DRAFT
Fountain Grove Conservation Area

Ten-Year Area Management Plan

FY 2019-2028

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OVERVIEW

- **Official Area Name:** Fountain Grove Conservation Area, #4601
- **Year of Initial Acquisition:** 1946
- **Acreage:** 7,959 acres
- **County:** Linn, Livingston
- **Region:** Northwest
- **Division with Administrative Responsibility:** Wildlife
- **Division with Maintenance Responsibility:** Wildlife
- **Statements of Purpose:**
  - **A. Strategic Direction**
    Protect, restore, and manage fish, forest, and wildlife habitats, particularly wetlands and their associated plants and animals, emphasizing biodiversity and ecosystem integrity, while providing high-quality public use opportunities for hunting, fishing, and wildlife viewing.
  - **B. Desired Future Condition**
    The desired future condition of Fountain Grove Conservation Area (CA) is ecologically healthy wetlands, forests, woodlands, grasslands, old fields, and riparian habitats.
  - **C. Federal Aid Statement**
    - Fountain Grove CA, or a portion thereof, was developed with North American Wetlands Conservation Act funds to conserve and restore wetland habitats.
    - Fountain Grove CA, or a portion thereof, was acquired with Pittman-Robertson Wildlife Restoration funds to restore and manage wildlife, conserve and restore suitable wildlife habitat, and provide public access for hunting or other wildlife-oriented recreation.
    - The South Side Wetland Complex was developed (before the Missouri Department of Conservation [MDC] purchased it) with Wetland Reserve Program funds to provide wetland habitat through a perpetual easement.

GENERAL INFORMATION AND CONDITIONS

I. <u>Special Considerations</u>

A. Priority Areas: Locust Creek Stream Reach Conservation Opportunity Area, Lower Grand River Grassland Prairie Savanna Conservation Opportunity Area, Lower Grand River Wetland Conservation Opportunity Area, Locust/Yellow Creek Fisheries Priority Watershed

B. Natural Areas: None

C. High Quality Natural Communities: Yes, records kept with MDC natural history biologist.

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:

- This area lies within the Lower Grand River Lowland Prairie Plains, the Missouri-Grand River Alluvial Plain and Grand River Alluvial Plains Landtype Associations, with a small portion lying within the Shoal Creek Prairie/Woodland Scarped Plain Landtype Association (Nigh & Schroeder, 2002). According to the *Atlas of Missouri Ecoregions* (Nigh & Schroeder, 2002):

  > The Lower Grand River Lowland Prairie Plains historically consisted of very gently rolling upland and lowland prairie. Oak savannas and woodlands graded to forest in lower protected areas while bottomlands consisted primarily of marshes, savannas, and shrub swamps. Soils are deep, but poorly drained.
  >
  > The Missouri-Grand River Alluvial Plain consists of moderately broad alluvial plains subject to frequent flooding. The plain contains numerous oxbow and remnant channels. Historically this landtype was dominated by wet prairie with the rest containing bottomland forest and marsh.
  >
  > The Grand River Alluvial Plains historically was a mosaic of marshes, wet prairies, and bottomland forest. The Grand River and its tributaries meander tightly throughout this landtype, which is characterized by deep soils formed in silty and clay alluvium. Channelization has created wetlands out of scattered oxbow lakes and old channels.
  >
  > A portion of Fountain Grove CA lies within the Shoal Creek Prairie/Woodland Scarped Plain, which is historically known for its prairies on broad flat uplands with oak woodlands and forest with some wetlands and bottomland forest.

- This area has been designated by Audubon Missouri as an Important Bird Area. Important Bird Areas are sites that have been identified by Audubon as those that

are the most crucial for bird populations, due to the abundance and/or diversity of birds present. Furthermore, this area has been recognized as part of the Great Missouri Birding Trail.

III. Existing Infrastructure

West Side Wetland Complex and associated uplands:

- Headquarters: Office/Draw Room building, shop, pole barn, Ducks Unlimited monument
- Other Buildings: Research house, two sheds, and two barns
- 26 waterfowl hunting blinds (one is Americans with Disabilities Act [ADA] accessible)
- 18 wetland pools (total of 2,574 acres) with associated water-control structures, one pump station, roads, and levees
- 21 parking lots
- Four gravel boat launches
- Jo Shelby Lake concrete boat ramp
- Jo Shelby Lake (30-acre fishing lake)
- 10 fishing ponds (total of 36 acres)
- 10 primitive camping areas
- Five privies (four are ADA-accessible, privy on west side of Jo Shelby Lake is not ADA-accessible)
- One 2.4-mile riparian hiking trail (including one footbridge)
- One boardwalk
- One memorial for Ted Shanks

East Side Wetland Complex:

- One barn
- 12 wetland pools (total of 942 acres) with associated water-control structures, one pump station, roads, and levees
- 10 parking lots
- Che-Ru Lake concrete boat ramp
- One privy (ADA-accessible)
- Che-Ru Lake (160-acre fishing lake)
- Che-Ru Lake dock (ADA-accessible)
- One wildlife viewing blind

South Side Wetland Complex:

- Six wetland pools (total of 400 acres) with six associated water-control structures, roads, and levees

IV. Area Restrictions or Limitations

A. Deed Restrictions or Ownership Considerations: South Side Wetland Complex: Management on the Wetland Reserve Program easement must follow a Memorandum of Understanding with the Natural Resources Conservation Service (NRCS).

B. Federal Interest:

- This land must be used to conserve and restore wetlands. The federal funds made available under the North American Wetlands Conservation Act may be not used for fish and wildlife mitigation purposes under the Fish and Wildlife Coordination Act or the Water Resources Development Act of 1986. Federal funds may also 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.
- Uses of land acquired with federal funds (Pittman-Robertson Wildlife Restoration funds) may not interfere with the purpose for which it was acquired. Federal funds may also 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.
- The wetland conservation easements permanently prohibit use of the affected land as cropland and require permanent maintenance of the wetland conditions, except in the case of natural disaster. After the easement has been perfected, no change will be made in the easement without a written request by the participant and the written consent of the NRCS Chief. Federal funds may also 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: Several electrical, waterline and telephone easements exist on the area.

D. Cultural Resources Findings: Yes, records kept with MDC environmental compliance coordinators. Managers should follow best management practices for cultural resources found in the MDC Resource Policy Manual.

E. Endangered Species: Endangered species are known from this area. Area managers should consult the Natural Heritage Database annually and review all management activities with the natural history biologist.

F. Boundary Issues: None

MANAGEMENT CONSIDERATIONS

V. Terrestrial Resource Management Considerations

Manage floodplain habitats and restore additional habitat that supports a diversity of game and non-game species for the benefit of public use, where possible.

Challenges and Opportunities:

1) High-quality waterfowl habitat and adequate waterfowl refuge is needed to support abundant waterfowl populations during spring and fall migrations.
2) Wetland pools and the adjoining upland habitats provide a large wetland complex and habitat for a broad suite of wetland-dependent species throughout the year.
3) The area contains some of the best examples of wetlands occurring in the Lower Grand Basin. Alterations, such as stream channelization and upstream and downstream impoundments have affected flood frequency, depth, duration, and base flows, making wetland management more challenging. Past wetland developments and repairs have partially restored stream-floodplain connectivity.
4) Sedimentation within the basin continues to be a significant issue. Future developments and infrastructure designs should capitalize on opportunities to export sediment through the floodplain on Fountain Grove CA to maintain long-term viability of wetland habitats.
5) Invasive species, particularly sericea lespedeza, reed canary grass, *Sesbania*, perennial smartweed, garlic mustard, and Johnson grass are present on the area.
6) Maintain forest health while maintaining and improving forested wildlife habitat.
7) Flooding history and altered hydrology causing extensive die-off of bottomland oak species. Oak regeneration occurs on select sites; however, little to no advance regeneration has been identified due to frequent flooding and repeated saturation of the root zone during the growing season.
8) Some infrastructure is inadequate or needs repair. Many structures located on east side wetland complex are over 25 years of age and need replacement. Furthermore, previous wetland pool designs provide restrictions on independent water delivery and drainage, which is slowly compromising habitat diversity and productivity. Additional drainage and water delivery structures would provide improved long-term area productivity and longevity.

Management Objective 1: Manage wetland pools primarily as moist-soil units.

Strategy 1: Manage pools using a variety of moist-soil management techniques, including but not limited to mowing, spraying, and disking. Manage water in spring and fall to promote native annual plants that are shallowly flooded and to provide interspersed open-water areas. (Wildlife)

Strategy 2: Plant small- and large-grain crops on suitable sites to manage succession and provide high-energy food for wildlife. (Wildlife)

Strategy 3: Continue to provide high-quality inviolate refuge to support seasonal concentrations of waterfowl. Refuge pools will serve as resting and foraging areas to help waterfowl build fat reserves and improve body condition. (Wildlife)

Strategy 4: Manage water on site suitable areas in late summer and spring to provide areas of shallowly flooded habitat, interspersed with mudflats to serve as forage and loafing areas for dabbling ducks and shorebirds. (Wildlife)

Management Objective 2: Manage site suitable wetland units to promote diverse wetland communities, including moist-soil interspersed with open-water, emergent marsh, shrub swamp, and forested wetlands, to provide for a broad range of wetland-dependent species.

