.</p> <p>Showers and restroom facilities would be upgraded to meet ADA standards in the Oak Hill Campground. No playground would be constructed, but the swing sets would remain.</p> <p>Up to 12 boat-in, primitive campsites would be added to the area between the old beach and existing beach. A restroom would be constructed to serve these sites. Bald Knob Road would be stabilized as part of the Bald-Knob-Rockhouse Hike/Bike Trail, and would serve as the administrative access to these boat-in sites.</p> <p>A horse camp would be constructed at the existing Sand Hill Trailhead. Up to 24 full service units would be constructed along the beginning portion of the horse trail. The trail is located on an old road, and that would be widened and leveled for the campsites. Water and electricity would need to be brought to the camp for showers and restrooms. A septic system would be constructed for these facilities.</p>

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Figure 3. General Locations of Elements Discussed in the Alternatives

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Affected Environment

The existing environmental and social conditions are displayed in this section. The information provides the decision maker with an understanding of the baseline conditions, something necessary when considering the environmental effects of the project that are displayed in the Environmental Effects section. The Affected Environment section was compiled from Forest specialist reports (found in the project file) and from information in the Lake Vesuvius Dam EA, 1997.

The Affected Environment is displayed by the six categories that covered the ten significant issues raised during public involvement:

- Natural Resources
- Federal Proposed, Threatened, and Endangered Species and Regional Forester Sensitive Species
- Heritage Resources
- Economic Impacts
- Safety
- Recreation

Natural Resources

Lake Vesuvius is a 143-acre lake, with a 6,850-acre watershed. A 100+ year old oak-hickory forest surrounds most of Lake Vesuvius. White oak (*Quercus alba*) is probably the most common species. Other common trees include black oak (*Q. velutina*), scarlet oak (*Q. coccinea*), chestnut oak (*Q. prinus*), sugar maple (*Acer saccharum*), red maple (*A. rubrum*), beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), dogwood (*Cornus florida*), and redbud (*Cercis canadensis*). There are several patches of white pine (*Pinus strobus*), shortleaf pine (*P. echinata*), and Virginia pine (*P. virginiana*). Sycamore (*Platanus occidentalis*), yellow poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), red oak (*Q. rubra*), black cherry (*Prunus serotina*), American elm (*Ulmus americana*), and sweet buckeye (*Aesculus octandra*) are found in the hollows.

Aquatic habitat is varied because of the topography of the land. The lake is a narrow, twisting impoundment. There are numerous

small coves where small feeder creeks enter the lake. The water quality of the feeder streams and the lake is considered good and supports a warmwater aquatic community. However, when heavy rains occur, the lake becomes turbid. Suspended clays and silts from upland areas and from the Paddle Creek drainage create the turbid conditions.

Soils are closely related to the landscape positions on which they occur. Soils information was obtained from the Soil Survey of Lawrence County, Ohio (USDA Natural Resources Conservation Service 1988). The following soils information is summarized from the Vesuvius Opportunity Area Analysis (USDA Forest Service 1991).

The Rarden-Gilpin Silt Loams and the Upshur-Gilpin Complex are the soil types found on the ridge tops and upper side slopes in the project area. Rarden soil is moderately deep, moderately well drained and formed in residuum weathered from shale bedrock. The Gilpin soil is moderately deep, well drained and formed in residuum from interbedded shale, siltstone and sandstone. Upshur soil is deep, well drained and formed in colluvium and residuum weathered from shale and limestone bedrock.

The Steinsburg-Shelocta Association occupies very steep topography of shoulder slopes and side slopes on uplands. Steinsburg soil is moderately deep, well drained and formed in material weathered from sandstone bedrock. Shelocta soil is deep, well drained and formed in material from siltstone, shale and sandstone.

The Chagrin Loam and the Kanawha Silt Loam are found in the bottomlands. Chagrin loam is a deep, well-drained soil that occupies nearly level topography on stream floodplains. It is subject to frequent flooding and is formed in deposits of loamy recent alluvium. It is the major soil in the Storms Creek drainage. Kanawha Silt Loam is a deep, well-drained soil that occupies gently sloping and strongly sloping topography on terrace remnants and alluvial fans. It is formed in loamy alluvium.

Throughout the years the Forest Service and Ohio Division of Wildlife have cooperatively managed Lake Vesuvius to provide recreational fishing opportunities for the public. The lake was drained in January 2001 in preparation for the current dam rehabilitation project. When the

valve is closed and water levels return to the normal conservation pool, the Ohio Division of Wildlife will restock the lake with largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and channel catfish (*Ictalurus punctatus*) (Fall 2002). Fishes that are found in Paddle and Storms Creek, the main feeder creeks to the lake, will return to the lake when it is refilled. These fish include southern redbelly dace (*Phoxinus erythrogaster*), creek chub (*Semotilus atromaculatus*), longear sunfish (*Lepomis megalotis*), green sunfish (*Lepomis cyanellus*), and rock bass (*Ambloplites rupestris*). Aquatic insects and invertebrates found in the lake prior to its draining will drift and/or migrate into the lake and re-establish once water returns.

Amphibians using the lake prior to its draining will likely return over time. Frog and toad surveys conducted from 1995 to 2000 at Lake Vesuvius found the most common species to be the bullfrog (*Rana catesbeiana*), green frog (*R. clamatans*) and spring peeper (*Hyla crucifer*), with smaller numbers of cricket frog (*Acris crepitans*), gray treefrog (*H. versicolor*), chorus frog (*Pseudacris triseriata*), pickerel frog (*R. palustris*), wood frog (*R. sylvatica*), and American toad (*Bufo americanus*). Reptiles that primarily use aquatic habitats would also likely return after the lake fills. These include the snapping turtle (*Chelydra serpentina*), spiny softshell turtle (*Trionyx spiniferus*), midland painted turtle (*Chrysemys picta*), stinkpot turtle (*Sternotherus odoratus*), map turtle (*Graptemys geographica*), and northern water snake (*Nerodia sipedon*).

Bird surveys conducted in mature upland hardwood forest from 1992 to 1994 near the south end of the lake found the most common birds to include the Acadian flycatcher (*Empidonax vireescens*), American crow (*Corvus brachyrhynchos*), ovenbird (*Seiurus aurocapillus*), red-eyed vireo (*Vireo olivaceus*), scarlet tanager (*Piranga olivacea*), worm-eating warbler (*Helminthos vermivorus*), and wood thrush (*Hylocichla mustelina*). Bird surveys conducted in 2001 in mixed cove hardwoods/pine in the bottomland hollows at both ends of the lake found some of the most common birds to include the yellow-throated warbler (*Dendroica dominica*), American redstart (*Setophaga ruticilla*), Kentucky warbler (*Oporornis formosus*), cerulean warbler (*D. cerulea*), Acadian flycatcher, yellow-billed

cuckoo (*Coccyzus americanus*) and pine warbler (*D. pinus*). Some of the common birds found along the brushy edges in the bottomland hollows were the Carolina wren (*Thryothorus ludovicianus*), tufted titmouse (*Parus bicolor*), rufous-sided towhee (*Pipilo erythrophthalmus*) and northern cardinal (*Cardinalis cardinalis*). Louisiana waterthrush (*Seiurus motacilla*) are found in the smaller side hollows. Waterfowl such as Canada goose (*Branta Canadensis*), wood duck (*Aix sponsa*), and mallard (*Anas platyrhynchos*) nest on the lake. Great blue heron (*Ardea herodias*), green heron (*Butorides striatus*) and belted kingfisher (*Megaceryle alcyon*) are often seen at the lake, and occasionally osprey.

Beaver (*Castor Canadensis*) were very active at the lake before it was drained. They are still present in the feeder creeks and are expected to return to the main part of the lake as the water refills.

Other animals that occur in the upland areas around the lake and in the project area include the ravine salamander (*Plethodon richmondi*), slimy salamander (*P. glutinosus glutinosus*), longtail salamander (*Eurycea longicauda*), box turtle (*Terrapene carolina*), ringneck snake (*Diadophis punctatus*), hognose snake (*Heterodon platyrhinos*), copperhead (*Agkistrodon contortrix*), white-footed mouse (*Peromyscus leucopus*), gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray fox (*Urocyon cinereoargenteus*), and white-tailed deer (*Odocoileus virginianus*). Dusky salamanders (*Desmognathus fuscus*) and two-lined salamanders (*Eurycea bislineata*) occur in or near the small feeder creeks flowing into the lake.

There is a diversity of habitats and natural features around the lake, including rock outcrops, mesic ravines, a beech-maple association, hemlock (*Tsuga* spp.) groves, a remnant white cedar (*Thuja occidentalis*) planting, mixed mesophytic woods, and a black walnut (*Juglans nigra*) grove.

Many plant surveys have been conducted at Lake Vesuvius over time, as evidenced by the documented collections in the Ohio Division of Natural Areas and Preserves heritage database. In some areas around the lake, the plant community reflects the disturbances, which have

occurred over time. For example, most of the western shore is densely vegetated with weedy, opportunistic species, both native and non-native (e.g., multiflora rose (*Rosa multiflora*), greenbrier (*Smilax rotundifolia*), sumac (*Rhus* spp.), ironweed (*Veronia* spp.), wild bergamot (*Monarda fistulosa*), grape (*Vitus* spp.), honeysuckle (*Lonicera* spp.), hazelnut (*Corylus* spp.), and serviceberry (*Amelanchier* spp.)). Several state-listed species occur in the project area. These include hyssop skullcap (*Scutellaria integrifolia*), Spanish oak (*Quercus falcata*), small-flowered alumroot (*Heuchara parviflora*), four-angled spikerush (*Eleocharis quadrangulata*), butternut (*Juglans cinerea*), rose azalea (*Rhododendron nudiflorum* var. *roseum*), Carolina ruellia (*Ruellia caroliniensis*), cross-vine (*Bignonia capreolata*), large yellow ladies slipper (*Cypripedium calceolus* var. *pubescens*), few-flowered tick trefoil (*Desmodium pauciflorum*), and butterfly pea (*Clitoria mariana*).

Federal Proposed, Threatened and Endangered Species, and Regional Forester Sensitive Species

Nine federally listed species have part of their range within or near the Wayne National Forest. These species are northern wild monkshood (*Aconitum noveboracense*), small whorled pogonia (*Isotria medeoloides*), Virginia spiraea (*Spiraea virginiana*), running buffalo clover (*Trifolium stoloniferum*), American burying beetle (*Nicrophorus americana*), pink mucket pearly mussel (*Lampsilis abrupta = orbiculata*), fanshell (*Cyprogenia stegaria*), bald eagle (*Haliaeetus leucocephalus*), and Indiana bat (*Myotis sodalis*). The American burying beetle, fanshell, and pink mucket pearly mussel are not addressed in this analysis because there is either no suitable habitat for the species (i.e., the mussels), or the species is only known to occur on the Athens Ranger District (i.e., the beetle) (Wayne NF Biological Assessment, 2001).

There are twenty-nine plant and animal species on the Wayne National Forest's Regional Forester's Sensitive Species list. The following species were included in this analysis because they have been documented near the project area, or have the potential to occur in the project area: juniper sedge (*Carex juniperorum*), striped gentian (*Gentiana villosa*), butternut (*Juglans*

cinerea), Philadelphia panicgrass (*Panicum philadelphicum*), blue scorpionweed (*Phacelia ranunculacea*), rock skullcap (*Scutellaria saxatilis*), pigeon grape (*Vitis cinerea*), evening bat (*Nycticeius humeralis*), black bear (*Ursus americana*), bobcat (*Lynx rufus*), cerulean warbler (*Dendroica cerulea*), timber rattlesnake (*Crotalus horridus*), Olympia marble (*Euchloe olympia*), Wabash river cruiser (*Macromia wabashensis*).

A biological evaluation was prepared for the plant and animal species that addresses the effects of the proposed action and alternatives on these federally listed species and these Regional Forester Sensitive Species. The U. S. Fish and Wildlife Service reviewed the biological evaluations and concurred with the findings USFWS memos, September 13, 2001; October 22, 2001).

Heritage Resources

The entire Vesuvius Recreation Area and environ was inventoried for heritage resources under contract in 1992 and 1994. Nine significant sites were identified in the project area as a result of these investigations. Vesuvius Dam and the following seven recreation structures (all WPA/CCC-era) were evaluated for significance by contract and were determined to be eligible for the National Register of Historic Places in 1998: the Recreation Office, the Garage, Warehouse #1, the Museum/Interpretive Center, Oak Hill Bath House, Oak Hill Latrine, and the Furnace Latrine. In addition, detailed recordation (HAER documentation) of Vesuvius Dam was conducted in 1998 to mitigate the adverse effect of the repair work. Through Section 106 consultation, the State Historic Preservation Office (SHPO) has concurred with the findings of all of these investigations.

Economic Impacts

The "Travel and Tourism Economic Impacts of 1996" report done by MarketVision Research, for Lawrence County estimates the impacts to the County as a result of travel and tourism. According to that report people traveling to the county from 50 or more miles away contributed

the following toward the County economy in 1996 dollars: Direct Output = \$18.76 million; Direct employment = 605 jobs; Direct Payroll = \$6.75 million; and Tax Receipts = \$1.88 million. A part of this total would be a result of people visiting the Lake Vesuvius Recreation Area, although the direct proportion was not isolated.

Safety

Currently, the facilities are monitored to identify conditions that could contribute to injury or illness. Visitor's behavior is also monitored for actions that could endanger themselves or others.

Recreation

Lake Vesuvius, a 143-acre fishing lake is the centerpiece for the Vesuvius Recreation Area and adjoining area. There are two campgrounds, Iron Ridge and Oak Hill. These offer primitive and developed camping sites. The primitive and developed campsites at Iron Ridge currently are separate so that the sites without electric hook-ups are at the end of the campground road, or are at the walk-in areas. The campsites at Oak Hill are separated by providing non-electric sites at the beginning and end of the campground road. A sewage dump station is located at the entrance to the Oak Hill Campground.

The Big Bend Beach offers swimming and picnicking opportunities on a seasonal basis.

There are five hiking trails available to the public in the Vesuvius Area. The Lakeshore Trail is an 8-mile trail that follows the waterline around lake Vesuvius. The Rockhouse Trail is ¾-mile in length and runs from the Lakeshore Trail at the boat dock to the Oak Hill Campground and to the Pine Knob picnic area. A short section of the trail (1/4-mile) is wheelchair accessible. The Whiskey Run Trail is a 1/2 – mile trail that begins in the Iron Ridge Campground and connects with the Lakeshore Trail. The Backpack Trail is 16 miles in length and circles the lake and a portion of its headwaters. Finally, a newer trail called the Office Trail, runs from the Ironton Ranger Station to the Vesuvius Road (Forest Service Road 1955). It is about ¼-mile in length.

The Vesuvius Horse Trail, has nearly 47 miles of horse trail circling the lake and its headwaters. There are four trailheads along the trail: Sand Hill, Paddle Creek, Johns Creek, and Bluegrass Ridge. Paddle Creek is also considered a horse camp. It is a primitive camp facility.

Currently bike use is not permitted on the trails within the Vesuvius Recreation Area. Bike use does occur on the Recreation Area's roads, and occasionally bikers mistakenly get onto the hiking trails.

The Vesuvius Area has a relatively consolidated area of National Forest System lands. To administer recreation sites and facilities, the Forest Service has road/vehicle access to certain areas. The general public has access to these sites also, unless roads are seasonally closed. Cars or pickup trucks, because of road deterioration, cannot drive bald Knob Road, a paved road that travels between the Oak Hill Campground and the "old Beach". The upper end of the lake is very difficult to travel by boat for search or rescue because of the shallow water and resulting lake vegetation. However, the Forest Service is planning to deepen a portion of the upper end of the lake to improve access (NEPA Decision, August 29, 2001).

