

Earthquake Hollow Conservation Area

Ten-Year Area Management Plan FY 2017-2026





Wildlife Division Chief

16 FEB 2017
Date

Earthquake Hollow Conservation Area Management Plan Approval Page

PLANNING TEAM

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CENTRAL REGION

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OVERVIEW

- **Official Area Name:** Earthquake Hollow Conservation Area #9128
- **Year of Initial Acquisition:** 1991
- **Acreage:** 87 acres
- **County:** Callaway
- **Division with Administrative Responsibility:** Wildlife
- **Division with Maintenance Responsibility:** Wildlife
- **Statements of Purpose:**

A. Strategic Direction

The primary purpose of Earthquake Hollow Conservation Area (CA) is to provide quality natural communities that support diverse populations of wildlife and plants for the benefit of Missouri's citizens. The highest priority is the protection of the area's soil, water, cultural, plant, and animal resources.

B. Desired Future Condition

The desired future condition is a high quality matrix of woodland, glade, and forest natural communities that meet the needs of both native wildlife and area users.

C. Federal Aid Statement

N/A

GENERAL INFORMATION AND CONDITIONS

I. Special Considerations

A. **Priority Areas:** None

B. **Natural Areas:** None

II. Important Natural Features and Resources

A. **Species of Conservation Concern:** Species of conservation concern are known from this area. Area managers should consult the Natural Heritage Database annually and review all management activities with the natural history biologist.

B. **Caves:** None

C. **Springs:** None

D. **Other:**

- Earthquake Hollow CA is located within the Outer Ozark Border Subsection of the Ozark Highlands Ecological Section (Nigh & Schroeder, 2002). It occurs in the Central Missouri Oak Woodland/Forest Hills Landtype Association. This landtype association consists of deeply dissected hills and bluffs along the Missouri River. Bluffs and entrenched tributaries have bold rock cliffs. Loess is thick near the bluffs and thins away from them. Narrow loess-covered ridges give way to steep slopes and narrow valleys in

Mississippian and Devonian limestone, and Ordovician Jefferson City-Cotter dolomite. Historically, oak woodland graded into oak and mixed-hardwood forests in the valleys. Frequent limestone and dolomite glades and woodlands occurred on exposed slopes. Today, some of the ridges and bottoms are cleared pasture with limited cropland or dense cedar-hardwood old-field thickets. Steeper lands are largely timbered in second-growth forest with numerous overgrown limestone or dolomite glades.

- Earthquake Hollow CA contains one of the best examples of a chert conglomerate cliff in Missouri.

III. Existing Infrastructure

- One gravel parking lot
- One fishless pond (0.05 acres)

IV. Area Restrictions or Limitations

A. Deed Restrictions or Ownership Considerations: None

B. Federal Interest: Federal funds may be used in the management of this land. Fish and wildlife agencies may not allow recreational activities and related facilities that would interfere with the purpose for which the State is managing the land. Other uses may be acceptable and must be assessed in each specific situation.

C. Easements: None

D. Cultural Resources Findings: Yes, records kept with Missouri Department of Conservation (the Department) environmental compliance specialist. Managers should follow best management practices for Cultural Resources found in the Department's Resource Policy Manual.

E. Endangered Species: None observed.

F. Boundary Issues: Establishing accurate and identifiable boundary markers is a priority for this property.

MANAGEMENT CONSIDERATIONS

V. Terrestrial Resource Management Considerations

Earthquake Hollow CA is a complex of quality natural communities suited for the various landforms and soils on the area. These communities include dry to dry-mesic woodlands on the exposed slopes and broad ridges; glades where thin soils are exposed to bedrock; and forests along protected slopes and streamsides, where shade-tolerant and fire-sensitive species are common.

Earthquake Hollow CA is managed to promote diverse woodlands, glades, and forests (Figure 2). Promoting and maintaining diverse plant communities and healthy wildlife populations on the area is the primary goal.