Strategy 1: Use a variety of management techniques, strategically timed throughout the year to promote moist-soil, emergent marsh, and shrub swamp habitat for a broad range of wetland species. (Wildlife)

Management Objective 3: Improve floodplain function and wetland resiliency.

Strategy 1: As aging or failing infrastructures are replaced and as funding permits, use the latest wetland renovation technologies, for instance, Light Detection and Ranging (LiDAR), soils data, and a stream-floodplain system approach also known as hydrogeomorphic-based evaluation. Conduct renovations in accordance with the *Wetland Planning Initiative Strategic Guidance Document* (MDC, 2015). (Wildlife)

Management Objective 4: On appropriate sites, manage forest and woodland communities to provide healthy and diverse habitats for forest/woodland-dependent wildlife.

Strategy 1: Utilize a variety of sustainable forest management techniques to promote healthy forest and woodland communities, including, but not limited to, timber harvesting, timber stand improvement, firewood cutting, salvage cuttings, tree planting, seeding, and prescribed burning. (Wildlife, Forestry)

Strategy 2: Maintain a diversity of timber age classes that will provide both a diversity of wildlife habitat as well as resiliency to biotic and abiotic damaging agents. (Forestry)

Strategy 3: Monitor forest for insect and disease outbreaks and respond accordingly. (Forestry)
Strategy 4: Utilize best management practices during forest management per the *Missouri Forest Management Guidelines: Voluntary Recommendations for Well-Managed Forests* (MDC, 2014a) and the *Missouri Watershed Protection Practice Manual* (MDC, 2014b) (Wildlife, Forestry)
Strategy 5: Utilize available LiDAR data to determine acceptable higher elevation areas suitable for tree planting and other forest management activities. (Forestry)

Management Objective 5: Restore wet bottomland prairie natural communities, where practical.

Strategy 1: Reconstruct wet bottomland prairie using native wet prairie seed on suitable areas when funding becomes available. (Wildlife)

Management Objective 6: Control invasive species.

Strategy 1: Monitor invasive species. Spot-treat, broadcast, or aerial spray invasive species, including but not limited to sericea lespedeza, reed canary grass, perennial smartweed, *Sesbania*, and Johnson grass. Natural communities, wetlands, and restored grasslands are prioritized for treatments. (Wildlife)

VI. Aquatic Resource Management Considerations

Challenges and Opportunities:

1) Landscape-scale alterations in the Upper Grand Basin have changed the hydrology and habitat conditions instream and across the floodplain, threatening water quality, streambank stability, and biodiversity on the area.
2) Missouri species of conservation concern occur in the Grand River and its tributaries.
3) Streams ranging in size, from first to eighth order, are present throughout the area.

Management Objective 1: Manage the area's streams and adjacent floodplain for a diversity of aquatic species, consistent with other management objectives.

Strategy 1: At first-order streams, maintain forested riparian corridors of at least 50 feet in width, per MDC's stream management guidelines (MDC, 2009a). At second- to fourth-order streams (based on topographic map blue-line streams), maintain forested corridors of at least 100 feet in width. At sixth-order and larger streams, maintain forested corridors of at least 300 feet in width. (Wildlife)
Strategy 2: Maintain water in borrow areas on portions of suitable wetland units, until June 15 of each year, to benefit fish spawning and nurseries, when consistent with wetland management objectives. (Wildlife)

Strategy 3: Retain spring and summer floodwater in borrow areas and across low floodplain areas on portions of suitable wetland units to benefit fish spawning and nurseries throughout the year, when consistent with wetland management objectives. (Wildlife)
Strategy 4: As old infrastructure is replaced, design new infrastructure to minimize seasonal mortality of native fish species in developed wetlands. (Wildlife, Design and Development)
Strategy 5: Continue to manage riparian areas for streambank stability to promote quality in-stream habitats for fish and other aquatic organisms, in accordance with MDC's stream management guidelines (MDC, 2009a). (Wildlife)
Strategy 6: Monitor gully erosion every five years. Work with USDA NRCS staff to implement appropriate practices where erosion is severe. (Wildlife, Fisheries)

Management Objective 2: Minimize impacts from wetland pumping to instream aquatic resources while balancing the needs of floodplain habitat and associated wetland resources.

Strategy 1: Limit pumping activities on West Side Wetland Complex, as needed, during periods of low flow on the Grand River, per the recommendations of an interdisciplinary team, as per the *Wetland Planning Initiative Strategic Guidance* document (MDC, 2015). (Wildlife, Fisheries, Resource Science)
Strategy 2: Begin construction in FY19 to replace diesel powered turbine pump station with electric, variable-flow pumps to maximize flexibility with pumping volume. (Wildlife, Design and Development)

Management Objective 3: Manage fishing ponds and lakes.