The facilities around the lake have been designed, as much as possible, to fit into the natural settings. People comment that the Lake Vesuvius Recreation Area is very beautiful and aesthetically pleasing. The negative comments about the aesthetics of the area most often are regarding the older buildings such as the Beach Bathhouse or the restrooms.

Environmental Effects

The environmental effects of the activities associated with each alternative are displayed in this section, as they relate to the issues raised during the public involvement process. Information from the Forest specialists was used to prepare this section (specialist reports are found in the project file). Any mitigation deemed necessary by the specialists is included in this section, and is also summarized in Appendix 3.

Natural Resources

Issue 1a. Bicycle use on the Lakeshore Trail may cause erosion leading to impacts to water quality and the health of aquatic communities.

Bicycles could have the potential to cause rutting on the trail surface, and over time could cause sediment to enter the small feeder creeks around the lake. Bicycle riding could occur on all or part of the Lakeshore Trail in Alternatives 1, 3-7. In Alternatives 1, 3-7 the lower portion of the trail would be hardened and widened. In Alternative 1, the upper portion of the trail would be hardened and widened also. In Alternatives 3-7, the upper portion of the trail would only be hardened as needed. Hardening the trail will help prevent rutting and soil movement in steep and soft areas. In addition, culverts and small foot bridges would be constructed on the trail. The combination of these trail management methods is helpful in minimizing rutting and sediment input into the feeder creeks. In the short term, sediment input would most likely come from the installation of the culverts and small foot bridges. Over the long-term, it is anticipated that negligible amounts of sediment would be input into the feeder streams from bicycle riding. The negligible amount of sediment input into the feeder streams would not have an adverse effect on the aquatic communities in the feeder streams or the lake.

Alternative 2 does not change the use of the Lakeshore Trail. Routine maintenance would occur. This alternative would not allow construction of foot bridges across wet drainages (there are two major drainages where hikers must walk across wide stream bottoms). Without foot bridges, there would continue to be erosion of the trail's approaches in these areas, and there would continue to be a turbidity zone where hikers stir up the muck on the stream

bottom where they cross. This turbidity increases when large groups are hiking together. The clays and silts stirred up by hikers will move downstream and settle out at the mouth of the stream as it enters the lake.

It is not anticipated that bicycle use would increase shoreline erosion in Alternatives 1, 3-7. There are two known areas where shoreline erosion is occurring due to high recreation use (i.e., swimming rock and climbing rocks). A few bicycle riders may stray off the trail every once in a while, but most are likely to stay on the trail. Law enforcement patrols should be able to reduce the number of problem riders.

Mitigation – The steeper the trail, the more potential there is for sediment movement into drainages. When appropriate, utilize boardwalks out over the edge of the lake and small bridges to cross coves or hollows to alleviate the grade of the trail. Utilize trail drainage practices to prevent sediment from moving into drainages.

Monitor all culverts and drainage crossings twice a year (December and April) to ensure they are functioning properly. December is a good time to check culverts for leaves and debris. Most of the heavy winter and spring rains have occurred by April, which is the start of the busy recreation season.

Bicycle riders straying off the trail could do the most damage to the resources during the wet time of year. Currently, all off-road vehicle trails are closed to bicycles between December 15-April 15 to protect streams from sediment input. Closing the Lakeshore Trail to bicycles from December 15-April 15 could add further protection to trailside resources in the event bicycle riders went off trail.

Close the swimming rock to swimming to alleviate the amount of pressure in that area. The decline in use could allow vegetation to re-establish, thereby stabilizing the shoreline.

Cumulative Effects – The results of the past and current activities, as they relate to sedimentation and aquatic communities is described in the Affected Environment section. The Lakeshore Trail has been in use for approximately 40 years. The use of the trail will likely increase in the future if bicycles are allowed to use the trail (Alternatives 1, 3-7). Use would likely remain the same in the future if

Alternative 2 were implemented. Currently, there is sediment entering feeder creeks where culverts have not been maintained and where hikers must cross wide-bottomed drainages. The placement of culverts and small foot bridges, and their maintenance, will have a beneficial impact on water quality and the health of aquatic communities. Hardening soft areas of the trail surface will also help to protect water quality. Bicycle tires will be less likely to rut and disturb the trail surface, thereby minimizing the amount of soil entering the feeder streams. No cumulative effects are expected to occur to water quality or the health of the aquatic communities as a result of implementing Alternatives 1, 3-7. There will be a minimal cumulative effect to water quality if Alternative 2 is implemented. Under that alternative, hikers would continue to stir up clays and silts where the trail crosses the wide-bottomed feeder creeks.

There are places around the trail that are considered high use areas (near the climbing rocks, and the swimming rock), and these areas are compacted and exhibit some shoreline erosion. These areas will likely receive continued high use. When one looks at the size of the watershed, it is clear that these small areas of shoreline disturbance have little or no cumulative impact to water quality or the health of aquatic communities.

Issue 1b. Bicycle use on the Lakeshore Trail may damage rare wildflowers and other vegetation.

Under current conditions, vegetation along the Lakeshore Trail, including rare wildflowers, is minimally impacted by off-trail foot traffic. Alternative 2 would not alter the current trail and therefore would not change these conditions. Alternatives 1, 3, and 4 would allow bike access to all eight miles of Lakeshore Trail, but only Alternative 1 would widen and harden all eight miles of the trail. Alternatives 5, 6, and 7 would allow bike access to only a portion of the Lakeshore Trail (i.e., the lower part of the trail). Widening and hardening the trail, and allowing bike access to the trail, would likely exaggerate off-trail impacts through increased trampling, erosion and picking. However, the amount of habitat that would be affected would not likely impact the diversity of area flora, or the viability of any individual species, since the zone of

impact would be mostly limited to the trail perimeters. In most cases, plenty of suitable, unmodified habitats would remain in the surrounding areas for plant dispersal and growth.

Bicycle traffic may also increase the potential introduction and spread of Non-Native Invasive plant Species (NNIS), through transport on bike hardware (e.g., tires, rims and spokes). Exotic, invasive species pose a serious threat to plant community health and diversity, more so than the temporary loss of habitat due to trampling or earth movement during construction.

Mitigation- Alternatives that allow biking to occur on the Lakeshore Trail include interpretive signing as a way to remind both bikers and hikers about the importance of staying on the trail to protect natural resources. Educational signs should also be placed near communities of interest (i.e. areas with a high floral diversity, unique community types, or special natural features) to raise visitor awareness, and thus respect, of area flora. The more vulnerable areas should be monitored for changes in community composition, influx of NNIS and health, as a result of increased visitor traffic.

To prevent further spread of NNIS to the lesser-impacted areas, develop educational materials for visitors, explaining weed prevention practices, and provide washing facilities (e.g., hose and water) to rinse potential NNIS invaders off bikes.

Cumulative Effects – The Lakeshore trail has been open to foot traffic for several decades. The results of past and present activities, in relation to wildflowers and other vegetation, are described in the Affected Environment section. In summary, the portions of the trail that receive the most use (e.g., first half mile on both sides of the dam and the western shore between the beach and the dam) contain considerably more NNIS (e.g., multiflora rose and Japanese honeysuckle), and therefore fewer native wildflowers, than the lesser-accessed upper portions of the trail, presumably due to an increased human presence. Allowing bike access to all 8 miles of the trail, in the future, would increase the likelihood of spreading NNIS to the less disturbed portions of the trail. Since exotic species, by definition, have been transplanted outside their original range, they often lack natural controls (e.g., disease,

predators, parasites, or climate), which allow them to out compete and eventually replace more rare native species over time. Implementation of mitigating measures above would reduce the cumulative introduction and spread of NNIS. Moreover, monitoring changes in plant communities would allow forest managers to track any opportunistic NNIS spread, and respond by developing management plans for its control.

Issue 1c: Bicycle use on the Lakeshore Trail may disturb wildlife communities.

All of the alternatives (except Alternative 2) provide for bicycles on at least the lower part of the Lakeshore Trail, and some provide for bicycles on all eight miles. This would likely result in an increase in both the number of visitors and the speed at which they travel (i.e., hiking vs. bicycle riding), which could cause disturbance to wildlife, both unintentional and also purposeful (harassment). Some sensitive animals, such as bear (*Euarctos americanus*) or bobcat (*Lynx rufus*), might move out of the drainage, but most (deer, turkey (*Meleagris gallopavo*)) would just run off temporarily. Animals such as chipmunks (*Tamias striatus*) and songbirds would dart away for a few minutes and then return. A few small animals such shrews and frogs would occasionally be run over or stepped on. The overall impact of bicycles on wildlife would be small, however, since wildlife are already somewhat disturbed by the many hikers currently using the trail, plus the large area of less disturbed forest habitat surrounding the lake would still be available to sensitive wildlife.

Mitigation – Any portion of the Lakeshore Trail that would be designated for bicycle use should be designed to discourage high speed riding. For example, avoid long straight-aways, especially on hills. Close the trail to bicycle use between December 15-April 15.

Cumulative Effects – The results of past and present activities, in relationship to wildlife communities, are described in the Affected Environment section. Use of the Lakeshore Trail, in the future, would likely increase if Alternatives 1, 3-7 were implemented, but would likely remain the same if Alternative 2 were selected. However, no significant cumulative effects would be expected with the

implementation of the mitigation described above and, even though the level of disturbance to wildlife would likely increase with bicycles on the trail, the disturbance would still be confined to a very small area, plus the large area of more remote forest habitat which surrounds the lake would be available to sensitive wildlife.

Issue 1d: Bicycle use on the Lakeshore Trail may cause impacts to existing natural features

Alternatives 1, 3, and 4 allow bike access to all eight miles of the Lakeshore Trail. Natural rock faces, outcrops and shelters host a unique set of environmental conditions (e.g., generally shaded, cool and moist), which, in turn, support a unique floral community. For example, small-flowered alumroot, a state potentially threatened species, grows on or at the base of moist, shaded rock faces. Numerous rock features can be found at various locations around the Lakeshore Trail, several of which support healthy populations of small-flowered alumroot and other distinctive native vegetation. These rock features are popular with visitors who enjoy exploring and rock climbing on and around the rocks, as is evident by the numerous undesigned footpaths encircling these areas. Recreational use of these natural features poses a threat to the native vegetation through trampling and picking. Allowing bike access on the trail would likely exaggerate this use, and subsequently, the potential damaging effects to area flora.

Mitigation – Post interpretative signs, which express “stay-on-trail” objectives, near the outcrops. Signs should be placed at vulnerable, relatively undisturbed rock faces, especially those containing small-flowered alumroot, explaining the sensitivity and uniqueness of rock habitats. Interpretive signs may also be a viable strategy to divert visitors away from cliff habitats. Remediate any user-made, non-designated footpaths at these, and all, rock outcrops. Monitor known populations of small flowered alumroot.

Cumulative Effects – The results of past and present activities, in relation to natural features, are described in the Affected Environment section. In summary, visitors have been using the Lakeshore Trail for several decades, with the greatest use concentrated along the first half

mile to mile of the trail on both sides of the dam. As a result of prolonged use, many of the rock outcrops on the eastern shore along this first mile of trail have been heavily degraded (e.g., no vegetation on or around the rocks and large patches of exposed mineral soil). However, if the mitigating measures outlined above were implemented, increased access to all 8 miles of the trail, in the future, would not likely result in any negative cumulative effects to the more intact, healthier rock faces. Therefore, the proposed alternatives would have no cumulative impacts on existing natural features.

Issue 2: The project may affect state-listed plant species and unique plant communities.

Lakeshore Trail – Under Alternative 1: a) Small-flowered alumroot, a state potentially threatened species, grows on or around moist, shaded ledges or cliffs (sandstone or limestone), and can be found in several locations along the trail. Alternatives proposing to widen the trail could directly affect this species if the widening occurred on top of a basal population, and indirectly if shade trees were removed allowing increased light exposure and warming. b) A mature Spanish oak, a state endangered species, can be found on the eastern shore, and would be killed if cut down during trail expansion. c) Hyssop skullcap, a state potentially threatened species, grows in fields, thickets and open woods, and can be found in several locations around the lake. The direct impacts of widening and hardening the trail would likely kill any hyssop skullcap individuals in the project area, since most were found growing right along the trail during the botanist's surveys. d) Rose azalea, a state potentially threatened species, is a low shrub that grows in moist or dry woods and thickets. Individuals can be found scattered along the eastern shore, above the proposed bridge site to mid-way along the trail before a hemlock grove. The direct impacts of widening and hardening the trail would likely kill any rose azalea individuals in the project area. e) Four-angled spikerush, a state potentially threatened species, is a rhizomatous perennial wetland species found at seven locations along the lakeshore. Habitat for this species is shallow water along the lake margin, and thus the project is only likely to directly affect four-angled spikerush if fill is added to expand the trail towards the lake. f) Carolina ruellia, a state potentially threatened species,

grows in dry woods and clearings and along grassy slopes, and can be found scattered along the Lakeshore Trail. Despite its state listed status, ruellia is relatively common in the Lake Vesuvius area, and can be found in several areas of the project area. Thus, loss of a few populations along the Lakeshore Trail is not likely to trend this species towards federal listing. g) Four other rare species, cross vine, yellow ladies slipper, butterfly pea, and few-flowered tick trefoil have been deemed “*demonstrably*” globally secure by The Nature Conservancy; therefore, potential destruction of a few individuals by the proposed action is unlikely to drive any of these species towards federal listing.

Under Alternative 2, the Lakeshore Trail would remain as is, with access given only to hikers. The only impacts to sensitive plant populations under the no-action alternative would be continued occasional trampling from off-trail foot traffic. Several state listed species have been recorded around the Lakeshore Trail. All should retain their viability along the trail if conditions remain as they are, with the possible exception of the small-flowered alumroot, which grows on or around rock faces. Off-trail foot traffic currently impacts areas with rock outcrops, as visitors use these sites for climbing and exploration (see Issue 1d above).

Under Alternative 3, only the lower 4 miles of trail would be widened and hardened with asphalt, and bikers and hikers would be allowed on all 8 miles. Many of the unique plant communities (e.g. rock outcrops, mesic ravines, a beech-maple association, hemlock groves, a remnant white cedar plantation, mixed mesophytic woods, and a black walnut grove) and rare plants described in Alternatives 1 and 2 are located along the upper 4 miles of the Lakeshore Trail. Allowing bike traffic in this area would likely increase erosion and trampling through off-trail travel, as well as, increase the potential for NNIS introductions.

Alternative 4 is identical to 3, except crushed stone is used to harden the trail instead of asphalt. The use of stone may actually intensify the negative impacts to plant communities over the long term, since stones may deflect and accumulate off trail over time, thus expanding the zone of impact to greater than 8 ft. However, the use of crushed stone (dense

graded aggregate) minimizes the movement of stone.

Under Alternatives 5-7, only the lower 4 miles of trail would be widened and hardened with asphalt, where bikers would be restricted to these paved sections. For the effects of widening and hardening the lower four miles on rare species and their communities, see Alternative 1. Preventing bikers from accessing the upper four miles of trail would decrease potential impacts to plant communities and rare species along the trail through trampling and erosion, as well as, decrease the potential for the introduction and further spread of NNIS.