Challenges and Opportunities:

- 1) High-quality natural communities are found on portions of the conservation area. These communities require periodic disturbances to maintain their structure and species diversity.
- 2) Control invasive species (sericea lespedeza, autumn olive, fescue, honey locust, black locust, Johnson grass, multiflora rose, eastern red cedar, sugar maple, etc.).
- 3) Improve and maintain healthy forest, woodland, and glade natural communities for ecological integrity and public demonstrations.
- 4) Incorporate prescribed fire to ensure that fire-dependent natural communities remain healthy and diverse.
- 5) Update records of area species and natural communities in the Department's Natural Heritage database.

Management Objective 1: Maintain structure and floristic diversity of high-quality woodlands and glades.

Strategy 1: Use current compartment level inventory from Fiscal Year (FY) 2014, aerial photography, and on-site inspections to identify landscape scale management units that encompass a complex of natural communities that can be easily managed as a single unit. (Wildlife)

Strategy 2: When identified by forest inventories, conduct needed prescriptions per compartment to promote diverse natural communities. (Forestry)

Strategy 3: Utilize prescribed burning and other management techniques to maintain diversity and control undesirable woody plant species in woodlands, savannas, and glades. (Wildlife)

Management Objective 2: Control invasive species.

Strategy 1: Monitor the area for bush honeysuckle, sericea lespedeza, autumn olive, tall fescue, Johnson grass, and other invasive species. (Wildlife)

Strategy 2: Apply appropriate management techniques, such as herbicides, to control herbaceous and woody invasive species. (Wildlife)

Strategy 3: Implement forestry practices that may include woodland and forest thinning of red cedar and sugar maple. (Forestry)

Management Objective 3: Improve and maintain healthy forest, woodland, and glade natural communities for ecological integrity and public demonstration.

Strategy 1: Conduct forest inventory with an estimated re-entry time of 15 years or as needed. The next inventory is scheduled for FY 2029. (Forestry)

Strategy 2: Implement forestry practices as prescribed by the forest inventory process. (Forestry)

Strategy 3: Utilize best management practices to maintain soil, water, and visual integrity. (Forestry)

Strategy 4: Conduct prescribed burns on a three-to-five year rotation, in appropriate locations/communities to maintain desired basal area and promote native forbs and grasses. (Wildlife)

Strategy 5: Evaluate the need for tree regeneration and recruitment into the overstory in the woodland natural communities. When new tree recruitment in the overstory is needed, implement strategies that will accomplish this goal. (Forestry)

Management Objective 4: Update Department records of species of conservation concern.

Strategy 1: Work with Department staff and partners (e.g., Missouri Audubon volunteers, Missouri Native Plant Society Members, etc.) to periodically survey for unique plants and animals every three to five years. (Wildlife)

VI. Aquatic Resource Management Considerations

Aquatic resources on Earthquake Hollow CA are limited and consist of one small stream drainage and one fishless pond. There are no public fishing lakes on the area. However, the area streams have the potential to provide habitat to a wide diversity of fish and other aquatic organisms.

Stream Resources:

The only stream on the area, Town Creek, is classified as intermittent and flows for just 0.3 miles within area boundaries. Although Town Creek is classified as an intermittent stream, it does maintain permanent pools throughout the year.

Town Creek, which is on the southeastern margin of the Dissected Till Plains Physiographic Region, originates on level uplands underlain by shales and descends into rolling to hilly terrain underlain by limestone (Nigh & Schroeder, 2002). Most of the streams in this area are considered transitional Ozark/prairie streams and, as such, have a wide diversity of fish species common to both types of habitat. Town Creek is expected to have a fairly diverse fish community, similar to nearby streams. Additional fish

sampling in this stream is needed to adequately determine fish community status and appropriate future fisheries management strategies.

Water quality, stream habitat, and riparian corridors within the area are very good along most of the stream reaches. Maintaining and enhancing riparian corridors on ephemeral and headwater streams is a high priority. Implementing other best management practices in these watersheds is also critical to aquatic habitat improvement. The diversity and health of aquatic fauna within the area should improve, or at least be maintained, if aquatic habitat can be conserved or enhanced.

Challenges and Opportunities:

- 1) Protect, enhance, and maintain area stream resources to support diverse aquatic biota.
- 2) Maintain and enhance the forested riparian corridors along area streams.

Management Objective 1: Monitor fish populations to evaluate diversity and quality of all stream resources.