Strategy 1: Monitor fish communities in fishing basins, as needed. Sample Che-Ru and Jo Shelby once every three years. (Fisheries)
Strategy 2: Sample area ponds every five years. (Fisheries)
Strategy 3: Periodically stock supplemental channel catfish. Stock channel catfish in Jo Shelby and Che-Ru every other year. (Fisheries)
Strategy 4: Stock area ponds every five years. (Fisheries)
Strategy 5: Monitor and manage vegetation in fishing ponds. (Fisheries)
Strategy 6: Evaluate non-fishing ponds and consider potential as amphibian ponds. (Fisheries)

VII. Public Use Management Considerations

Challenges and Opportunities:

1) The waterfowl hunting program on Fountain Grove CA provides excellent opportunity on a large scale, while balancing hunter preferences for a range of hunting styles.
2) Deer hunting opportunities are extensive on the area. Area user conflicts arise due to access limitations, hunting pressure, differences in preferred hunting methods, and road or zone closures.
3) River access for public fishing is limited on the area. Other fishing opportunities exist including, a 30-acre lake, a 160-acre reservoir, and 10 other ponds and lakes.
4) Access is somewhat limited on portions of the area, particularly on the newly acquired southside wetland complex. Maintenance of existing parking lots is a priority to provide opportunities for hunting, fishing, and nature viewing.
5) Work to build positive relationships with stakeholders (such as neighboring landowners and duck clubs) by providing timely assistance if private access or public use issues develop.
6) The area's size, habitat diversity, and existing infrastructure provide good potential for educational and interpretive opportunities.
7) Camping is a popular activity on the area. Area user conflicts occasionally arise due to limited space, abuse of regulations, or zone closures.

Management Objective 1: Provide a range of waterfowl hunting opportunities to meet the needs and preferences of waterfowl hunters.

Strategy 1: Support the continuation of the managed hunt program for the waterfowl-hunting-only pools in the East and West Side Wetland Complexes. (Wildlife)

Strategy 2: Determine the appropriate number of hunting positions allocated daily by considering draw pool configurations and arrangements, Waterfowl Hunt Program guidelines (approximately 40 acres per party), and hunter expectations for a quality hunting experience. (Wildlife)

Strategy 3: Provide at least one ADA-accessible waterfowl hunting blind, when conditions allow. (Wildlife)

Management Objective 2: Provide abundant deer hunting opportunities.

Strategy 1: Promote deer hunting to maximize hunting opportunities, consistent with other resource and public use objectives. (Wildlife)

Management Objective 3: Provide stream-based recreational opportunities.

Strategy 1: Maintain bank-fishing access points and parking lots on the Grand River. (Wildlife)

Management Objective 4: Provide wildlife viewing and parking areas that are informative and inviting to the public.

Strategy 1: Maintain the Auto Tour to provide a variety of wildlife viewing opportunities. (Wildlife)
Strategy 2: Maintain signage in accordance with MDC policy. (Wildlife)
Strategy 3: Maintain all current parking lots to be inviting to the public. (Wildlife)

Management Objective 5: Foster positive relationships with neighboring landowners.

Strategy 1: Work with neighbors to prevent or resolve any ingress or egress issues, and boundary or trespass issues. (Wildlife, Private Land Services and Protection)

Management Objective 6: Improve educational and interpretive opportunities.

Strategy 1: Taxidermy mounts of water birds in the public meeting room (draw room), as specimens are made available and as funding permits. (Wildlife)
Strategy 2: Repair/renovate the wetland boardwalk when funding becomes available, in the Wildlife Viewing Area located on Alton Road to ensure a safe and inviting wildlife viewing opportunity. (Design and Development)
Strategy 3: Update maps and information on the MDC website to inform the public of area opportunities. (Wildlife)
Strategy 4: Communicate the area's educational programs to teachers and other youth leaders, as opportunities arise. (Outreach and Education)

Management Objective 7: Provide camping opportunities for the public.

Strategy 1: Maintain existing level of camping opportunities for the public. (Wildlife)

Management Objective 8: Enforce area regulations.

Strategy 1: Regularly patrol and enforce the *Wildlife Code of Missouri*, with emphasis on vandalism, littering, and response to public complaints. (Protection, Wildlife)

VIII. Administrative Considerations

Challenges and Opportunities:

1) Maintain and clearly demarcate area boundary lines.

2) Evaluate land offered as additions to the area.

Management Objective 1: Clearly identify area boundaries.