Whiskey Run, Rockhouse-Bald Knob Road Trails - A lone large yellow ladies slipper, a state potentially threatened species, was found on the Whiskey Run Trail near its junction with Iron Ridge Campground. If nothing is done to protect the plant, it risks being trampled by foot traffic to and from the campground. Orchids generally do not tolerate transplantation well; therefore, moving the plant to another suitable location in the area is not an option.

Alternatives 3 and 5-7 propose to connect the two major campgrounds, Oak Hill and Iron Ridge, with the Lakeshore Trail by widening and hardening (with asphalt) the Whiskey Run, Rockhouse and Bald Knob Trails. Trails would be accessible to both hikers and bicycle riders. Carolina ruellia can be found scattered along the Rockhouse Trail and Bald Knob Road. Ruellia is relatively common in the Lake Vesuvius area and secure globally; therefore, the loss of a few individuals during project construction is unlikely to drive this species towards federal listing. The Rockhouse Trail and Bald Knob Road are being severely threatened by NNIS. For example, there is a large, prolific multiflora rose shrub in the parking lot at the base of Bald Knob Road that poses a threat for NNIS introduction to this area.

Alternative 4 is the same as above, except crushed stone would be used in place of asphalt. The use of stone may actually cause greater impacts to plant communities over the long term, since stones may deflect and accumulate off trail over time, thus expanding the zone of impact around the trails. However, the use of crushed stone (dense graded aggregate) minimizes the movement of stone.

Backpack Trail and Office Trail - No actions are proposed for Alternatives 1 and 2. Since no actions are planned for these alternatives, neither habitat diversity, species viability, nor NNIS spread would be altered along these trails.

In order to accommodate both hikers and mountain bikers, minor improvements (e.g., stabilization of trail-stream crossings and construction of small bridges to prevent sediment input into streams) would be made to the Backpack and Office Trails under Alternatives 3-7. Combined, the two trails cover an area of approximately 16 miles, and traverse a variety of habitats (e.g., mature and second-growth forest, dry ridge tops and moist ravines, rock outcrops, open fields, and brush land). Allowing bikes on these trails would likely increase the potential invasion and spread of NNIS. Certain portions of the trails have already been affected by NNIS, specifically those areas that see the most foot traffic and seed influx (e.g. trailheads and some waterways).

Boardwalk – Alternatives 1, 3, 4, 5, 6, and 7 include the construction of a boardwalk between the boat dock and the dam. No state-listed species were found in this area. There would be no effects to any rare plant species or any unique plant communities with implementation of any alternative.

Barrier-Free Fishing Piers– Four-angled spikerush grows in selected areas of shallow water along the lake margin, and thus, may be affected by shading from the piers and/or placement of pier footers. However, loss of one or two small populations would not likely affect the viability of this species, since seed sources and suitable habitat are available around the unaffected portions of the lake to maintain four-angled spikerush populations. Spanish oak trees are located on the eastern shore, and could be negatively impacted if cut during pier construction. Small-flowered alumroot grows on rock outcrops that are also found on the eastern shore. There would be no direct effects to these populations from equipment access or pier/pier footer placement. However, excessive shade-tree removal could indirectly affect alumroot populations by increasing light exposure and warming to the rock environment.

Storms Creek – No rare plant species or unique habitats were found in the project area. Therefore, there would be no effects to any rare

plant species or any unique plant communities with implementation of any alternative.

Boat Dock Area – Alternatives 1, 3-7 would enlarge the boat dock parking area to improve parking and visitor safety. A large population of Carolina ruellia (about 100-150 individuals) exists on the grassy hillside adjacent to the boat dock parking lot. The population would likely be destroyed if the toe of the hillside were removed for enlargement of the parking lot. Ruellia is relatively common in the Lake Vesuvius area and secure globally, thus, loss of one population would not affect the viability of the species in the area, or drive it towards Federal listing. Alternative 2 would not change the parking area, so no ruellia would be affected.

No rare plant species or unique habitats were found along Rockhouse Hollow Streambank. Therefore, there would be no effects to any rare plant species or any unique plant communities with implementation of any alternative.

Beach Area – No rare plant species or unique habitats were found in the Beach. Therefore, there would be no effects to any rare plant species or any unique plant communities with implementation of any alternative.

Boat-in Campsites – No sensitive species were found in the region between the old and new beach, potential site of several boat-in campsites. Therefore, there would be no effects to any rare plant species or any unique plant communities with implementation of any alternative.

Oak Hill Campground – Alternative 1 would add up to 12 campsites to the Oak Hill Campground with showers and flush toilets added in the area of these campsites. Water, electric, and sewage treatment is available at both campgrounds, but lines would need to be extended to the new facilities, and septic systems would need to be upgraded and constructed for the campground. Carolina ruellia can be found scattered along the road running through Oak Hill Campground, starting from the entrance/information sign to the farthest campsites. Much of this population would be killed by the addition of campsites and placement of sewer and water lines along the road. However, ruellia is relatively common in the Lake Vesuvius area, and thus, loss of a few individuals would not likely affect the viability of this species or tend it towards federal listing.

The Oak Hill Campground would continue to serve RV and primitive campers with no improvements made to the site and its facilities in Alternative 2. Since no alterations would be made to the campground, populations of ruellia would presumably continue to grow and proliferate within the campground.

Alternatives 3 and 4 are similar to Alternative 1, except, individual sewer hookups would be extended to all existing sites. Since these lines would be installed along the road, populations of ruellia would likely be affected.

Alternatives 1, 5, 6 and 7 propose to upgrade the shower and restroom facilities at the Oak Hill Campground to ADA standards. In addition, a small playground would be added where a swing set already exists. Again, Ruellia may be affected where the earth is disturbed.

Iron Ridge Campground – No rare plant species or unique habitats were found at Iron Ridge Campground. Iron Ridge Campground has a fairly extensive, yet manageable population of exotic olive trees. During a preliminary investigation of the area, at least 2-dozen small trees were counted along the road and around campsites and restroom facilities.

Sand Hill Horse Camp - No rare plant species or unique habitats were found in the project area. Therefore, there would be no effects to any rare plant species or any unique plant communities with implementation of any alternative.

Mitigation -

Trails (all trails) - To prevent the introduction and spread of NNIS, certain mitigating measures should be implemented:

- 1) Develop educational materials for visitors, identifying some of the more common, threatening invasive weeds and weed prevention practices. In the materials, note that a washing facility (i.e., hose and water) is available at the Forest Service warehouse where bicycle tires can be rinsed before riding, to further prevent the spread of NNIS.
- 2) Establish a monitoring program to track the influx and spread of non-native species along accessible portions of the Trail.

- 3) Place interpretive signs at the boat dock parking lot and/or entrance to the trails explaining the significance of NNIS invasion.

Lakeshore Trail – To protect the small-flowered alumroot, follow the Standards and Guidelines (Forest Plan, page 4-47), which state “vegetation management is prohibited within a 50 feet radius of rock shelters and within 50 feet of the base and 50 feet of the top of naturally occurring, large, rock faces or outcrops...” Undesignated footpaths surrounding rock faces should be closed and restored, and interpretive signs, which express “stay-on-trail” objectives and explain the sensitivity of rock habitats, should be placed around outcrops.

To protect Spanish oak trees, divert the trail around this species, making sure to avoid cutting or irrevocably harming it.

Where hyssop skullcap and rose azalea is present in a construction area, starting construction work in the fall is preferable to ensure that they set seed thus increasing its chances for reestablishment during the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area if work is done prior to the fall. Widening and hardening only part of the trail (i.e. the lower 4 miles) would ensure that some individuals survive and suitable habitat remains for its future establishment and expansion.

Do not fill shoreline areas containing four-angled spikerush populations. Locations of the populations can be found in the project file.

To ensure the continued viability of cross-vine, large yellow ladies slipper, few-flowered tick trefoil, and butterfly pea in the Lake Vesuvius area and on the Wayne National Forest, project construction along sections of the trail where populations occur should preferably start in the fall or winter to allow each species to set seed, thus increasing their chance for recolonization the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area if work is done prior to the fall or winter. Widening and hardening only part of the trail would ensure that some individuals of each species survive and that enough suitable habitat remains for their future establishment and expansion.

To protect rock outcrop habitats, place interpretive signs at all significant outcrops explaining “stay-on-trail” objectives and describing the uniqueness of cliff/rock outcrop habitats.

Whiskey Run, Rockhouse-Bald Knob Road Trails - Divert the Whiskey Run Trail away from the yellow ladies slipper orchid or place an interpretive or directional sign, preferably on the opposite side of the trail as the plant, to divert attention from the orchid. The interpretive sign should remind visitors to stay on trail. Remove the multiflora rose along these trails to prevent the further spread of NNIS.

Barrier-Free Fishing Piers – Avoid building a pier in regions where rock outcrops exist on both sides of the trail (a specific location on the southeast side of the lake).

During construction of the trail, ensure shading to rock faces is maintained.

Do not cut any Spanish oak trees during construction.

Do not build piers where known four-angled spikerush populations occur.

Boat Dock Improvements – Where ruellia is present, completing improvement projects in the fall is preferable to ensure that ruellia sets seed, and thus, reestablishes it the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area, if work is done during the other seasons.

Oak Hill Campground - Where ruellia is present, completing improvement projects in the fall is preferable to ensure that ruellia sets seed, and thus, reestablishes it the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area, if work is done during the other seasons.

Sand Hill Horse Camp - Habitat invasion by non-native invasive species is one of the greatest threats to native plant communities, including vulnerable rare species. Horses can introduce invasive weed species to an area on their body (hooves, hair and hide), in their feces, or in their feed. To prevent this invasion, equestrians should be provided with educational

materials that incorporate the following information on how to stop the spread of NNIS:

- 1) Remove weed seeds from pack animals by brushing, picking and cleaning their hooves and bodies before transporting.
- 2) Feed pack animals certified weed free food exclusively during the four days preceding the trip.
- 3) Carry only feed that is certified weed free.

A monitoring program should be implemented to track the effects of increased horse and bike use on non-native species invasion.

Cumulative Effects – The results of past and present activities, in relation to state-listed plants and unique plant communities are described in the Affected Environment section. In summary, the Lake Vesuvius Recreation Area has been a popular visitor destination since at least 1939, when the Vesuvius dam was constructed. Currently, the 143-acre complex attracts visitors to partake in its various recreational opportunities (e.g., camping, fishing, horseback riding, hiking, etc.). This sustained influx of people to the area (with their vehicles, animals, and equipment) has resulted in the introduction and spread of NNIS. Strong evidence of NNIS can be seen in the more heavily used regions of the Recreation Area (e.g., beach, campgrounds, boat ramp, and trails). Exotic, invasive species pose a threat to plant and animal community health and diversity. Since exotic species, by definition, have been transplanted outside their original range, they often lack natural controls (e.g., disease, predators, parasites, or climate), which allows them to out compete and eventually replace more sensitive native species. Once NNIS become established, they are extremely difficult to eradicate, and the resulting change in community plant composition can alter ecosystem dynamics and functions over time. For example, the herbaceous layer along the Rockhouse Trail (from the boat ramp parking lot to Oak Hill Campground) is almost entirely comprised of young honeysuckle plants (an exotic from Japan) in certain areas. This climbing vine, if left unchecked, could completely engulf the understory and canopy vegetation, eliminating more sensitive native species like ruellia, which grow along the trail.

The Lake Vesuvius Recreation Improvement Project will undoubtedly attract an increase in visitors in the future, and thus, an increase in foreign spores and seeds from plants not native to the area. If mitigation measures were implemented to reduce the spread of NNIS, the cumulative effects on rare plant species and unique habitats would be minimized. Furthermore, a consistent monitoring program would allow forest managers to detect NNIS introduction and spread early, and thus effectively implement appropriate controls.

At least seven recreation improvement projects are being proposed for the Lake Vesuvius area, the physical impacts of which include habitat loss due to earth movement, trampling and compaction by heavy equipment, or burial under asphalt, rock or various building structures. The cumulative impacts from all projects within the Lake Vesuvius Recreation area could considerably reduce ruellia population numbers, since several of the proposed projects would directly negatively impact individual populations. This species is fairly common within the Recreation Area; therefore, loss of one or two populations would not likely adversely affect the viability of this species. However, the cumulative loss of numerous populations could affect its viability locally.

Federal Proposed, Threatened and Endangered Species, and Regional Forester Sensitive Species

Issue 3: The project may cause potential impacts to Federal Proposed, Threatened and Endangered Species, and Regional Forester Sensitive Species.

Federally Listed Species

Running buffalo clover – There are no mapped occurrences of this species on the Wayne National Forest. However, a population of running buffalo clover was found in Lawrence County, approximately eight miles from the southern border of the Ironton Ranger District. This species can be found in a wide variety of habitats, but prefers semi-shaded, edge regions that have been subjected to some sort of moderate, periodic disturbance over an extended period of time (e.g., light grazing or old trails). This species will generally not tolerate

full-shade or full-sun habitats, or severe disturbance, and almost all of the known Ohio populations are near streams and rivers (Wayne National Forest Biological Assessment, 2001).

The project area contains several riparian regions and plenty of edge habitat, suitable for running buffalo clover. Alternatives 1, 3-7 include activities that involve work along Rockhouse Hollow, Storms Creek, the beach, and the lake shoreline. The amount of potential habitat that would be lost as a result of reconstructing grade control structures in Rockhouse Hollow, stabilizing streambanks along Storms Creek, or constructing fishing piers along the lake shoreline would not affect future establishment of the species, as plenty of suitable habitat exists along the unaffected portions of the lakeshore and streams. The loss of suitable habitat as a result of improvements at the beach, including construction of campsites, a second boat ramp and a playground is irrelevant to the overall viability of the species.

Mitigation – Widen and harden only a portion of the Lakeshore trail (i.e. the lower 4 miles) to ensure that suitable habitat remains for potential future establishment and expansion of running buffalo clover.

Cumulative Effects - There are 12 known populations of running buffalo clover in Ohio, one of which is in Lawrence county approximately 8 miles from the southern border of the Ironton district of the Wayne NF. A survey was conducted for this species in 1997 on the Ironton district (~320 acres), and portions of the Lake Vesuvius Recreation Area were included (i.e., portions of the Rockhouse Trail and Bald Knob Road, and Vesuvius Cemetery). No individuals were found. And, since no individuals were found in the project area during numerous site visits in 2001, the combined improvement projects would have no direct cumulative effect on this species. Furthermore, although several of the improvement projects would negatively impact small fragments of suitable habitat for running buffalo clover, many of the effects would be temporary (e.g., earth disturbance around gabion structures), and thus would not contribute to long-term cumulative habitat loss. See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for running buffalo clover.

Small whorled pogonia – This species has been documented in Scioto County, which contains the western portion of the Ironton Unit of the Wayne NF. It grows in mid-successional forests with a sparse understory and herb layer. Proximity to physical features, like streams, which tend to create long semi-permanent breaks in the forest canopy, encourages the growth of small whorled pogonia. Furthermore, evidence of human disturbance (e.g., selective cutting, old homesteads) is generally present at most small-whorled pogonia sites.

There is suitable habitat for this species in the project area, specifically along the Lakeshore Trail, Sand Hill Horse Camp, Iron Ridge Campground, Oak Hill Campground, and Boat-in Campsites. Most of the improvement projects, however, involve modifications to already existing trails or developed sites, and rarely impact far into the forest. Some exceptions include new campsite construction and an increase in off-trail travel that would likely occur as a result of widening and hardening the trail system. The amount of habitat lost as a result of these exceptions would not drastically decrease the total amount of habitat available for any potential future establishment of this species, since plenty of suitable habitat would remain unaffected.