Strategy 1: Inventory the area's stream fish communities by electrofishing and seining to determine species composition and status. Sample streams every five to seven years, or as needed, to monitor status of fish community. (Fisheries)

Management Objective 2: Maintain a riparian corridor of trees along all stream drainages.

Strategy 1: A minimum riparian corridor width of 100 feet on each side of the stream will be maintained on all area streams. Reinspect streams every five to seven years, or as needed. (Fisheries)

Management Objective 3: Manage stream resources to maintain and enhance their water quality and aquatic life.

Strategy 1: Maintain in-stream habitat by inventorying and monitoring stream life and habitat. (Fisheries)

Strategy 2: Develop and implement management recommendations, as needed, for area streams with water quality, habitat or fish/macro-invertebrate community concerns. (Fisheries)

Pond and Wetland Resources:

Other aquatic resources on the area include one small fishless pond, approximately 0.1-acres. Shallow ponds, such as this one, were originally constructed to provide water for wildlife. Due to the small size and shallow nature of this pond, there is very limited potential for establishing any type of fishery. However, ponds like this provide excellent

habitat for other aquatic species such as plants, invertebrates, reptiles, and amphibians. As a result, the pond is maintained fishless and managed according to recommendations provided in *Amphibian and Reptile Management on Conservation Department Impoundments* (Johnson, 1994), *The Amphibians and Reptiles of Missouri* (Johnson, 1997), and *Amphibian and Reptile Management Guidelines* (Johnson, 1998). Implementing watershed best management practices is necessary to continue to provide quality fishless pond habitat.

Challenges and Opportunities:

- 1) Maintain area pond for wildlife and amphibian use.
- 2) Control nuisance aquatic plants that threaten the integrity or function of the shallow-water pond and wetland.
- 3) Protect, enhance, and maintain area wetland resources.

Management Objective 4: Manage the fishless pond on the area for amphibian and wildlife benefits.

Strategy 1: Chemically renovate pond, when needed, and maintain fishless to promote use by amphibians, reptiles, and other wildlife. (Fisheries)

Strategy 2: Continue to maintain/enhance aquatic habitat in the area's pond by establishing desirable aquatic vegetation, planting trees around shorelines for amphibians and reptiles, reducing siltation, and maintaining good water quality. (Fisheries)

Management Objective 5: Treat nuisance aquatic plants as necessary.

Strategy 1: Use appropriate chemical, biological or mechanical methods to control nuisance plants, as necessary. (Fisheries)

Management Objective 6: Minimize impacts of area pond and wetland on area streams.

Strategy 1: Maintain and improve fishless pond and ephemeral wetland to allow for more natural hydrology instead of conventional silt basins or ponds. (Fisheries)

VII. Public Use Management Considerations

Challenges and Opportunities:

- 1) The chert conglomerate cliffs and numerous rock outcrops are popular with area users. They provide a positive nature-based experience for citizens, yet present a challenge because many of these geological features occur on private lands all-around Earthquake Hollow CA. One particular location of rock outcrops occurs

on the northwestern boundary and has been a popular site for trespass and rock climbing enthusiasts.

- 2) Provide the public with opportunities for multiple use activities.

Management Objective 1: Deter area users from trespassing onto adjacent private property.

Strategy 1: Maintain area signage. (Wildlife)

Strategy 2: Continue maintenance of area boundary fences throughout the year. Plan work days to cut blow downs and clear debris from fences. (Wildlife)

Strategy 3: Maintain close communication with area neighbors to be proactive against any trespass issues. (Wildlife)

Management Objective 2: Provide area users with recreational and educational opportunities, and with up-to-date area information.

Strategy 1: Provide accurate and up-to-date area information and regulations through the Atlas database, area brochures, posted information, and staff contacts with area users. (Wildlife)

Strategy 2: Promote compatible uses of hunting, birding, hiking, wildflower viewing, and nature photography. (Wildlife)

VIII. Administrative Considerations

Challenges and Opportunities:

- 1) Aging infrastructure needs to be maintained and repaired to be inviting and encourage the public to care for it properly.
- 2) Public use, though highly desirable, can result in abuse such as littering, all-terrain vehicle trespass, vegetation damage, vandalism, etc.
- 3) Consider acquisition of land, when available.