Strategy 1: Submit a boundary survey request for boundary segments that have no fence or delineation and have never been surveyed. (Wildlife)
Strategy 2: Maintain clearly identified property lines by inspecting and marking on a regular cycle. (Wildlife)

Lands Proposed for Acquisition:

When available, adjacent land may be considered for acquisition from willing sellers. Tracts that eliminated inholdings, improve area access, provide public use opportunities, contain unique natural communities and/or species of conservation concern, or meet other MDC priorities, as identified in the annual MDC land acquisition priorities, may be considered.

MANAGEMENT TIMETABLE

Strategies are considered ongoing unless listed in the following table:

	FY19	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Aquatic Resource Considerations										
Objective 1										
Strategy 6					X					X
Objective 2										
Strategy 2	X									
Objective 3										
Strategy 1			X			X			X	
Strategy 2					X					X
Strategy 3		X		X		X		X		X
Strategy 4					X					X
Strategy 6			X							

APPENDICES

Area Background:
Fountain Grove CA is in Linn and Livingston counties, approximately 5 miles south of Highway 36 on Route W. Fountain Grove CA includes 7,959 acres of wetlands, forest, woodland, old fields, grasslands, open land, streams, ponds, and lakes.

The initial purchase was 3,433 acres in 1947-1948, using Pittman-Robertson Wildlife Restoration funds to provide habitat for migratory waterfowl and duck hunting opportunities for the public. Since the initial purchase, there have been three additions to Fountain Grove CA. From 1948-1975, 2,405 acres were purchased using general MDC revenue (license sales) to enhance wetland habitats and to provide opportunity for management of Canada geese migrating from west of Hudson Bay known as the Eastern Prairie Population. From 1978-1992, 1,315 acres were purchased using general revenue (including Design and Conservation sales tax) to carry out planned wetland development on Fountain Grove CA's East Side and acquire key inholdings to enhance additional Eastern Prairie Population Canada goose management. In 2015, 752 acres were purchased using general MDC revenue for additional floodplain expansion and wetland and upland species management.

Fountain Grove CA was the first waterfowl area developed by MDC in 1947-1948. The initial purchase of 3,433 was to provide habitat for migrating waterfowl and duck hunting opportunities for the public. During this period, 2,000 acres of the initial land purchase were developed into three wetland pools. These three wetland pools were filled by rainfall until 1960 when a diesel-powered pump was installed on the Grand River to provide a reliable water supply for wetland management.

In 1963, wetland objectives were shifted from duck management to Canada goose management. This shift in focus was due to a declining duck population throughout the flyway and the establishment of a major wintering population of Eastern Prairie Population Canada geese on Fountain Grove CA and Swan Lake National Wildlife Refuge. The primary goal during this time was to provide Canada goose habitat.

During 1962-1976, Fountain Grove CA emphasized land acquisition and intensifying the permittee farming program to meet the Canada goose food requirements associated with the growing goose population. At the end of 1976, Fountain Grove CA was 6,200 acres.

In 1983, Fountain Grove CA was the first wildlife area to develop an area plan. The plan established a broader and multi-disciplined management style that focused on the importance of wetland diversity. During this time, Fountain Grove CA was reclassified as a wetland area, instead of a waterfowl area. The management emphasis was to identify and provide quality

wetland habitat for migratory and resident wildlife resources as well as providing wetland recreational opportunities to the public. During this time, Canada goose management objectives were maintained, and wetland development priorities were made, such as the East Side (Locust Creek) development to provide an additional 1,100 acres of wetland units, West Side (Parson Creek) development to provide an additional 570 acres of wetland units, and improvements in the existing wetlands (Grand River) to increase management capabilities of nearly 2,100 acres.

From 1984-1988 there was a dramatic change in Canada goose distribution and composition on Fountain Grove CA, Swan Lake National Wildlife Refuge, and the Swan Lake zone. These changes included delayed migrations, declining numbers of Canada geese on Fountain Grove CA/Swan Lake National Wildlife Refuge, and greater winter dispersal throughout Missouri. Population composition shifted from Eastern Prairie Population Canada geese, which predominated up to this time to more Giant Canada geese (resident and migrants) and Richardson Canada geese (Tall Grass Prairie Population).

The East Side (Locust Creek) development was completed in late 1989. This added 1,300 acres of diverse, manageable wetlands and Che-Ru Lake. Che-Ru Lake's main function is to serve as a water supply to flood the wetland units in the East Side Complex. At this time, the East Side Complex consisted of eight unique wetland units that comprised of emergent marsh, moist soil, food plots, and agricultural fields. Che-Ru Lake opened for fishing in the spring of 1990.

The Flood of 1993 established a new highwater mark for Fountain Grove CA, putting 4 feet of water in the buildings and depositing a tremendous amount of silt along the periphery of wetland pools along the Grand River.