Mitigation – To protect suitable habitat for the small-whorled pogonia species, do not pave or gravel the stretch of the Lakeshore Trail that runs through mesophytic (mesic or moist) forest habitat, in the upper part of the trail. Do not cut shade trees on the opposite side of the trail in this same area. Install interpretive, stay-on-trail signs in this area.

Cumulative Effects - There are 3 known populations of small whorled pogonia in Ohio, one of which is in Scioto County on the Shawnee State Forest. A survey was conducted for this species in 1997 on the Ironton district (~260 acres), but no individuals were found. And, since no individuals were found in the project area during numerous site visits in 2001, the combined improvement projects would likely have no cumulative effect on this species. See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for small-whorled pogonia.

Virginia spiraea – Four populations of Virginia spiraea have been documented in Scioto County, which contains the western portion of the Ironton Unit of the Wayne NF. It grows in riverine and riparian habitats along rocky banks or low sandbars, and thrives in geologically active areas that are subject to erosion, deposition, and scouring. There is suitable habitat in the project area, specifically along the Lakeshore Trail, Rockhouse Hollow, and Storms Creek. No Virginia spiraea was found in the project area during several site visits in 2001; therefore, the proposed projects would not likely directly impact this species. Furthermore, while some suitable habitat may be lost during project construction, the loss would not likely affect the potential future establishment of this species in the area. According to Stine (1993), the four existing Ohio populations were found in a very distinct habitat type (along Scioto Brush Creek) not known to occur anywhere else in Ohio, making its future presence in the Recreation Area unlikely.

Mitigation – Ensure that bridges and culverts placed in or across ephemeral and intermittent streams do not significantly alter flow of water through the area.

Cumulative Effects - In 1991, portions of the Wayne NF thought to contain suitable habitat for Virginia spiraea were surveyed for this species, but no individuals were found. Furthermore, no individuals have been found in the project area, and are unlikely to occur there in the future due to specific habitat requirements not known to exist on the Forest. Therefore, it is unlikely that any of the projects would have a cumulative effect on this species.

Northern wild monkshood – This species generally grows near cliff faces, which are exposed to either continuous cold air drainage from subterranean vents or cold groundwater flow from neighboring bedrock. These sites generally have a fairly high relative humidity. The Lakeshore Trail around Lake Vesuvius abuts several moist, rock cliffs, and thus, may have suitable habitat for the northern wild monkshood. All populations of this plant have been found in northern Ohio or southeastern Hocking County, making its presence in the area unlikely. Implementing the following mitigation measures would protect its suitable habitat.

Mitigation – Follow the Standards and Guidelines (Forest Plan, page 4-47), which state “vegetation management is prohibited within a 50 feet radius of rock shelters and within 50 feet of the base and 50 feet of the top of naturally occurring, large, rock faces or outcrops...” Revegetate footpaths surrounding rock faces when needed and post interpretive signs near the outcrops, which express “stay-on-trail” objectives and explain the sensitivity of rock habitats.

Cumulative Effects – Lake Vesuvius Recreation Area contains numerous rock outcrops that may make suitable habitat for Northern wild monkshood, several of which may be impacted by various proposed projects (namely modifications to the Lakeshore Trail; see Issue 1d). Though the species is not likely to be directly impacted by the cumulative effects of these combined projects (since no individuals have been found in the area), suitable habitat for its potential future establishment may be adversely affected. However, if the mitigating measures outlined above (regarding the establishment of a designated climbing zone, and widening and hardening only the lower 4 miles of trail) are implemented, there should be no cumulative effects to suitable habitat for Northern wild monkshood. Also, see discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for Northern wild monkshood.

Indiana bat – An Indiana bat was netted over Paddle Creek, upstream from Lake Vesuvius, during the summer of 1997. If any trees are cut during the bat non-hibernation season (April 15 – September 15), individual Indiana bats could be harmed, i.e., adversely affected, if they are roosting in the trees. Individual trees would need to be cut in Alternatives 1, 3, 4, 5, 6, and 7 for purposes of trail construction, bridge footer placement, and pool development in Storms Creek. Hazard trees may be cut in all Alternatives as part of routine trail maintenance in the recreation area to ensure public safety.

Hundreds of bats (most likely big brown and little brown) roost in the rafters and under the siding of the existing bathhouse each summer. None of the bats are likely to be rare species, since the Indiana bat very rarely roosts in buildings. From a public health standpoint, however, the large number of bats roosting in the bathhouse

is undesirable because bat droppings are scattered throughout the building, even in the food concession area. Due to the open design of the building, it would be very difficult to remodel it to exclude bats.

If the following mitigation measures are implemented, the continued existence of the Indiana bat should not be jeopardized, according to the Wayne National Forest Plan Biological Opinion and U. S. Fish and Wildlife Service concurrence letter (October 22, 2001).

Mitigation – Follow the Reasonable and Prudent Measures and Terms and Conditions in the Wayne National Forest's Biological Opinion. This includes no cutting of snags (dead trees), and the cutting of shagbark and shellbark hickory trees, or any trees that are hollow, have major splits or broken tops only during the bat hibernation season (September 15 – April 15). Trees that are safety hazards may be cut anytime, but if they are cut during the nonhibernation season (April 15 – September 15), the wildlife biologist must be notified of the number of trees cut. All of these mitigation measures apply to only those trees that must be removed which are over 6 inches dbh.

Whether the existing bathhouse is maintained or a new one is built, a large bat condominium should be erected in the open grassy lawn nearby, to try to lure the bats away from the building. If a new bathhouse is built, it should be designed to discourage bats from entering the occupied portion of the building. Any work on the bathhouse that might impact roosting bats should be done in the hibernation season, in case any Indiana bats were present.

Cumulative Effects – No significant cumulative effects would be expected because of the mitigation described above, plus the impacts would be confined to a very small area surrounded by a large area of suitable forest habitat.

Bald eagle – Alternatives 1, 3, 4, 5, 6 and 7 include the placement of fish habitat structures in Lake Vesuvius. This activity should be beneficial to the bald eagle because it could result in an increase in prey for the eagle. All of the alternatives (except Alternative 2), however, would likely result in increased visitation to the Lake Vesuvius area, which could cause

disturbance to sensitive animals such as the bald eagle. At this time, eagles are not known to nest or roost near Lake Vesuvius.

None of the proposed projects should have adverse impacts on the bald eagle, per the Forest's Biological Opinion.

Mitigation - Any bald eagle nests or roosts discovered would be protected as described in the Bald Eagle Recovery Plan. Also, all supercanopy trees near the lake would be preserved as potential roost trees.

Cumulative Effects – No significant cumulative effects would be expected because of the mitigation described above, plus, since no eagles are known to nest or roost near the lake at this time, if any do attempt to establish at the lake they probably are already fairly tolerant of human disturbance.

Regional Forester Sensitive Species

Butternut – This species grows in moist woods and fields, and along streambanks. There is suitable habitat for it along Rockhouse Hollow and Storms Creek, but no butternut trees were found in these project areas. Therefore, Alternatives 1, 3, 4, 5, 6, and 7, which would call for activities to occur along these streams, would not affect this species. The butternut has been found along the upper end of the Lakeshore Trail, and there is suitable habitat for it at various locations around the lake's shoreline. However, the small amount of habitat affected by construction of fishing piers or the boardwalk would not affect the future establishment of the species, since plenty of suitable habitat exists around the unaffected portions of the lake.

Mitigation – Do not cut any butternut trees during trail reconstruction.

Cumulative Effects - Several of the proposed projects would affect habitat for butternut; however, the cumulative effects of the combined habitat modification should not be enough to impact the viability of this species. See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for butternut.

Rock skullcap – This species grows on moist banks and woods, dry slopes and openings. Suitable habitat exists for rock skullcap along Rockhouse Hollow, around the lakeshore, along the stream bordering the upper beach parking lot, in the Sand Hill Horse Camp area, in Iron Ridge and Oak Hill Campgrounds, and along the Backpack and Office Trails. No individuals were found in any of the project areas except for the Lakeshore Trail, where two individuals were found on the eastern side of the lake less than 1 meter from the trail. These individuals would likely be killed during widening and expansion of the trail system; however, loss of a few individuals would not affect the viability of this species, or drive it towards federal listing. Furthermore, while suitable habitat would be lost in several project areas, the amount lost would not be enough to affect the long-term viability of the species. Plenty of suitable habitat would remain for its potential future establishment.

Mitigation – Widen and harden only a portion of the Lakeshore Trail to ensure plenty of suitable habitat would remain for this species in the unaltered areas. Do not build boat-in campsites within 100 feet of ravine habitats between the old and new beach.

Cumulative Effects – Numerous projects would modify small fragments of suitable habitat for rock skullcap; however, the cumulative effects of this habitat loss would not be enough to affect the viability of this species. Enough habitat would remain for its potential future establishment in the Vesuvius Area. See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for rock skullcap.

Pigeon grape – This species prefers moist, alluvial soil and low thickets and streambanks. Suitable habitat for the species occurs along the western shore of the lake, along the Vesuvius Horse Trail near Sand Hill Horse Camp, and along Storm's Creek. No individuals were found in any of the projects areas, and the small amount of habitat that would be lost during construction of fishing piers or the horse camp (proposed in Alternatives 1, 3, 4, 5, 6, and 7) would not affect any potential future establishment of this species in the area.

Cumulative Effects – Numerous projects would modify small fragments of suitable habitat for

summer grape; however, the cumulative effects of this habitat loss would not be enough to affect the viability of this species. Enough habitat would remain for its potential future establishment in the Vesuvius Area.

See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for summer grape.

Juniper sedge, Striped gentian, Philadelphia panicgrass, and Blue scorpionweed – Suitable habitat for these species occurs in Lawrence County, but no individuals have been found in the project area. The loss of a small amount of suitable habitat would not likely drive these species towards federal listing.

Mitigation – To protect suitable habitat for these species, the Forest's botanist would be involved in on-the-ground layout of all projects prior to construction

Cumulative Effects – Numerous projects would modify small fragments of suitable habitat for the above species; however, the cumulative effects of this habitat loss would not be enough to affect the viability of this species. Enough habitat would remain for its potential future establishment in the Vesuvius Area.

See discussion of NNIS (Issue 2) for potential cumulative effects of increased visitor traffic on suitable habitat for Juniper sedge, striped gentian, Philadelphia panicgrass, and Blue scorpionweed.

Evening bat - Evening bats could also occur in the area since the project area is within its current known range and suitable habitat is present. If any trees are cut during the bat non-hibernation season (April 15 – September 15), individual evening bats or could be harmed, i.e., adversely affected, if they are roosting in the trees. Individual trees would need to be cut in Alternatives 1, 3, 4, 5, 6, and 7 for purposes of trail construction, bridge footer placement, and pool development in Storms Creek. Hazard trees may be cut in all Alternatives as part of routine trail maintenance in the recreation area to ensure public safety.

Hundreds of bats (most likely big brown and little brown) roost in the rafters and under the siding

of the existing bathhouse each summer. None of the bats are likely to be rare species, since the evening bat is known on the forest from only one record, 20 years ago, at the north end of the Ironton Ranger District. From a public health standpoint, however, the large number of bats roosting in the bathhouse is undesirable because bat droppings are scattered throughout the building, even in the food concession area. Due to the open design of the building, it would be very difficult to remodel it to exclude bats.

Mitigation – Follow the Reasonable and Prudent Measures and Terms and Conditions in the Wayne National Forest’s Biological Opinion. This includes no cutting of snags (dead trees), and the cutting of shagbark and shellbark hickory trees, or any trees that are hollow, have major splits or broken tops only during the bat hibernation season (September 15 – April 15). Trees that are safety hazards may be cut anytime, but if they are cut during the non-hibernation season (April 15 – September 15), the wildlife biologist must be notified of the number of trees cut. All of these mitigation measures apply to only those trees that must be removed which are over 6 inches dbh.

Whether the existing bathhouse is maintained or a new one is built, a large bat condominium should be erected in the open grassy lawn nearby, to try to lure the bats away from the building. If a new bathhouse is built, it should be designed to discourage bats from entering the occupied portion of the building. Any work on the bathhouse that might impact roosting bats should be done in the hibernation season, in case any Indiana or evening bats were present.

Cumulative Effects – No significant cumulative effects would be expected because of the mitigation described above, plus the impacts would be confined to a very small area surrounded by a large area of suitable forest habitat.

Black bear, bobcat - All of the alternatives (except Alternative 2), however, would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to sensitive animals such as the black bear and bobcat. None of the Alternatives contribute to the loss of viability or movement toward federal listing of the black bear or bobcat since plenty of more remote habitat is available nearby.

Cumulative Effects – No significant cumulative effects would be expected because disturbance would be confined to a very small area surrounded by a large area of more remote forest habitat.

Cerulean warbler – This species nests in the canopy of tall trees and therefore individual animals could be harmed if mature trees are cut. None of the proposed projects, however, should cause the loss of viability or movement toward federal listing of the warbler since only a very small proportion of the suitable nesting trees would be cut from the hundreds of acres of mature stands surrounding the lake.

Cumulative Effects – No significant cumulative effects would be expected because the impacts would be confined to a very small area surrounded by a large area of suitable forest habitat.

Timber rattlesnake - The rock outcrops scattered around Lake Vesuvius and up the side hollows would provide good habitat for timber rattlesnakes but none have been confirmed in the area for many years. Therefore, none of the proposed projects should cause viability loss or federal listing of the snake.

Mitigation - To protect potential habitat, all disturbance to rock outcrops should be kept to a minimum.

Cumulative Effects – No significant cumulative effects would be expected because of the mitigation described above, plus the rattlesnake was probably extirpated from the Lake Vesuvius area many years ago.

Olympia marble - is considered rare and local, and is only known to inhabit dry ridgetops in and adjacent to open oak woods. It was found in the Lake Vesuvius area in 1984, but not since, despite several searches. The potential exists, however, for the butterfly to still be present in the area. Alternatives, which include enlarging Oak Hill Campground or building a new horse camp, could result in harm to individual animals or damage to habitat. However, by implementing the following mitigation measures, the proposed projects should not contribute to the loss of

viability or cause to move toward federal listing of the Olympia marble.

Mitigation - Possible impacts to the species could be reduced by having the wildlife biologist conduct a survey for the butterfly during the flight period (late April to early May), and by avoiding development at sites which are found to be occupied by the butterfly or which contain significant amounts of rock cress (*Arabis* sp.), the host plant for the larvae.

Cumulative Effects – No significant cumulative effects would be expected because of the mitigation described above.

Wabash belted skimmer – In its larval form, this species is aquatic and prefers weedy, lake-type habitats. None of the activities described in Alternatives 1-7 would directly modify habitat found in Lake Vesuvius, with the exception of adding structure to the lake for fisheries habitat. However, this structure would be placed in deeper water and would not be found in shallow areas where the larval form of the insect would be found. None of the alternatives should cause viability loss or federal listing of this insect. Therefore, there would be no cumulative effects to this species.

Heritage Resources

Issue 4: The project may impact heritage resources in the Lake Vesuvius Recreation Area.

The following heritage resources could be affected by the activities proposed in Alternative 1:

- Sites 33LE325, 33LE326, and 33LE391 along the Lakeshore Trail
- Sites 33LE56 and 33LE388 along the Backpack Trail
- Site 33LE34 in the Oak Hill Campground
- Oak Hill Bath House and Latrine

Mitigation - Complete avoidance of 33LE34, 33LE56, 33LE325, 33LE326, 33LE388, and 33LE391 (with no formal evaluation) by providing an appropriate buffer around each site; Care must be taken in the areas of all six

affected archaeological sites mentioned above to avoid any impacts to them through ancillary construction activities or subsequent recreation use.