Management Objective 1: Reduce the impact of detrimental public use on the area.

Strategy 1: Maintain good communication with neighbors and local staff to ensure that restricted activities are noted and necessary steps are taken to remedy and eliminate them. (Wildlife)

Strategy 2: Monitor the area's unique natural communities (e.g., the chert conglomerate cliff) to ensure they are not damaged by unauthorized public use. (Wildlife)

Lands Proposed for Acquisition:

When available, adjacent land may be considered for acquisition from willing sellers. Tracts that improve area access, provide public use opportunities, contain

unique natural communities and/or species of conservation concern, or meet other Department priorities as identified in the annual Department land acquisition priorities may be considered.

MANAGEMENT TIMETABLE

All strategies for this management plan are considered ongoing.

APPENDICES

Area Background:

Earthquake Hollow Conservation Area is in Callaway County, southeast of Highway 54 and New Bloomfield off County Road 452. This 87-acre area features narrow wooded ridges near the tributary of Town Creek.

The area contains examples of a unique chert conglomerate cliff community. These unusual outcrops feature rounded weathered pieces of chert that provide habitat for a diversity of plants. In addition, the deep, mesic ravines support a showy spring wildflower mix. Because of its unique geological and botanical qualities, Earthquake Hollow Conservation Area has long been a favorite site for plant groups and nature enthusiasts.

Long-term management efforts include maintaining or improving glades and woodlands that will increase the diversity of prairie plants. Natural resource management practices designed to improve wildlife habitat, maintain watershed quality, restore natural communities, and enhance tree growth and species composition are often implemented on the area. Wildlife habitat management practices include the creation of shallow water developments that will provide habitat for reptiles and amphibians, and woodland thinning followed by prescribed burning to open up the woodland canopy. Timber thinning, which results in forage and cover for wildlife, is also an important element in habitat management.

The area is popular with deer and turkey hunters as well as native plant enthusiasts. The unique geologic formations exposed on the area are best seen in the fall through the spring.

Current Land and Water Types:

Land/Water Type	Acres	Miles	% of Area
Woodland	35		40
Forest	24		28
Old Field	19		22
Glade	9		10
Ephemeral Wetlands	<1		<1
Total	87		100
Stream Frontage		0.3	

Public Input Summary:

The draft Earthquake Hollow Conservation Area Management Plan was available for a public comment period October 1–31, 2016. The Missouri Department of Conservation received comments from two respondents (Appendix A). The Earthquake Hollow Conservation Area Planning Team carefully reviewed and considered these ideas as they finalized this document. A

brief summary of public input themes, including how they were incorporated or why they were not, can be found below. Rather than respond to each individual comment, comments are grouped into general themes and are addressed collectively.

Department responses to themes and issues identified through the Earthquake Hollow Conservation Area Management Plan public comment period.

Suggests adding a hiking trail to Earthquake Hollow CA.

There is a minimal maintenance trail that travels from the parking lot through the old-field and to the edge of the forest. The steep topography and sensitive natural features limit additional trail development on the area.

Suggests adding a fence to Earthquake Hollow CA to prevent trespassing onto neighboring property.

Fencing and signage is maintained along the boundary where the most significant trespass issues occur.

Suggests adding trashcans.

Due to the limited availability of staff and the problems associated with remote trash cans, the area will remain under the “pack it in; pack it out” philosophy. If area users notice litter, they are encouraged to remove it or report it to area staff. Ongoing violations should be reported to local law enforcement.

Suggests acquiring additional land when available.

The Department is always willing to consider land offers from willing sellers.

References:

Johnson, T. R. (1994). *Amphibian and reptile management on Conservation Department impoundments*. Jefferson City, MO: Missouri Department of Conservation.

Johnson, T. R. (1997). *The amphibians and reptiles of Missouri*. Jefferson City, MO: Missouri Department of Conservation.

Johnson, T. R. (1998). *Amphibian and reptile management guidelines*. Jefferson City, MO: Missouri Department of Conservation.

Nigh, T. A., & Schroeder, W. A. (2002). *Atlas of Missouri ecoregions*. Jefferson City, MO: Missouri Department of Conservation.