During 1997, Fountain Grove CA celebrated 50 years of wetland conservation and the dedication of the Jeff Churan Grand River-Parson Creek Wetland Complex.

Currently at Fountain Grove CA, the East Side Complex is managed for a wide range of wetland-dependent wildlife by using a variety of moist soil management techniques and planting small- and large-grain crops, where feasible. The East Side Complex has some flood protection and generally is paramount in providing predictable resources on an annual basis for many species of migratory wildlife. Management in Pools 1, 2, and 3, and the Parson Creek Complex consists of bottomland forest, moist soil, shrub-scrub and emergent marsh. These habitats provide a broad range of wetland-dependent species, including waterfowl, secretive marsh birds, shorebirds, fish, and wetland mammals.

Fountain Grove CA is a widely recognized waterfowl hunting and wildlife viewing destination. The area provides opportunity for well over 3,500 hunter-use-days, and averages approximately

1-2.5 million duck use days annually. The area also attracts numerous birders, anglers, deer hunters, turkey hunters, small game hunters, and dove hunters.

Current Land and Water Types:

Land/Water Type	Acres	% of Area	Miles
Wetland	3,791	48	
Forest	2,275	28	
Open land	540	7	
Old Field	411	5	
Impounded water	369	4	
Infrastructure	345	4	
Grassland	225	3	
Woodland	75	1	
Total	**7,959**	**100**	
Stream frontage			17.5

References:

Missouri Department of Conservation. (2009a). *Watershed and stream management guidelines for lands and waters managed by Missouri Department of Conservation*. Jefferson City, MO: Missouri Department of Conservation.

Missouri Department of Conservation. (2014a). *Missouri forest management guidelines: Voluntary recommendations for well-managed forests.* Jefferson City, MO: Conservation Commission of the State of Missouri.

Missouri Department of Conservation. (2014b). *Missouri watershed protection practice recommended practices for Missouri forests: 2014 management guidelines for maintaining forested watersheds to protect streams*. Jefferson City, MO: Conservation Commission of the State of Missouri.

Missouri Department of Conservation. (2015). *Wetland planning initiative strategic guidance*. Jefferson City, MO: Missouri Department of Conservation.

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

Maps:

Figure 1: Area Map
Figure 2: Aerial Photograph

Figure 1: Area Map

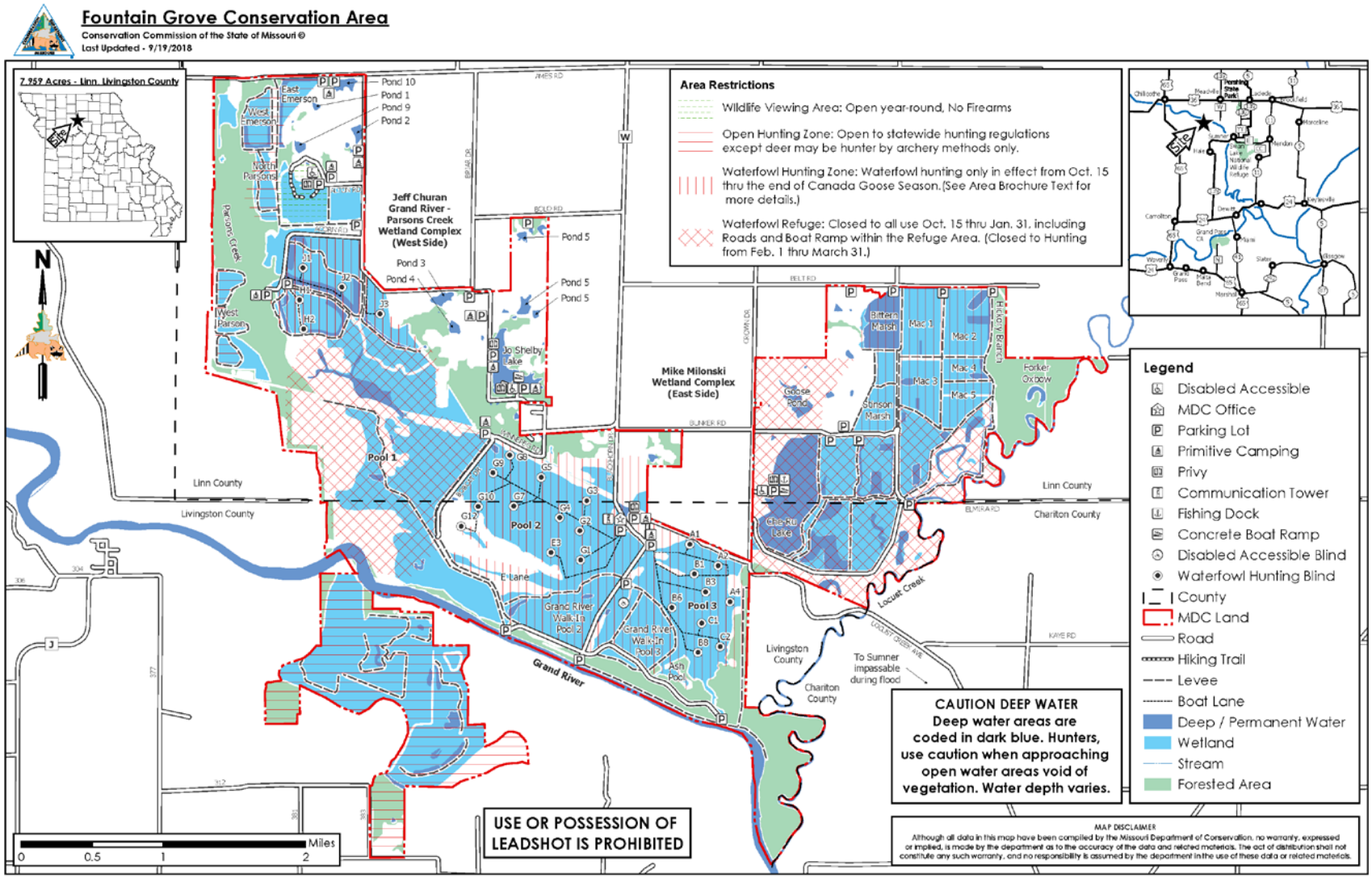


Figure 2: Aerial Photograph Map