If avoidance is not possible, the National Register eligibility of these six affected sites must be formally evaluated through detailed archaeological investigation, literary research, and documentation. Should any of these sites be determined eligible for the Register, total data recovery must be conducted which may include full excavation/removal and complete documentation

Because the Oak Hill Bath House and Latrine are both eligible for the National Register, any proposed activity (e.g. routine maintenance, alteration, or otherwise) that affects their integrity is considered adverse. Adverse effects to eligible properties must be mitigated and agreed upon through consultation with the SHPO, and often the Advisory Council on Historic Preservation if warranted by consulting parties.

Cumulative Effects – The six archaeological sites have been protected when past and present activities were implemented. There is always the possibility that the six archaeological sites could be subject to vandalism or accidental damage as a result of increased usage in those portions of the Recreation Area, in the future, thus precipitating increased monitoring, protection, or even area closures. The Oak Hill historic properties may deteriorate more rapidly with increased usage, heightening the need for more frequent stabilization measures.

The following heritage resources could be affected by the activities proposed in Alternative 2 (no action alternative).

- Oak Hill Bath House and Latrine

Because the Oak Hill Bath House and Latrine are both eligible for the National Register, any proposed activity (e.g. routine maintenance, alteration, or otherwise) that affects their integrity is considered adverse. Adverse effects to eligible properties must be mitigated and agreed upon through consultation with the SHPO, and often the Advisory Council on Historic Preservation if warranted by consulting parties.

Cumulative Effects - There are no cumulative effects on heritage resources as a result of implementing Alternative 2 because no activities would be implemented.

The following heritage resources could be affected by the activities proposed in Alternatives 3, 4, 5, 6, and 7:

- Sites 33LE325, 33LE326, and 33LE391 along the Lakeshore Trail
- Sites 33LE56 and 33LE388 along the Backpack Trail
- Site 378 along Bald Knob Road
- Site 33LE34 in the Oak Hill Campground/along Bald Knob Road
- Oak Hill Bath House and Latrine

Mitigation - Complete avoidance of 33LE34, 33LE56, 33LE325, 33LE326, 33LE378, 33LE388, and 33LE391 (with no formal evaluation) by providing an appropriate buffer around each site; Care must be taken in the areas of all seven affected archaeological sites mentioned above to avoid any impacts to them through ancillary construction activities or subsequent recreation use.

If avoidance is not possible, the National Register eligibility of these six affected sites must be formally evaluated through detailed archaeological investigation, literary research, and documentation. Should any of these sites be determined eligible for the Register, total data recovery must be conducted which may include full excavation/removal and complete documentation

Because the Oak Hill Bath House and Latrine are both eligible for the National Register, any proposed activity (e.g. routine maintenance, alteration, or otherwise) that affects their integrity is considered adverse. Adverse effects to eligible properties must be mitigated and agreed upon through consultation with the SHPO, and often the Advisory Council on Historic Preservation if warranted by consulting parties.

Cumulative Effects - The seven archaeological sites have been protected when past and present activities were implemented. There is always the possibility that the seven archaeological sites could be subject to vandalism or accidental damage as a result of

increased usage, in the future, in those portions of the Recreation Area thus precipitating increased monitoring, protection, or even area closures. The Oak Hill historic properties may deteriorate more rapidly with increased usage, heightening the need for more frequent stabilization measures.

Economic Impacts

Issue 5: The recreational improvements could impact the local economy.

The effect to the local economy from changing the types of recreational opportunities available at the Lake Vesuvius area is dependent on two major factors: (1) changes in the number of people participating in various activities and (2) how long they stay plus the amount of money each type of user spends for an outing. As the number of people participating increases or their length of visit increases, then the effect to the local economy would be increased by an amount related to how much money is spent on items such as gasoline, food, or items related to their trip. If changes are made to the facilities that make the area less attractive to certain users, then the effect to the local economy may be negative unless the changes at least are compensated for by an increase of others.

In general, the demand from potential visitors for recreation opportunities is predicted to increase. The results of a study entitled, *National Survey on Recreation and the Environment* (Cordell et al. 2000) projected demand for activities is as follows:

Activity	Increase (+)/ Decrease (-) in People Participating between 1995 and 2020
Sightseeing	+ 32%
Biking	+ 28%
Going to Beach	+ 24%
Hiking	+ 23%
Horseback Riding	+ 23%
Walking	+ 21%
Camping	+19%
Fishing	+ 17%
Canoeing	+ 15%

Within the report is a map that is entitled "Public Land x Recreation Demand Hotspots, 1999". This map combines the availability of public land with the anticipated demand to show where public land exists where there is also a large demand. The county that contains Lake Vesuvius – Lawrence County – is identified as a "Heavy Demand" county.

Therefore it appears that there will be an increased demand at Lake Vesuvius for types of recreation facilities being discussed in an amount similar to the national figures shown in the table above. The lake is currently drained for repair, and some of the facilities are closed to facilitate those repairs, but in the past the facilities have received moderate to high usage. Some facilities are in need of repair or updating as noted elsewhere in this document.

The amount of money that is spent in the local economy by visitors is dependent on many factors including the length of their stay, the type of activity, and the types of supplies needed. For example, the impact of someone stopping at a picnic site to eat a quick lunch that they brought from home would be less than a person who drives a large Recreational Vehicle and stays in the area for 14 days. To participate in some activities such as fishing or biking the local residents would likely buy gear and supplies.

In the southern Appalachians the following dollars are spent on the average per day by individual recreationists (SAFC, no date).

Activity	Net Benefit Dollars per Day
Family Picnics	\$73.90
Bass Fishing	\$32.40
Pool/Outdoor	\$28.54
Warm Water Fishing	\$10.06
Camping	\$6.05
Day Hikes/Walking	\$5.79

The economic impact of fishing and wildlife viewing on National Forests are estimated for 6 southeast states in the following table (SAFC, no date). The dollar figures represent the average spent per day by individual recreationists.

Activity	Net Benefit Dollars per day
Hunting	\$46 - \$119
Fishing	\$37 - \$64
Wildlife Viewing	\$19 - \$55

In the publication *Thinking Green – A Guide to the Benefits and Costs of Greenways and Trails* (OGT 1998), it was reported that a study found that users of 19 trails in Illinois contributed \$2.89 per person per trip. The trails studied were multiple use trails including hikers, horseback riders and bikers. The report also states that the people engaged in horseback riding spent slightly higher than average amounts. The report states that local users typically spent less per trip, but were likely to use the trail more often.

Trails and Associated Facilities

Following will be some discussions of how some of the changes to the trail system at the Vesuvius Recreation Area could increase or decrease the numbers of visitors and/or how long the people stay. After that discussion, the predicted results from the mix of the changes as described in each alternative will be presented.

A trail (up to 8 feet in width and accessible to all persons) that is hardened with stone or asphalt would likely attract more people. A trail that is easier to travel upon would create more potential visitors because some people who do not attempt to travel on a narrower trail with steep grades or native surfacing would be attracted to an easier access. This new group of visitors would include younger people with their parents or guardians, older visitors, and people with disabilities. A trail (up to 8 feet in width and accessible to all persons) would likely be a negative influence on some visitors who prefer a more natural and less-developed recreation area. Some people would likely either not use the trail and thus stay for a shorter time when they visit, and some may not visit at all.

After adding a boardwalk to form a portion of the Lakeshore Trail on the west side of the lake between the boat ramp and the dam, more visitors can be expected. The general attraction of being able to walk along the water's edge would likely attract many people. Plus the opportunity for people to fish along the boardwalk would attract people. Since the boardwalk would be barrier-free, people with

disabilities could use the boardwalk for fishing, wildlife viewing, and/or viewing the scenery.

The addition of the barrier-free fishing piers along the Lakeshore Trail would likely increase the number of visitors to the area because everyone, including people with disabilities, could more easily fish from shore.

A bridge across the lake near the Beach would connect the Lakeshore Trail in the middle and would likely add to the total numbers of visitors for several reasons. A bridge would enable people to travel around a portion of the lake without going the entire eight miles. With a bridge people at Iron Ridge Campground and other facilities on the east or south side of the lake, to travel to the beach without needing to drive a vehicle or walk long distances. The bridge itself would be an attraction because generally people are attracted to water; a bridge would allow people to walk above the lake, people could observe wildlife in the lake, and visitors could view the beauty of the lake and hills from another vantage point.

By opening some of the trails to general bicycle riders and mountain bike riders, a new user-group would be visiting the Recreation Area. No other National Forest trails on the Ironton District have been open in the past to mountain bikes, except the nearby-motorized off-road trails, which receive a small amount of mountain bike traffic. Comments about riding on the motorized trails include a dislike of being on the same trail with motorized users. In the future the Forest may consider opening the Morgan Sisters / Symmes Creek Trails (14 miles) on the northeast part of the Ironton District to mountain bikes, and the Raccoon Creek County Park is considering opening their trails to mountain bikes also.

The number of visitors is likely to increase if bicycles were permitted on some of the trails at the Vesuvius Recreation Area. The type of use that would be expected includes children and parents who bring their bikes when the family is camping, mountain-bike enthusiasts who are looking for trail riding opportunities, and casual day riders from the community who enjoy riding their bikes through a wooded or scenic setting. A hardened (with stone) or asphalted trail would likely primarily attract the children and families and the casual day riders. A non-hardened and narrower trail would likely attract the mountain-

bike enthusiasts as long as an adequate number of miles were available (10 or more). Some walkers/hikers would likely not use the trails if bikes were permitted on the trails because they desire the quiet and serenity of a walking-only area. Also, some may not visit the trails if bikes were allowed because they would fear that their safety was jeopardized when walking on a trail that is also used by bikes.

By asphaltting or hardening (with stone) the Whiskey Run and Bald Knob – Rockhouse Trails, more people would likely visit the campgrounds since they would have easier access to the Lakeshore Trail, and the other facilities that could be accessed by the Lakeshore Trail.

Alternative 1 would result in an 8 mile long trail that is hardened with stone plus a boardwalk, and a bridge built across the lake that would allow the lakeshore trail to be cut in half and to allow access to the beach area from the east side of the lake. No change would be made to Whiskey Run Trail, Rockhouse Trail, the Office Trail, or the Backpack Trail. Bikes would not be permitted on any of the trails, except the Lakeshore Trail.

With Alternative 1 the number of day-hikers and walkers would likely increase from recent past due to the bridge, hardened Lakeshore Trail, and boardwalk for the reasons described above. Some people, who are looking for solitude, may not visit if bikes were allowed, but it is expected that the number of bikers would exceed the number of people who decided not to visit because of the presence of bikes.

Due to improved shoreline fishing access from the piers, boardwalk, and hardened trail, the number of anglers is likely to increase over the present time.

The number of backpackers would likely remain the same as recent past.

The length of stay for the visitors would likely increase from the recent past due to the added attraction of the hardened trail, boardwalk, and bridge because of the variety of attractions plus the accessibility of the attractions is increased over the current conditions.

Alternative 2 would result in the operation and maintenance of the current trail facilities. No

new improvements would be added and no bikes would be allowed on any of the trails.

With Alternative 2 the number of visitors would likely remain the same as recent past.

Alternative 3 and Alternative 6 would result in an 4 mile long trail that is hardened with asphalt on the lower end of the lake and minor improvements to the upper 4 miles of the trail, plus a boardwalk, and a bridge built across the lake that would allow the Lakeshore Trail to be cut in half and to allow access to the beach area from the east side of the lake. Whiskey Run Trail, Rockhouse Trail, and the Bald Knob Road would be asphalted. The Office Trail and the Backpack Trail would be managed to accommodate hikers and mountain bikers. For both Alternative 3 and Alternative 6 bicycles would be permitted on the lower 4 miles of the Lakeshore Trail, Whiskey Run, Rockhouse Trail, the Backpack Trail, the Office Trail, and the Bald Knob Road. The only difference between Alternative 3 and Alternative 6 is that Alternative 3 would allow bicycles on the entire Lakeshore Trail but Alternative 6 would allow bicycles on only the lower 4 miles.

With Alternative 3 and Alternative 6 the number of day-hikers and walkers would likely increase from recent past due to the bridge, hardened Lakeshore Trail, and Boardwalk for the reasons described above. With Alternative 6, since biking is not permitted in the upper 4 miles of the Lakeshore Trail, the people not likely to visit because of the presence of bikes could still hike the upper 4 miles without encountering bikes. Therefore, some of them would still likely visit. Some people, who are looking for solitude, may not visit if bikes were allowed, but it is expected that the number of bikers would exceed the number of people who decided not to visit because of the presence of bikes.

Due to improved shoreline fishing access from the piers, boardwalk, and hardened trail, the number of anglers is likely to increase over the present time.

The number of backpackers using the Backpack Trail would likely decline slightly compared to the recent past because some people may not desire to share the trail with mountain bikes. It is expected that the number of bikers would exceed the number of people who decided not to visit because of the presence of bikes.

The length of stay for the visitors would likely increase from the recent past due to the added attraction of the hardened trail, boardwalk, and bridge because of the variety of attractions plus the accessibility of the attractions is increased over the current conditions. Also, since some of the trails are open to bikes, the variety of activities is increased which would likely increase the time some visitors stay.

Alternative 4 would result in conditions exactly the same as described under Alternative 3 and Alternative 6 except that instead of the Lakeshore Trail being asphalted, the trail would be hardened with crushed stone.

The effects to the local economy would also be the same except that some of the people, who may not like to hike or walk on an asphalted surface because of it appearing unnatural, may find a stone surface more acceptable. Therefore those people may visit the area instead of going somewhere else.

Because the surface would be stone instead of asphalt, a more uneven surface can be expected. Therefore, inexperienced bike riders or people who have difficulty walking may not visit as often.

Alternative 5 and Alternative 7 would result in conditions as described for Alternative 6 except for two items. The bridge across the lake would not be built. And because of this, the Lakeshore Trail would be asphalted only between the Beach and the Whiskey Run Trail.

The result would be that compared to Alternative 6, however the access from the east side of the lake to the Beach Area would be still long or require driving. Also, the loop trails would be different. Rather than two loop trails created by the bridge, the Lakeshore Trail would connect to the Whiskey Run Trail and the Bald Knob-Rockhouse Trail and loop through the campgrounds out onto roads used by cars and recreational vehicles. Since the bridge would not be built, the number of people visiting would likely be much less than potential because the bridge itself, and the trail connection would add a very unique draw for the recreation area.

Lake Habitat Improvements

After the lake renovations are complete and the lake is refilled with water, fish will be restocked as directed by the fishery biologist. The species and numbers stocked will be planned to produce the best population of mixed species as practical.

As described in Alternatives 1, 3, 4, 5, 6, and 7 the placement of structure such as woody material and concrete rubble would eventually increase fishing success of the anglers. Therefore people will likely fish longer and more often, and as word spreads about successful fishing more anglers will travel to Lake Vesuvius to fish. As a result the effects to the local and state economy will be positive as the anglers buy gas, bait, food, gear, licenses, and other items necessary for their visits.

In Alternative 2, no structure would be placed in the lake so the fishing success will be similar to past years. The success would not be expected to be as good as that which would result from the other Alternatives, so the effect to the local economy would be less.

Storms Creek Habitat Improvements

The direct or indirect effects to the local economy from improving the bank conditions of Storm Creek as described would be insignificant under any of the Alternatives.

Under Alternatives 1 and 2, the horse trail crossing would not be moved. Not moving the crossing could cause some people to avoid the area and visit other recreation areas. Relocating the horse trail crossing (Alternatives 3, 4, 5, 6, and 7) would allow the horseback riders to be more secure when crossing the creek and enjoy their rides more; this could lead to more frequent visits to the area.