Maps:

Figure 1: Area Map

Figure 2: Ecological Landtypes

Figure 3: Current Covertypes

Figure 4: Aquatic Resources

Figure 5: Area Infrastructure

Additional Appendices:

Appendix A. Earthquake Hollow Conservation Area Public Comments

Figure 1: Area Map

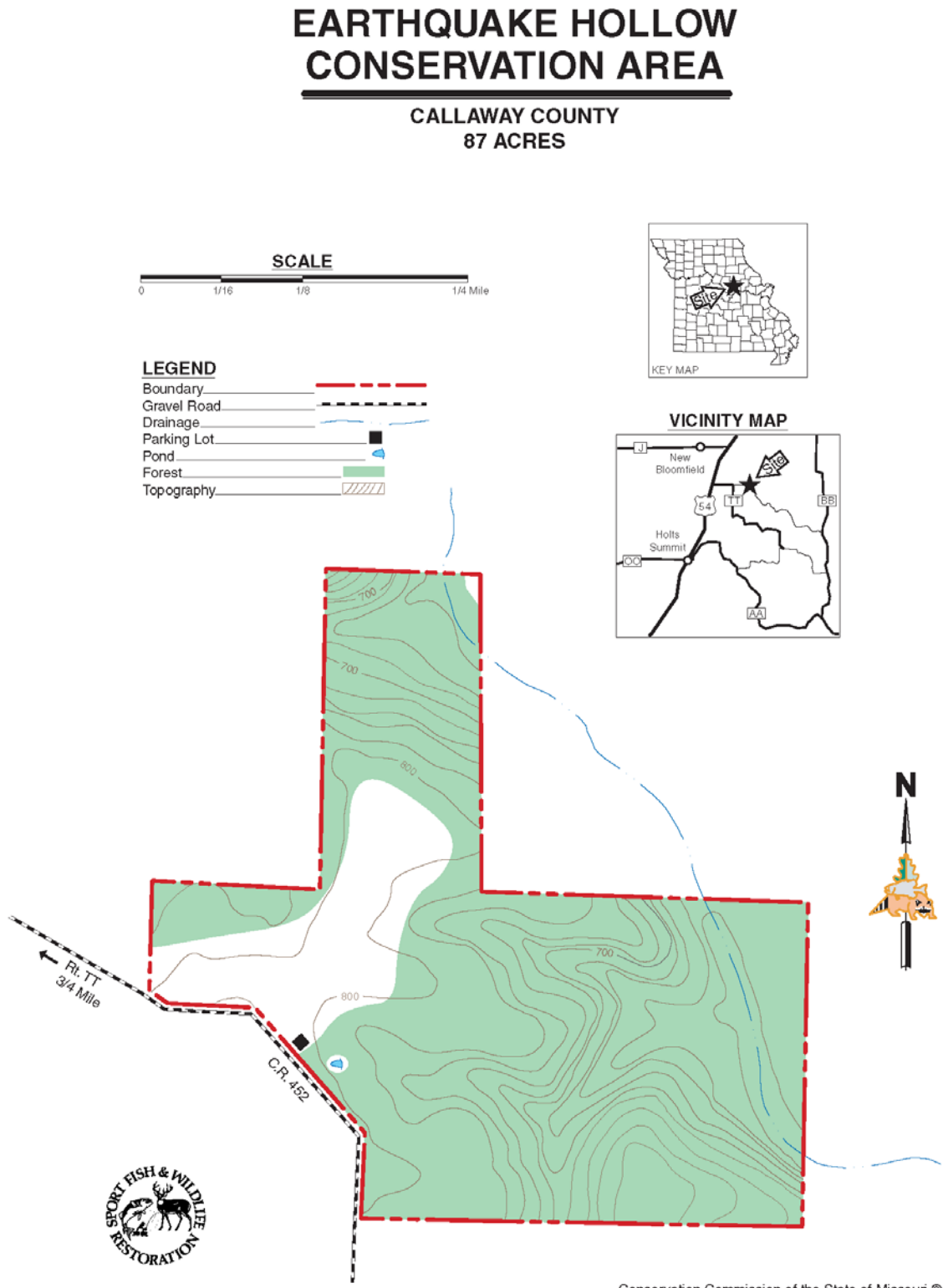