Under Alternatives 1 and 2, there would not be any v-dams created. Creating the v-dams (Alternatives 3, 4, 5, 6, and 7) would add more angling opportunities. As a result the effects to the local economy will be positive as the anglers buy gas, bait, food, gear, and other items necessary for their visits.

Boat Dock Improvements

Alternatives 1, 3, 4, 5, 6, and 7 repair the crib wall, enlarge the parking lot, and upgrade the

restrooms at the existing boat dock. Alternative 1 corrects the siltation problem differently than Alternatives 3, 4, 5, 6, and 7, but the end results are the same.

Alternatives 3, 4, 5, 6, and 7 also add a boat ramp and parking area at the Beach. Alternatives 1, 3, 4, 5, 6, and 7 upgrade the restroom at the existing boat dock to be more satisfactory as the existing toilets are old and produce unsatisfactory odors. The restrooms would also meet ADA standards.

In the past, one of the limiting factors in how many people could access the lake by boat has been the limited boat launching facilities. One problem has been the limited parking space at the existing boat dock area. Another problem has been the silting of the lakebed immediately out from the ramp.

Alternatives 1, 3, 4, 5, 6, and 7 alleviate these problems by expanding the parking and launching facilities, and limiting the siltation problem in the future. Therefore, more people will be able to access the lake and park in acceptable locations. The expanded parking lot will also provide more space for vehicles unloading wheelchairs. Thus, the numbers of people visiting the area to fish or boat will not be limited and the local economy will benefit from increased numbers of visitors.

Alternative 2 does not correct these problems or upgrade the restroom facilities to where they are more satisfactory. No more people will be able to launch and boat than in the recent past.

Beach Improvements

Alternative 1 would maintain the existing bathhouse; the bathhouse is old and not as functional so some people would be less likely to use the facility. A breakwater would be built to prevent debris from floating and accumulating in the swim area; therefore, more people than in the recent past would be more attracted to the swim area because it would be cleaner and more inviting. A playground would be added to the Beach area, which would likely attract more people and people would likely stay longer because there is more for people to do.

Alternative 2 would maintain the current bathhouse and would not add a breakwater to divert debris from the swim area. Since the

bathroom is old and not as functional and the swimming area would occasionally receive floating debris, the numbers of people visiting to use the beach would either stay the same as the recent past or possibly decline since the conditions of both facilities would deteriorate more over time.

Alternatives 3, 4, 6, and 7 would add a new bathroom to replace the existing structure. Besides being able to include modern facilities within the building, the mere fact that the structure would appear cleaner and newer would likely add significant numbers of people beyond the recent past. As described in Alternative 1, a breakwater and playground would be added, and the effects would be similar. Also under these alternatives, a boat ramp and would be added to the Beach Area. A boat ramp would increase the numbers of boaters that could access the lake because the existing boat ramp is small. Also, since this location is approximately midway up the lake, people who are paddling or have slow electric motors could more easily access the upper portions of the lake if they could launch their boat at the Beach Area. Therefore, with the addition of the boat ramp near the Beach, significantly more people would likely visit the recreation area to boat or fish. The boat ramp would be designed to minimize the interaction between the people using the beach area and those launching boats, but there may be a few people who resist visiting the beach to swim if there are also people launching boats; this number is expected to be very small since gas-powered engines are prohibited from Lake Vesuvius.

Campsites would also be added under Alternatives 3, 6, and 7; the campsites would be where the upper parking area is presently. The campsites would increase the number of people visiting the area because many would enjoy the opportunity to camp immediately adjacent to a beach since they would not need to travel much distance to swim or play. The loss of parking at the beach would reduce the capacity at the beach for day-users, but this effect would likely only be applicable on busy holiday weekends.

Alternative 5 would remove the beach entirely and convert the area to a campground with a playground and a boat ramp. Since this campground would be next to the water with easy access, the campground would likely be very popular. As described above, the boat

ramp would likely add to the number of boaters and anglers using the lake. The removal of the beach would likely reduce significantly the numbers of people who visit the area. The day-use swimmers would not have a reason to visit, and many of the campers visit the area with a variety of activities planned, including swimming. If the beach was removed, many would likely camp elsewhere.

Campground Improvements

With Alternatives 1, 3, 4, 5, 6, and 7 at Iron Ridge Campground, restrooms with flush toilets and showers would replace the existing vault toilets. Also, a sewage dump station would be added. With Alternative 3 six campsites would also have sewer connections added. With Alternative 2, the existing restrooms and campsites would remain the same. By adding flush toilets and showers and sewage hookups more people would likely visit the campground because of the added amenities. In addition to more people visiting, some of the people would likely stay longer because they can more easily feel comfortable because of the showers. Also, with the sewer hookups at individual campsites, people who wish to use the bathroom facilities within their recreational vehicle could stay longer without needing to move to dump their holding tanks.

At Oak Hill Campground, Alternatives 1, 3, and 4 would add up to 12 new campsites and the associated restrooms with showers. Alternatives 2, 5, 6, and 7 would not add any campsites. The added campsites would allow more people to visit, particularly during peak seasons when the existing campsites are full. The addition of a ADA flush toilet for these campsites provides more of an incentive for people to visit since their needs can be easily filled. Without the addition of campsites, there would not be an increase in the number of people visiting the area, and without the added restroom, people would be less likely to use the new campsites if the restrooms are inconvenient. Under Alternatives 3 and 4 individual sewer hookups would be added to the existing campsites; this would allow more people to enjoy the area and for longer times as described in the discussion about Iron Ridge. With Alternatives 5, 6, and 7 the restrooms at Oak Hill would be upgraded so that they would meet ADA standards; in this way, more people could enjoy the recreation area including people with disabilities. Generally, if the restrooms

were upgraded to these standards, everyone could enjoy the sites more and this would lead to more visits.

Alternative 1 would add campsites along the shore in and around the old beach. This would likely add to the number of people visiting the area. People who boat into the camp area and hikers on the Lakeshore Trail would be expected to use these campsites. A moderate increase in the number of people visiting the area would be expected from people destined for these facilities.

Alternative 3-7 would also add boat-in campsites as described in Alternative 1, but the campsites would be spread out along the shore between the old beach and new beach. Also, the closed road (Bald Knob Road) that begins at Oak Hill Campground and ends near the old beach would be stabilized so that administrative vehicles could use it. Alternative 3-7 would likely result in slightly more use than Alternative 1 because the campsites would be more isolated from each other, some would be nearer the beach area (if it is kept), and because the administrative road is accessible cleanup and repair would be more regular.

Alternatives 1, 3, 4, 5, 6, and 7 would add a modern campground at the Sand Hill Trailhead for people bringing their horses to ride the nearby trails. The addition of this facility would likely add many new visitors to the area since such a campground has not existed on the District previously. Horse trails already exist (47 miles) so there is a trail system ready for use. The full service campgrounds proposed would not replace the rustic facility being used currently along Paddle Creek. The proposed facility would complement the existing facility by adding more comforts; there may be a few people who have visited Paddle Creek Camp in the past who switch to the Sand Hill facility, but the increase in new people, particularly from further distances, is expected to be significant. Therefore, it is expected that there would be a significant increase in the numbers of people visiting the area if the Horse Camp was added. Alternative 2 would not produce these added visitors to the area.

Cumulative Effects – Lake Vesuvius and the associated recreational facilities have contributed to the local economy in the past, and they continue to do so. Future economic impacts from implementing any of the

alternatives will be analyzed as they affect the Lawrence County, Ashland, Kentucky and Huntington, West Virginia economy. The improvements made to the Vesuvius Recreation Area as described in Alternatives 1, 3-7 would likely add to the number of people visiting Vesuvius, which would add to the health of the Lawrence County economy since many of the increased number of people would likely come from these population areas. The effect to the economies of Ashland and Huntington would be negative if the residents left the area to visit Vesuvius because of the improvements if otherwise they would recreate in local parks. With Alternatives 1, 3-7 it is likely that there would be an increase in the number of people visiting from outside these three communities; in this case the effect to all three economies would benefit since it is likely that as outside visitors pass through on their way to or from Vesuvius, many would likely stop in one of the areas for fuel or supplies. Under Alternative 2, the changes to the local economy would likely be no different, either positively or negatively.

Safety

Issue 6: Visitor safety to Lake Vesuvius should be considered in the improvement or development of facilities.

For any alternative selected, Engineers and Landscape Architects would design the improvements proposed so that possible injuries to the visitors are minimized. For example, the bridge and boardwalk would be designed so that the conditions that may result in falls and/or other injuries would be minimized through railings, curbs, or ramps. In addition to design features, if there was a situation that warranted a special warning, that location would be highlighted so that the visitors will recognize the danger, or a sign will be erected that explains the danger and how to guard against it.

If some of the trails were opened to allow bikes, a combination of mitigations such as signs, striping to separate traffic, and enforcement would minimize the possibility of collisions. Therefore, if Alternatives 1, 3, 4, 5, 6, or 7 were implemented, the dangers to the visitor would not be significantly different than the existing conditions in Alternative 2.

Cumulative Effects – This is a very site-specific issue. Safety has been a primary concern to the Forest Service in the past, and continues to be presently. Safety would continue to be of concern in the future. There should be no cumulative effects to safety.

Recreation

Issue 7: Locate and construct campsites that will provide campers the opportunity to achieve their desired camping experiences.

With all Alternatives, the Iron Ridge Campground would be configured the same as the present. The restrooms would be improved, but the campsites would remain the same; the RV – Hookup sites would be in the eastern part of the Campground, and the “tent sites” would remain in the western part. The walk-in sites would remain the same. The campsites that would have the sewer hookups added would be at sites that already have electric hookups.

At Oak Hill Campground Alternatives 1, 3, and 4 would have campsites added to the Pine Knob-Rockhouse area of the facility. The existing configuration at the Campground has the “tent” sites at the end; under Alternatives 1, 3, and 4 this situation would not change. The Pine Knob area that has been used for “overflow” camping would change in character since electric hookups would be available.

Alternatives 2, 5, 6, and 7 would not add or change any currently primitive sites to ones that have hook-ups, so these alternatives would not change the current separation in types of visitor preferences.

Adding the Boat-in Campsites as described in Alternatives 1, 3-7 would add a new opportunity for primitive camping that does not now exist at the Vesuvius Recreation Area. Alternative 2 would not provide this opportunity.

The addition of the Sand Hill Horse Camp (Alternatives 1, 3-7) would not affect the separation of visitor preferences (primitive and developed) since currently there are not camping opportunities at these areas now.

Cumulative Effects – The results of past and present activities, in relationship to camping experiences, is described in the Affected

Environment section. The cumulative effects of these actions along with other actions likely to occur on the Ironton District will be analyzed for the effects to opportunities for a variety of camping experiences. The primitive camping available at the Paddle Creek Horse Camp would be available under all alternatives in the future. Therefore, if equestrians did not want to have a developed experience, Paddle Creek Camp would still fill that need. People can boat-in camp at Timbre Ridge Lake, although no improvements are available. Primitive camping is common along the other trail systems on the Ironton District and in the general forest area. Some camping is in other private facilities around the area, including Dean State Forest, Shawnee State Forest, and private facilities. When the primitive campsites along the ATV Trails are improved and hardened these would provide another site to camp in a rustic setting.

Issue 8: Ensure there is adequate administrative access and increased law enforcement at the Lake Vesuvius Recreation Area.

Currently during the recreation season there are roads that are open to Oak Hill Campground, Iron Ridge Campground, the Beach Area, Sand Hill, and close to the upper end of the Lake. Under all Alternatives, this would not change.

With Alternatives 3-7 the Bald Knob Road would be stabilized so that the Forest Service could access the old beach area where the boat-in campsites would be constructed under these alternatives. Although this road would not be open to the public, the Forest Service could use it to clean and maintain the campsites, and for law enforcement or emergency access when needed. Alternatives 1 and 2 do not stabilize this road so that the road could be used. In Alternatives 1, 3-7, some portions of the trail system would be widened and hardened. In emergencies, this would allow faster administrative access for situations such as injuries. Alternative 1 provides the greatest amount of widening and hardening of trails. Alternative 2 does not widen or harden any trail sections.

The personnel available for enforcing laws and regulations is expected to be approximately the same for all alternatives.

Cumulative Effects - The results of past and present activities, in relationship to administrative access and law enforcement, is described in the Affected Environment section. The cumulative effects of these actions, along with other actions likely to occur on the Ironton District, will be analyzed as they affect the availability of law enforcement. Other sites that are regularly visited by law enforcement include Timbre Ridge Lake; the various trail systems on the District, and the general forest area. If the same numbers of people are available for enforcement in the future as exists now, then if the numbers of visitors increase with the implementation of the Proposed Action or Alternatives 3-7, some area of the Forest will receive less coverage based on the number of people. However it is expected that if the number of visitors increases after these Alternatives are implemented, then there is a likelihood that the staff would also eventually increase. If Alternative 2 is implemented, then the areas will likely continue to receive approximately the same number of visitors and the same amount of law enforcement coverage.

Issue 9: Ensure recreation developments and improvements are constructed in an aesthetically pleasing manner.

Landscape Architects and Engineers would design the improvements proposed within each alternative so that the facilities fit into the setting, and not dominate the setting. The design of the facilities, materials specified, and the locations would be combined to produce a pleasing and functional result. Therefore, if Alternatives 1, 3-7 were implemented, the visitor would be able to enjoy the constructed facilities and still enjoy the natural setting. Alternative 2 would result in no changes from the present.

Cumulative Effects – This is a very site-specific issue. Aesthetics have been considered in the design of projects in the past and present. Landscape architects and engineers will continue to consider aesthetics when implementing projects in the future. There would be no cumulative effects to the aesthetics with implementation of any alternative.

Issue 10: The presence of bicycles on the Lakeshore Trail may interfere with those wishing to enjoy a serene hiking experience.

Alternatives 1, 3, and 4 would allow bikes on all 8 miles of the Lakeshore Trail and so those desiring a hike without the chances of encountering bikes would not be able to do so.

Alternatives 5, 6, and 7 do not allow bikes on the upper 4 miles of the Lakeshore Trail and so those desiring to hike without the chances of encountering bikes could hike this section. The lower 4 miles would allow bikes.

Alternative 2 continues to not allow any bike use on any of the Lakeshore Trail, so those desiring a hike without the chances of encountering bikes could use the entire 8 miles.

Mitigation – If trails are reconstructed or re-designated, the techniques described in the publication “Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice” should be reviewed to determine which techniques fit the situations and are appropriate. This publication highlights techniques used on other trails to minimize conflicts. Using these methods, the trails will be less likely to produce conflicts.

Cumulative Effects – There have been no bicycles allowed on the Lakeshore Trail, or any other hiking trail on the Ironton Ranger District in the past or in the present time period. The cumulative effects of these actions along with other actions likely to occur on the Ironton District will be analyzed as to the effects on the hikers. It is possible that the Morgan Sisters and Symmes Creek Trails could be opened to mountain bike riders in the future, possible connecting to the Raccoon Creek County Park Trails. Some of the mountain bike enthusiasts who are looking for a more rustic setting will likely visit those trails instead of Vesuvius. Also, it is possible that ATV Trails could be added to the National Forest land between the Pine Creek ATV Trail System and to the Hanging Rock Trail System. Mountain bike riders could directly ride both which would attract long distance mountain bikers. In either case, the numbers of mountain bike users would be less than if only Vesuvius Trails were open. In this case, it is likely that many of the people seeking more demanding and long distance routes would visit a system other than Vesuvius; it is still likely that Vesuvius

would see many people on bikes on the trails, but the use would be more casual. The Forest will be conducting a Recreation Use Survey in 2003 that will generate statistical information for some of the developed sites in the Vesuvius Area.

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Appendix 1. Comparison of Management Areas in the Project Area

The following information is provided to give the reader a brief summary of the general purpose and desired future conditions of the three Management Areas (MA) that contain the Lake Vesuvius Fisheries and Recreation Improvement Project.

The full description of the purpose, desired future condition, and prescriptions for the three MA's can be found in the Wayne National Forest Land and Resource Management Plan (pages 4-114 to 4-128, 4-140 to 4-145). It is available for review at all Wayne National Forest offices.

Management Area 6.1

Elements of the project that fall within this Management Area:

Trails and Associated Facilities

- Office Trail
- Storms Creek Habitat Improvements
- Campground Improvements
- Horse Camp

The purpose of this MA, as it relates to recreation and habitat management (trails, horse camps, and fisheries habitat improvements) is to provide habitat for a variety of native wildlife, particularly for species that require mature or over-mature hardwoods, and to provide various dispersed recreation opportunities in moderate amounts in a natural appearing landscape. Moderate amounts of non-motorized forms of recreation opportunities are provided.

The desired future condition of this MA, as it relates to recreation (trails and horse camps), is that the forest will be accessible by trails to lakes and ponds and by roads needed for management. Motorized public access will be only to the periphery of the forest. There is evidence of human activities. Interaction between users is low to moderate. The areas are essentially free from evidence of restrictions and controls. There is a moderate probability of experiencing considerable isolation from the

sights and sounds of people, closeness to nature and tranquility.

Management Area 6.2

Elements of the project that fall within this Management Area:

Trails and Associated Facilities

- Lakeshore Trail
- Backpack Trail

The purpose of this MA, as it relates to recreation (trails), is to provide recreation opportunities requiring considerable solitude and/or feeling of closeness to nature. On some of the area, access to the forest for hiking, viewing wildlife and scenery, fishing and other nonmotorized forms of recreation is provided by appropriate trails.

The desired future condition of this MA, as it relates to recreation (trails), is that interaction between users is low. There is subtle evidence of other users. The areas are essentially free from evidence of restrictions and controls. There is high probability of experiencing considerable isolation from the sights and sounds of people, independence, closeness to nature, tranquility, and self-reliance.

Management Area 7.1

Elements of the project that fall within this Management Area:

Trails and Associated Facilities

- Lakeshore Trail
- Bridge
- Boardwalk
- Fishing Piers
- Whiskey Run Trail
- Bald Knob-Rockhouse Trail
- Lake Habitat Improvements
- Boat Dock Improvements
- Beach Improvements
- Campground Improvements
- Iron Ridge Campground
- Oak Hill Campground
- Boat-in Sites

Appendix 1 (continued). Comparison of Management Areas in the Project Area

The purpose of MA 7.1 is to recognize existing recreation facilities and the future need to provide sites for highly developed sites intended to serve large numbers of people, to broaden the range of various recreation opportunities provided and protect high quality opportunities, provide for dispersed recreation along lakesides, and protect and enhance visual quality.

The desired future condition of this MA is that developed areas will contain high density, self-contained destination type recreation developments within a forest environment. Handicapped access to most facilities and structures will be provided. Roads and trails will be designed to accommodate the high density recreation use and other related activities associated with the area. Recreation facilities and structures will be present and may dominate the landscape in developed areas. Design, building materials, and placement of facilities and structures will be such that they are in harmony with the environment. Intensive recreation opportunities are provided in more developed portions of the area. More undeveloped areas provide opportunities for boating, fishing, hunting and hiking.

Appendix 2. Management Indicator Species

The USDA Forest Service is mandated under Code of Federal Regulations (CFR) 200.3(b) (2) “to administer and manage lands...in accordance with ...the National Forest Management Act (NFMA)”. The NFMA does not mention Management Indicator Species (MIS) or monitoring wildlife populations. Direction for MIS is located in 36 CFR 219.19, which establishes the basis for managing and maintaining viable populations of existing native and desired non-native vertebrate species. It states that for planning purposes a viable population shall be regarded as one, which has the estimated numbers, and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. Specifically, 36 CFR 219.19(a)(6) states “population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies to the extent practicable”.

The USDA Forest Service Manual (FSM) provides further direction on MIS both in the Wildlife, Fish, and Sensitive Plant Habitat Management directives (FSM 2600) and the Planning Directives (FSM 1900). MIS are defined as “plant and animal species, communities, or special habitats selected for emphasis in planning in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent” (FSM 2600). The FSM further states that species selected will be those “that best represent the issues, concerns, and opportunities to support the recovery of Federally-listed species, provide continued viability of sensitive species, and enhance management of wildlife and fish for commercial, recreational, scientific, subsistence, or aesthetic values or uses” (FSM 2600).

The Wayne National Forest Land and Resource Management Plan integrates MIS into its planning process consistent with USDA Forest Service Manual direction under Resource Integration Requirements (FSM 1900: 1922.15 items 10 and 11). The FSM states “10. Ensure that the set of management indicator species

includes Resources Planning Act (RPA) and regional wildlife and fish indicators and represents all significant forest level wildlife and fish diversity and resource production issues, concerns, and opportunities.”, and “11. Ensure that management prescriptions will provide for the habitat capability to meet demand for management indicator species and provide access for recreational and commercial uses with minimal disturbance to species use of suitable habitats”.

The manual further requires that plans “Ensure the plan provides for the kinds, amounts, and distribution of habitat needed for the recovery of threatened and endangered species and needed to maintain viable, well-distributed populations of all existing native and desired non-native species” (FSM 1900).

Analysis of project level effects is used to determine an activity’s contribution to meeting forest-wide objectives for providing for well-distributed, viable populations. Management activity effects are examined in light of the existing habitat conditions both within and outside the Forest, and documented population conditions and trends.

The following list displays the Wayne National Forest Management Indicator Species, along with a brief description of the habitat components the MIS represent:

<u>Species</u>	<u>Habitat Component</u>
Cerulean warbler	Close-Canopied, Mature/Over-Mature Hardwoods
Pileated woodpecker	Mature Hardwoods
White-eyed vireo	Late Succession
Common yellowthroat	Middle Succession
Field sparrow	Early Succession
Pine warbler	Conifers
Ruffed grouse	Early Hardwoods
Eastern bluebird	Park Like
Wood duck	Beaver Ponds, Oxbows
Virginia rail	Marsh
Western chorus frog	Fishless Ponds In Fields

Appendix 2 (continued). Management Indicator Species

Species	Habitat Component
Wood frog	Vernal Ponds in Hardwoods
Bluegill	Artificial Impoundments
Southern Redbelly Dace	Small/Intermittent Streams
Redfin Shiner	Medium Streams with Sand/Gravel Pools
Blackside Darter	Medium Streams with Silt Pools
Rainbow Darter	Medium Streams with Riffles
Golden Redhorse	Large Streams with Pools
Sand Shiner	Large Streams with Sand Pools
Banded Darter	Large Streams with Riffles

The Forest Service has begun to inventory appropriate habitats for these species. Inventories are conducted in cooperation with state and federal agencies, universities, and volunteers. No specific trend data is available for these species, in the area of this project, at this time. The following provides a description of the species habitat association, along with other general habits. The Forest's wildlife and fisheries biologists have reviewed inventory data for their presence in the project area, and have made predictions as to the effects on each MIS as a result of implementing any of the alternatives.

Cerulean warbler (*Dendroica cerulea*) – This bird is associated with mature deciduous woodlands. In southeast Ohio, breeding pairs occupy extensive mixed mesophytic forests and floodplain woods. Nests are placed 30-60 feet high among the outer branches of tall trees. This species has been documented at Lake Vesuvius during various surveys conducted since 1992. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if

completed during the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Pileated woodpecker (*Dryocopus pileatus*) – This bird prefers extensive tracts of mature forests, but may also be found in scattered woodlots and along wooded riparian corridors. Nests are most frequently located in cavities 25-50 feet high in large dead deciduous trees. This species has been documented at Lake Vesuvius during various surveys conducted since 1992. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

White-eyed vireo (*Vireo griseus*) – This bird prefers shrub stage successional habitats, especially old fields where woody vegetation is interspersed with herbaceous patches. They may also be found in woodland edges and openings, and along fencerows. Damp and dry habitats are equally suitable, but not swamps. Nests are usually placed six feet high or less in dense bushes. This species has been documented within two miles of the lake during various surveys conducted since 1993. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during

Appendix 2 (continued). Management Indicator Species

the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Common yellowthroat (*Geothlypis trichas*) –

This bird inhabits dense herbaceous vegetation with scattered brushy thickets and small saplings in damp or wet locations. Most breeding pairs inhabit old fields, corridors along fencerows and streams, woodland edges and openings, and the margins of ponds and marshes. Nests are either on the ground under dense herbaceous cover, or at heights of less than one foot attached to shrubs and clumps of grasses. This species has been documented at Lake Vesuvius, or within one mile of the lake, during various surveys conducted since 1993. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Field sparrow (*Spizella pusilla*) – This bird occupies a wide variety of brushy successional habitats, such as old fields and cutover hillsides where herbaceous vegetation is interspersed with brushy tangles and scattered small saplings. They inhabit brushy pastures, woodland edges and openings with shrubby undergrowth, and narrow brushy corridors along fencerows, roadsides, railroads, and streams adjacent to open fields. Nests are generally placed 1-3 feet high in shrubs and small

saplings. This species has been documented within two miles of the lake during various surveys conducted since 1995. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Pine warbler (*Dendroica pinus*) – This bird is

restricted to woodlands dominated by pines. In Ohio, they prefer mixed woods with a pine canopy and an understory of various deciduous species. However, they may nest in pure pine plantations. They occupy mature forests and second growth woods with scattered large pines, and are equally likely to be found within the interiors and along the edges of these habitats. Most pairs are found in large wooded tracts but may also inhabit isolated woodlots. Nests are normally placed 20-50 feet high among the outer branches of tall pines. This species was documented at Lake Vesuvius during surveys conducted in 2000 and 2001. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Ruffed grouse (*Bonasa umbellus*) – This bird prefers second growth deciduous woods where dense understories, shrubs, vines, and other tangles provide suitable cover. They prefer extensive tracts but may also occupy isolated

Appendix 2 (continued). Management Indicator Species

woodlots. Nests are placed on the ground, usually near woodland edges and clearings. This species was documented within two miles of the lake during a survey conducted in 1995. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Eastern bluebird (*Sialia sialis*) – This bird inhabits open country, such as large grassy pastures, fields, and rights-of-way along roads bordered by fencerows and woodland edges. They also occupy weedy fallow fields, but avoid woodland interiors. They nest exclusively in cavities, primarily bird boxes, but they also use old woodpecker holes and natural cavities in fence posts and trees. The preferred bird box height is 3-5 feet; most nests in natural cavities are less than 10 feet high. This species has been documented within one mile of the lake during various surveys conducted since 1993. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Wood duck (*Aix sponsa*) – This bird prefers mature riparian corridors along streams, quiet

backwaters of lakes and ponds bordered by large trees, and secluded wooded swamps. They nest exclusively in cavities, either natural ones in large trees or in nest boxes. Most nests are near or over water, but some are over 500 feet from water. Nest height ranges from 23 feet above water in boxes to more than 50 feet in mature trees. This species has been documented at Lake Vesuvius during various surveys conducted since 1992. An increase in duck hunters to the north end of the lake, where hunting is permitted, could affect wood ducks. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals, especially if completed during the breeding season. Mitigation measures proposed to protect the Indiana bat, which limit tree cutting, would also help protect birds which nest in trees. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals, especially birds nesting near the trails. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Virginia rail (*Rallus limicola*) – This bird prefers dense marshy vegetation. They occupy shallow marshes dominated by cattails or other tall emergent vegetation. This species is not known to occur in southeastern Ohio. It has not been observed at Lake Vesuvius. The proposed action or alternatives will not affect this species.

Western chorus frog (*Pseudacris triseriata*) – This frog can be found in a variety of habitats including marshes, meadows, swales, and other open areas. Breeding occurs in early spring in the edges of shallow ponds, flooded swales, ditches, wooded swamps, and flooded fields. They usually remain close to the breeding grounds throughout the year, hiding from predators (and hibernating also) beneath logs, rocks, leaf litter, and in loose soil or animal burrows. This species was documented (possibly, may have been the upland chorus frog) at Lake Vesuvius during a survey conducted in 1996. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals. All

Appendix 2 (continued). Management Indicator Species

of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Wood frog (*Rana sylvatica*) – This frog is most commonly found in moist woodlands during the summer. They hibernate under stones, stumps and leaf litter in the winter. Breeding occurs in very early spring in woodland ponds. This species was documented at Lake Vesuvius during a survey conducted in 1996. All of the proposed alternatives would result in only minor impacts to this MIS. Alternatives 1, 3, 4, 5, 6, and 7, which involve tree cutting, brush removal or soil disturbance could harm individual animals. All of the alternatives (except No Action) would likely result in increased visitation to the Lake Vesuvius area, which could cause disturbance to some animals. Overall impact to this MIS would be insignificant because only a very small area would be affected, compared to the large area of suitable habitat, which would still be available nearby.

Bluegill (*Lepomis macrochirus*) - The preferred habitat of the bluegill is slow or non-moving clear water containing small amounts of suspended clayey silts, with bottoms made of sand, gravel, or soft muck containing organic debris with scattered beds of aquatic vegetation. Some examples are lakes, ponds, sloughs, reservoirs and moderately deep stream pools. The primary diet of the bluegill consists of insects, insect larvae, small fish, fish eggs, and plant material. Spawning for the bluegill in Ohio usually occurs in mid-May to mid-June, when water temperature reaches 65-70 degrees Fahrenheit. Nests are commonly made in water depths of 1-4 feet on sand or gravel bottoms. They may also be constructed on other bottom materials as well as heavily vegetated areas. Alternatives 1, 3, 4, 5, 6, and 7 will have a positive effect on the bluegill because these alternatives would improve fisheries habitat. Recreation improvements outlined in these alternatives would not have an effect on this species since there would be no large-scale impacts to aquatic

habitat or water quality. Alternative 2 would have no effect on the bluegill because no fisheries habitat would be improved.

Southern redbelly dace (*Phoxinus erythrogaster*) - The primary habitat of the southern redbelly dace is clear slow moving streams with long pools. These streams generally contain wooded undercut banks and are not subjected to frequent flooding. Undercut banks are desired for the sake of safety and shade. Unlike many other species of minnows the redbelly will school in the middle of the channel when frightened, especially if the cut banks are not present. The primary food source of the dace is algae and other plant debris, however they also eat aquatic insects, and small shellfish. The redbelly spawns in the spring and early summer in swift riffles over gravel bottom nests of other minnows. The redbelly dace is found in Storms Creek and Paddle Creek, above the lake. There are no projects outlined in any alternative that would directly or indirectly affect these streams. Therefore, implementation of any alternative would have no effect on this species.

Redfin Shiner (*Notropis umbratilis*) - Redfin shiners live in streams of all sizes with pools flowing slow to moderate over sand gravel or rock, often with aquatic vegetation. Redfin shiners tend to spawn from late spring through mid to late summer. The redfin spawns over nests of sunfishes, which usually consist of sand and gravel. They are attracted to these nests by the scent of a fluid released by the sunfishes during spawning. There may be suitable habitat in Storms Creek above the lake and below the Vesuvius Dam. Alternatives 1, 3, 4, 5, 6, and 7 will have a positive effect on the redfin shiner because these alternatives would improve habitat in the lake and in Storms Creek. Recreation improvements outlined in these alternatives would not have an effect on this species since there would be no large-scale impacts to aquatic habitat or water quality. Alternative 2 would have no effect on the redfin shiner because no fisheries habitat would be improved.