Figure 2: Ecological Landtypes

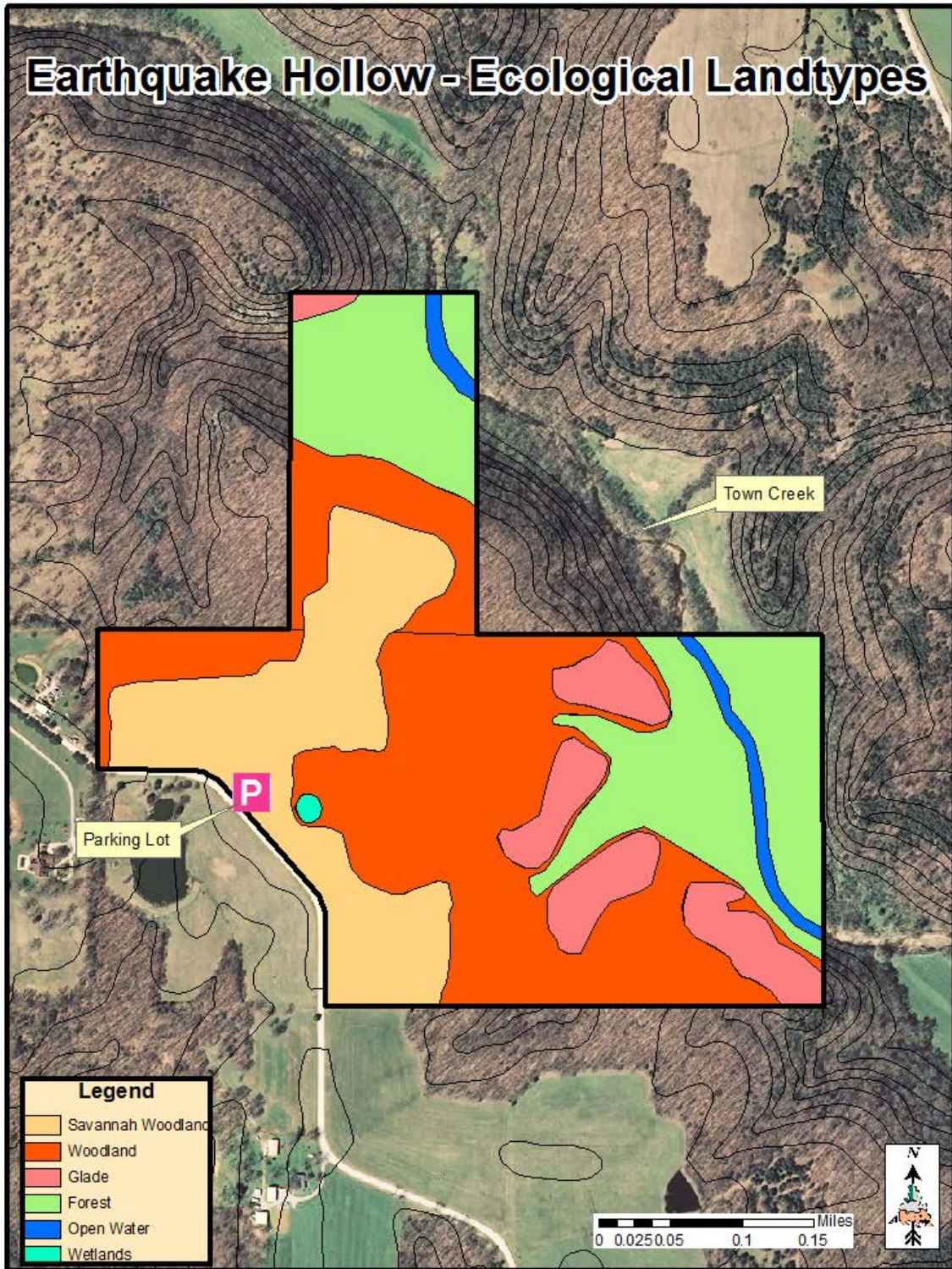


Figure 3: Current Covertypes

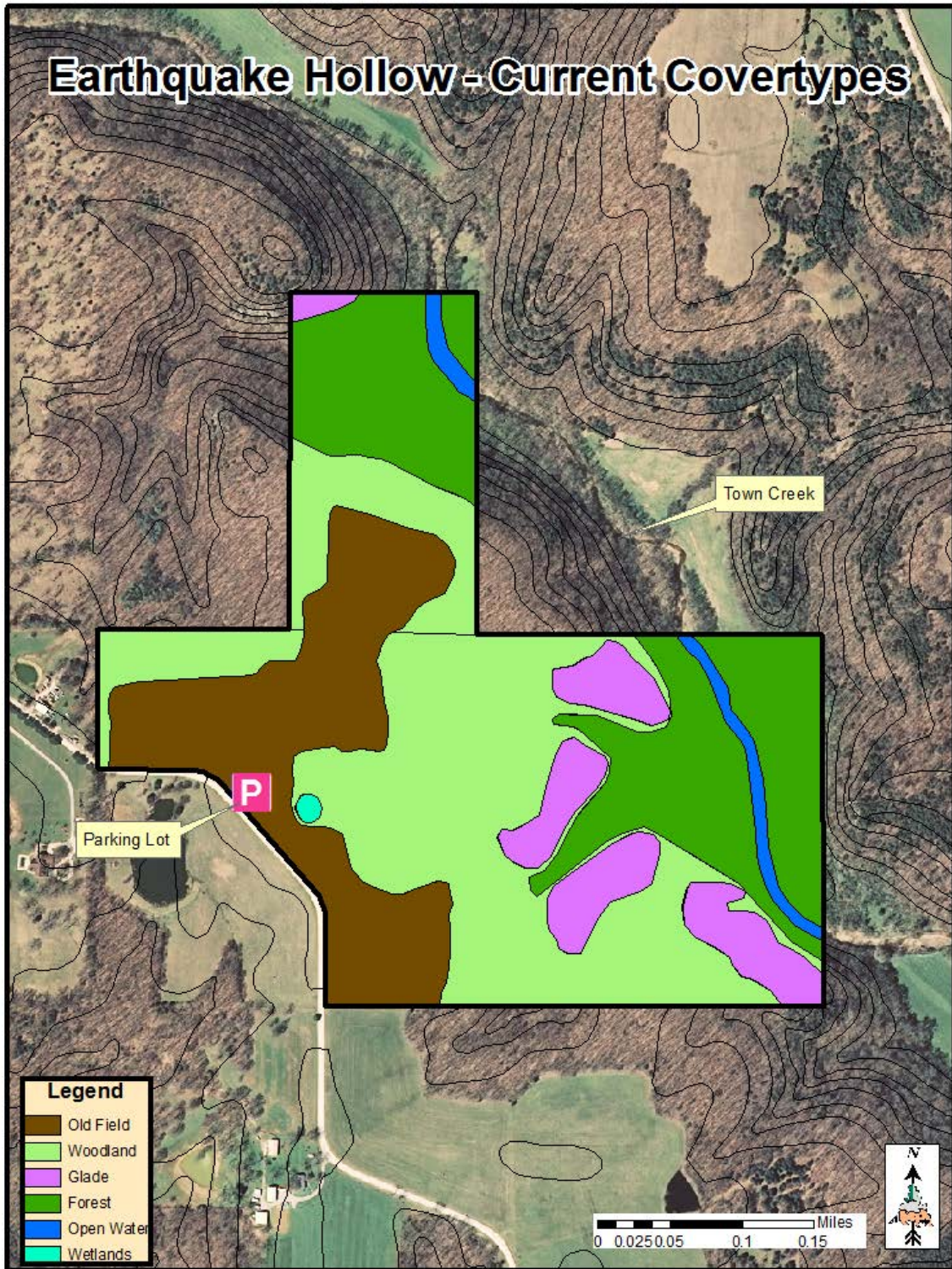
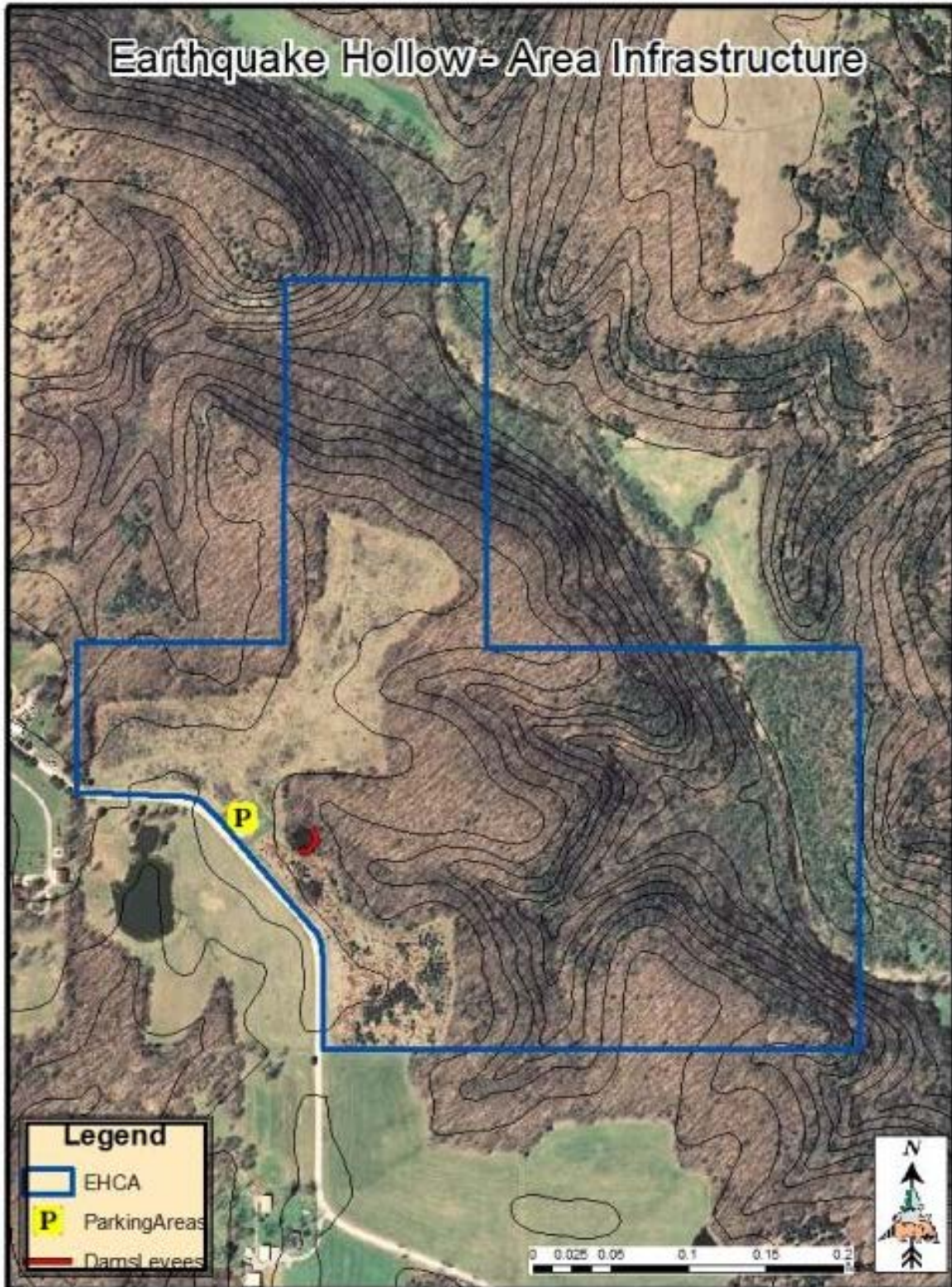


Figure 4: Aquatic Resources



Figure 5: Area Infrastructure



Appendix A. Earthquake Hollow Conservation Area Management Plan Public Comments

Received during public comment period (October 1-31, 2016):

every area needs at least one trail. It appears this area has none. By making the area more inviting to hikers it will increase a public presence there by helping to eliminate abuse of the area. Therefore add at least one trail.

Fencing to help prevent the public from trespassing on the privately owner rock formations is a good idea. I also support the idea of more information at the CA as well as more activities for the public. The area may also benefit from trash cans.

Lastly, when/if it comes available, land acquisition would be great.

Keep up the good work!