Blackside darter (*Percina maculata*) - The blackside darter generally lives in pools of creeks and small rivers with slow moving current and bottoms consisting of gravel and sand. This darter's primary food source is small crustaceans and aquatic insects. Spawning for

Appendix 2 (continued). Management Indicator Species

the blackside occurs within the months of May and June. The blackside darter has not been collected in Lake Vesuvius or any stream flowing in or out of the lake. There may be suitable habitat in Storms Creek below the Vesuvius Dam. Alternatives 1, 3, 4, 5, 6, and 7 will have a positive effect on the blackside darter because these alternatives would improve habitat in the lake and in Storms Creek. Recreation improvements outlined in these alternatives would not have an effect on this species since there would be no large-scale impacts to aquatic habitat or water quality. Alternative 2 would have no effect on the blackside darter because no fisheries habitat would be improved.

Rainbow darter (*Etheostoma caeruleum*) - Moderate streams and small rivers with long swift riffles, clear water, and sand or gravel bottoms are the perfect habitat for the rainbow darter. Its food source is primarily aquatic insects such as Diptera, and Trichoptera larvae, as well as Plecoptera naiads. They may also eat Coleoptera and Odonata larva, small crayfish, and the eggs of other minnows, especially the white sucker. Rainbow darters spawn between the months of March through June. They spawn in swift riffles above sand and gravel. Most darters especially the rainbows are sensitive to pollution, therefore it only occurs in streams and watersheds that have moderately low pollution content. The rainbow darter has not been collected in Lake Vesuvius or any stream flowing in or out of the lake. There may be suitable habitat in Storms Creek below the Vesuvius Dam. Alternatives 1, 3, 4, 5, 6, and 7 will have a positive effect on the rainbow darter because these alternatives would improve habitat in the lake and in Storms Creek. Recreation improvements outlined in these alternatives would not have an effect on this species since there would be no large-scale impacts to aquatic habitat or water quality. Alternative 2 would have no effect on the rainbow darter because no fisheries habitat would be improved.

Golden redhorse (*Moxostoma erythrurum*) - The golden redhorse lives in riffles, runs, and pools of streams over mud to rock bottoms. They also may live in large rivers and occasionally lakes. The food source of the

redhorse consists of Trichoptera, Ephemeroptera, Copepoda, mollusks, Hemiptera and other items. Algae make up the smallest portion of the redhorse diet. The redhorse spawns between the months of May and July when the water temperatures rise to between sixty and seventy degrees Fahrenheit. Swift riffles are chosen by the redhorse for spawning, however, no nest construction has been observed. The golden redhorse has not been collected in Lake Vesuvius or any stream flowing in or out of the lake, however there is suitable habitat for it in the lake and in Storms Creek below the Vesuvius Dam. Alternatives 1, 3, 4, 5, 6, and 7 will have a positive effect on the golden redhorse because these alternatives would improve habitat in the lake and in Storms Creek. Recreation improvements outlined in these alternatives would not have an effect on this species since there would be no large-scale impacts to aquatic habitat or water quality. Alternative 2 would have no effect on the golden redhorse because no fisheries habitat would be improved.

Sand Shiner (*Notropis ludibundus*) - Sand shiners inhabit pools and runs of creeks with sand and or gravel bottoms. It has also been found in large rivers as well as sandy lake areas. Typically the spawning season of the sand shiner occurs from late May to mid August. Sand shiners have a generalized diet consisting of aquatic insects, small crustaceans, and plant material. The sand shiner has not been collected in Lake Vesuvius or any stream flowing in or out of the lake, however there is suitable habitat for it in Storms Creek below the Vesuvius dam. Alternatives 1, 3, 4, 5, 6, and 7 include activities to stabilize banks and/or create pools in Storms Creek. These activities are expected to have a positive effect on the species. Alternative 2 proposes no habitat improvement in Storms Creek; therefore there would be no effect on the species.

Banded darter (*Etheostoma zonale*) - This darter typically inhabits clear high gradient streams with strong current flow. It tends to live in riffles that are rocky with algae covered boulders and current strong enough to prevent silt deposition. Aquatic plants and accumulations of leaves, sticks and other organic debris provide perfect cover for the banded darter. The primary diet of the banded

Appendix 2 (continued). Management Indicator Species

darther consists of immature aquatic insects. Spawning for this darther usually occurs from mid April into June and possibly as late as July. Spawning generally occurs in moderate to high gradient riffles where there is an abundance of algae and aquatic moss on the stones and boulders. Females deposit their eggs on this plant growth and tend to move downstream to deep water for the winter. There is no suitable habitat available in the project area for this species. There will be no effect on this species as a result of implementing any of the alternatives.

References used for documentation of management indicator species life histories:

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- Boschung Jr., H. T., J. D. Williams, D. W. Gotshall, D. K. Caldwell, and M. C. Caldwell. 1998. National Audubon Society Field Guide to North American Fishes, Whales, and Dolphins. Alfred A. Knopf, Inc., New York. 848 pp.
- Page, L. M. and B. M. Burr. 1991. The Peterson Field Guide Series, A Field Guide to Freshwater Fishes. Houghton Mifflin Company, Boston. 432 pp.
- Peterjohn, B. G. and D. L. Rice. 1991. The Ohio Breeding Bird Atlas. Ohio Department of Natural Resources.
- Pflieger, William L. 1975. The fishes of Missouri. Missouri Department of Conservation. 343 pp.
- University of Michigan Animal Diversity Web Page (October 2001).
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Appendix 3. Summary of Mitigation Measures Identified through the Environmental Effects Analysis, along with the Alternatives to which they Apply.

Element Under Which Activities Would Occur	Mitigation Measure	Alternatives Where Mitigation Would Apply
All	To protect suitable habitat for Regional Forester Sensitive Species, the Forest's botanist should be involved in on-the-ground layout of all projects prior to construction.	1, 3-7
All	Follow the Reasonable and Prudent Measures and Terms and Conditions in the Wayne National Forest's Biological Opinion to ensure protection of the Indiana bat. This includes no cutting of snags (dead trees), and the cutting of shagbark and shellbark hickory trees, or any trees that are hollow, have major splits or broken tops only during the bat hibernation season (September 15 – April 15). Trees that are safety hazards may be cut anytime, but if they are cut during the non-hibernation season (April 15 – September 15), the wildlife biologist must be notified of the number of trees cut. All of these mitigation measures apply to only those trees that must be removed which are over 6 inches dbh.	1-7
Beach Area Improvements	Erect a large bat condominium in the open grassy lawn near the beach bathhouse (either the existing or new bathhouse), to try to lure the bats away from the building. Any work on the existing bathhouse that might impact roosting bats should be done in the hibernation season, in case any Indiana or evening bats were present.	1, 2, 3, 4, 6, 7
Beach Area Improvements	If a new bathhouse is built, it should be designed to discourage bats from entering the occupied portion of the building.	3, 4, 6, 7
Campground Development & Improvements	Do not build boat-in campsites within 100 feet of ravine habitats between the old and new beach to protect suitable habitat for the rock skullcap	3-7
Campground Development & Improvements	Conduct a survey for the Olympia marble butterfly during the flight period (late April to early May) prior to construction of facilities in the Oak Hill Campground or at the Sand Hill Horse Trailhead; avoid development at sites which are found to be occupied by the butterfly or which contain significant amounts of rock cress (<i>Arabis sp.</i>), the host plant for the larvae.	1, 3-7
Campground Development & Improvements	Because the Oak Hill Bath House and Latrine are both eligible for the National Register, any proposed activity (e.g. routine maintenance, alteration, or otherwise) that affects their integrity is considered adverse. Adverse effects to eligible properties must be mitigated and agreed upon through consultation with the SHPO, and often the Advisory Council on Historic Preservation if warranted by consulting parties.	1, 3-7
Trails and Associated Facilities	To protect suitable habitat for Virginia spiraea, ensure that bridges and culverts placed in or across ephemeral and intermittent streams do not significantly alter flow of water through the area.	1, 3-7
Trails and Associated Facilities	When appropriate, utilize boardwalks out over the edge of the lake and small bridges to cross coves or hollows to alleviate the grade of the Lakeshore Trail. Utilize trail drainage practices to prevent sediment from moving into drainages.	1, 3-7
Trails and Associated Facilities	Monitor all culverts and drainage crossings on the Lakeshore Trail twice a year (December and April) to ensure they are functioning properly.	All

Appendix 3 (continued). Summary of Mitigation Measures Identified through the Environmental Effects Analysis, along with the Alternatives to which they Apply.

Trails and Associated Facilities	Close the Lakeshore Trail to bicycles from December 15-April 15 to protect trailside resources and wildlife.	1, 3-7
Trails and Associated Facilities	Close the swimming rock to swimming (closure order) to alleviate the amount of pressure in that area, thereby allowing vegetation to re-establish and stabilize the shoreline in that area.	All
Trails and Associated Facilities	Place educational signs near natural communities of interest (i.e. areas with a high floral diversity, unique community types, or special natural features) to raise visitor awareness, and thus respect, of area flora.	All
Trails and Associated Facilities	Establish a monitoring program to track the influx and spread of non-native species, and changes in plant community composition, along trails and vulnerable natural community areas.	All
Trails and Associated Facilities	Any portion of the Lakeshore Trail that would be designated for bicycle use should be designed to discourage high-speed riding. For example, avoid long straight-aways, especially on hills.	1, 3-7
Trails and Associated Facilities	To prevent the introduction and spread of Non-Native Invasive Species (NNIS along all trails: Develop educational materials for visitors, identifying some of the more common, threatening invasive weeds and weed prevention practices. In the materials, note that a washing facility (i.e., hose and water) is available at the Forest Service warehouse where bicycle tires can be rinsed before riding, to further prevent the spread of NNIS. Equestrians should be provided with educational materials that incorporate the following information on how to (1) remove weed seeds from pack animals by brushing, picking and cleaning their hooves and bodies before transporting; (2) feed pack animals certified weed free food exclusively during the four days preceding the trip; (3) carry only feed that is certified weed free. Place interpretive signs at the entrance to the trails explaining the significance of NNIS invasion.	1, 3-7
Trails and Associated Facilities	To protect Spanish oak, divert the Lakeshore Trail around this species, making sure to avoid cutting or irrevocably harming it.	1, 3-7
Trails and Associated Facilities	Where hyssop skullcap and rose azalea is present in a construction area, starting construction work in the fall is preferable to ensure that they set seed thus increasing their chances for re-establishment during the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area if work is done prior to the fall.	1, 3-7
Trails and Associated Facilities	Widening and hardening only part of the trail (i.e. only the lower 4 miles) would ensure that some individuals of rose azalea and hyssop skullcap survive, and that suitable habitat remains for future establishment and/or expansion of cross-vine, large yellow ladies slipper, few-flowered tick trefoil, butterfly pea, running buffalo clover, and rock skullcap.	1, 3-7
Trails and Associated Facilities	Do not fill shoreline areas or construct fishing piers where four-angled spikerush populations exist.	1, 3-7

Appendix 3 (continued). Summary of Mitigation Measures Identified through the Environmental Effects Analysis, along with the Alternatives to which they Apply.

Trails and Associated Facilities	Project construction along sections of the trail where populations of cross-vine, large yellow ladies slipper, few-flowered tick trefoil, and butterfly pea occur should preferably start in the fall or winter to allow each species to set seed, thus increasing their chance for recolonization the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area, if work is done during the other seasons.	1, 3-7
Trails and Associated Facilities	Divert the Whiskey Run Trail away from the yellow ladies slipper orchid or place an interpretive or directional sign, preferably on the opposite side of the trail as the plant, to divert attention from the orchid. The interpretive sign should remind visitors to stay on trail. Remove the multiflora rose along these trails to prevent the further spread of NNIS.	1, 3-7
Trails and Associated Facilities	Avoid building a fishing pier in where rock outcrops exist on both sides of the trail (a specific location on the southeast side of the lake).	1, 3-7
Trails and Associated Facilities	To protect suitable habitat for the small-whorled pogonia species, do not pave or gravel the stretch of the Lakeshore Trail that runs through mesophytic (mesic or moist) forest habitat, in the upper part of the trail. Do not cut shade trees on the opposite side of the trail in this same area. Install interpretive, stay-on-trail signs in this area.	1
Trails and Associated Facilities	To protect habitat for the timber rattlesnake, rock skullcap, small-flowered alumroot, and northern monkshood, disturbance to rock outcrops should be kept to a minimum. Follow the Standards and Guidelines (Forest Plan, page 4-47), which state “vegetation management is prohibited within a 50 feet radius of rock shelters and within 50 feet of the base and 50 feet of the top of naturally occurring, large, rock faces or outcrops....”. Ensure shading to rock faces is maintained.	1, 3-7
Trails and Associated Facilities	To protect rock skullcap, small-flowered alumroot, and northern monkshood re-vegetate footpaths surrounding rock faces when needed and post interpretive signs near the outcrops, which express “stay-on-trail” objectives and explain the sensitivity of rock habitats.	All
Trails and Associated Facilities	Do not cut any butternut trees during trail reconstruction.	1, 3-7
Trails and Associated Facilities	Post interpretive signing as a way to remind bicycle riders and hikers about the importance of staying on the Lakeshore Trail to protect natural resources.	1-7
Trails and Associated Facilities	Revegetate any user-made, non-designated footpaths near rock outcrops.	1-7
Trails and Associated Facilities	Monitor known populations of small flowered alumroot.	1-7
Trails and Associated Facilities	The recreation and engineering staff should review the publication, “Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice” when trails are reconstructed or re-designated. This publication highlights techniques used on other trails to minimize conflicts.	1, 3-7

Appendix 3 (continued). Summary of Mitigation Measures Identified through the Environmental Effects Analysis, along with the Alternatives to which they Apply.

Trails and Associated Facilities; Campground Development & Improvements	Complete avoidance of heritage resource sites 33LE34 (in the Oak Hill Campground); 33LE56, 33LE325 (along the Backpack Trail); 33LE326, 33LE388, and 33LE391 (along the Lakeshore Trail); and site 378 (along Bald Knob Road), with no formal evaluation, by providing an appropriate buffer around each site; Care must be taken in the areas of archaeological sites mentioned above to avoid any impacts to them through ancillary construction activities or subsequent recreation use (work with the Forest Archaeologist to ascertain the locations of these sensitive sites). If avoidance is not possible, the National Register eligibility of the affected sites must be formally evaluated through detailed archaeological investigation, literary research, and documentation. Should any of these sites be determined eligible for the Register, total data recovery must be conducted which may include full excavation/removal and complete documentation.	1-7
Trails and Associated Facilities; Campground Development & Improvements; Storms Creek	Any bald eagle nests or roosts discovered would be protected as described in the Bald Eagle Recovery Plan. Also, all supercanopy trees near the lake would be preserved as potential roost trees.	1, 3-7
Trails and Associated Facilities; Campground Development & Improvement; Boat dock Area	Where ruellia is present, completing improvement projects in the fall is preferable to ensure that ruellia sets seed, and thus, reestablishes it the following growing season. The Forest botanist should work with the engineering staff to ensure that a local seed source is available to reseed any disturbed area, if work is done during the other seasons.	1, 3-7