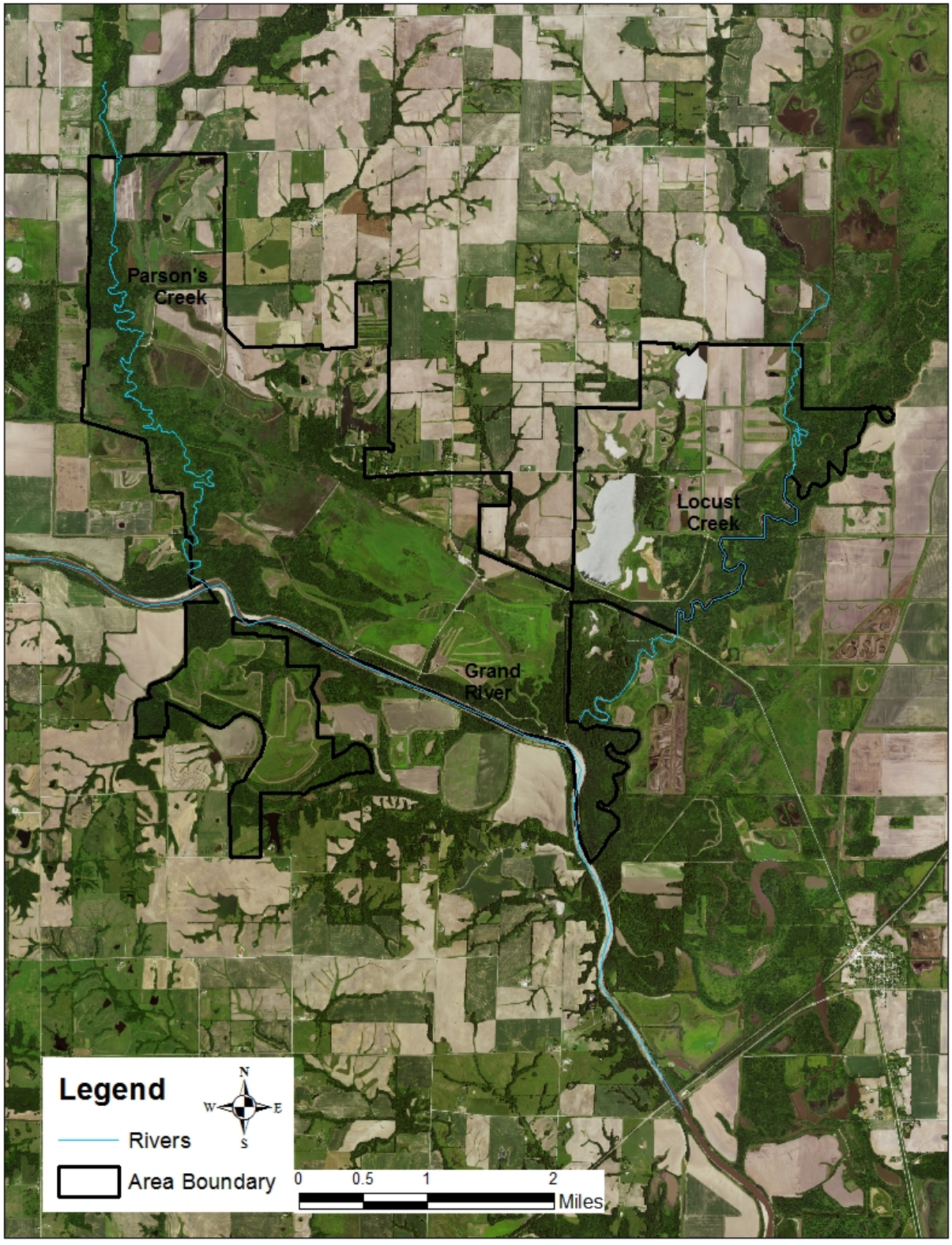


Figure 3: Land Cover Map

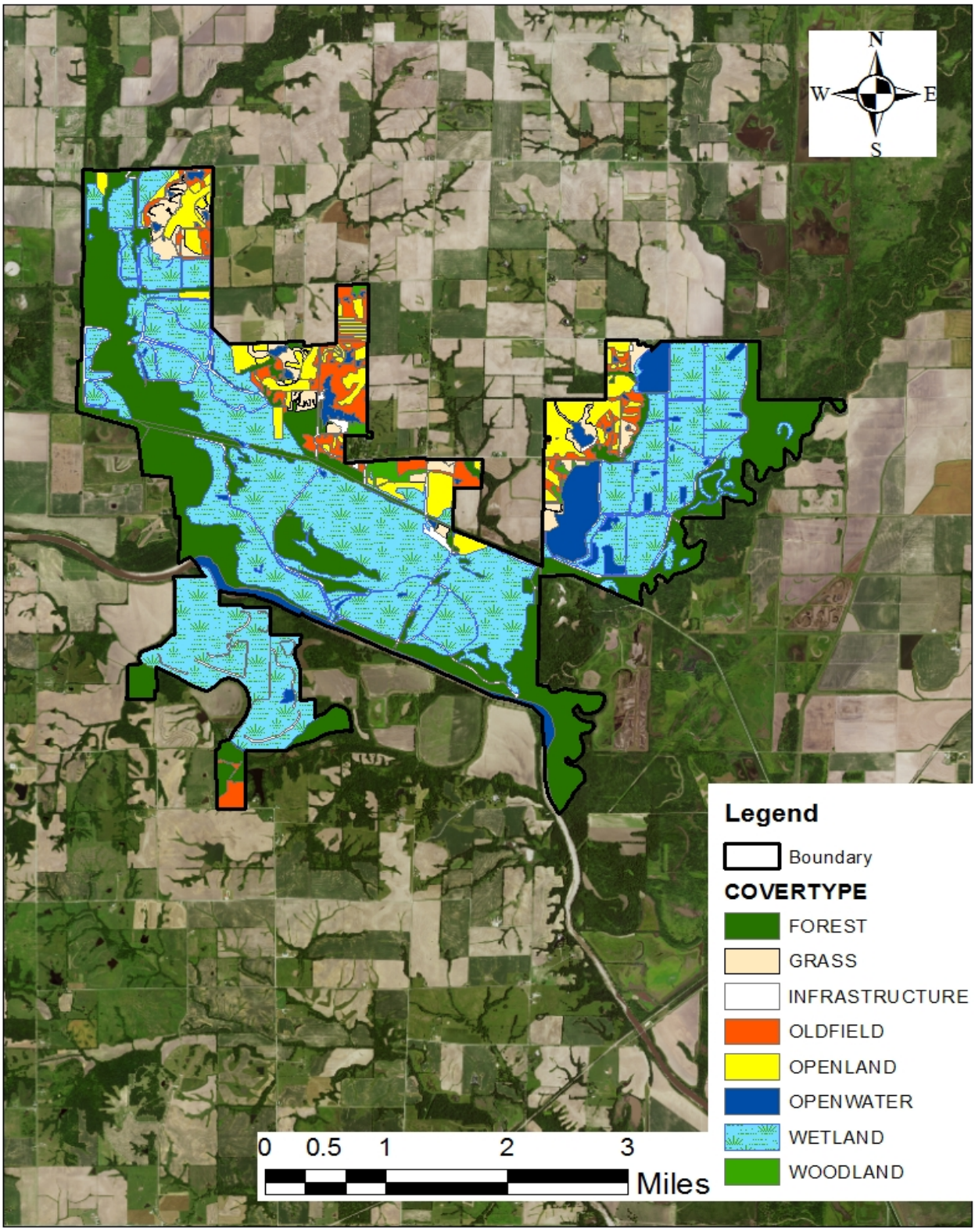


Figure 4: Forest Compartment Boundaries

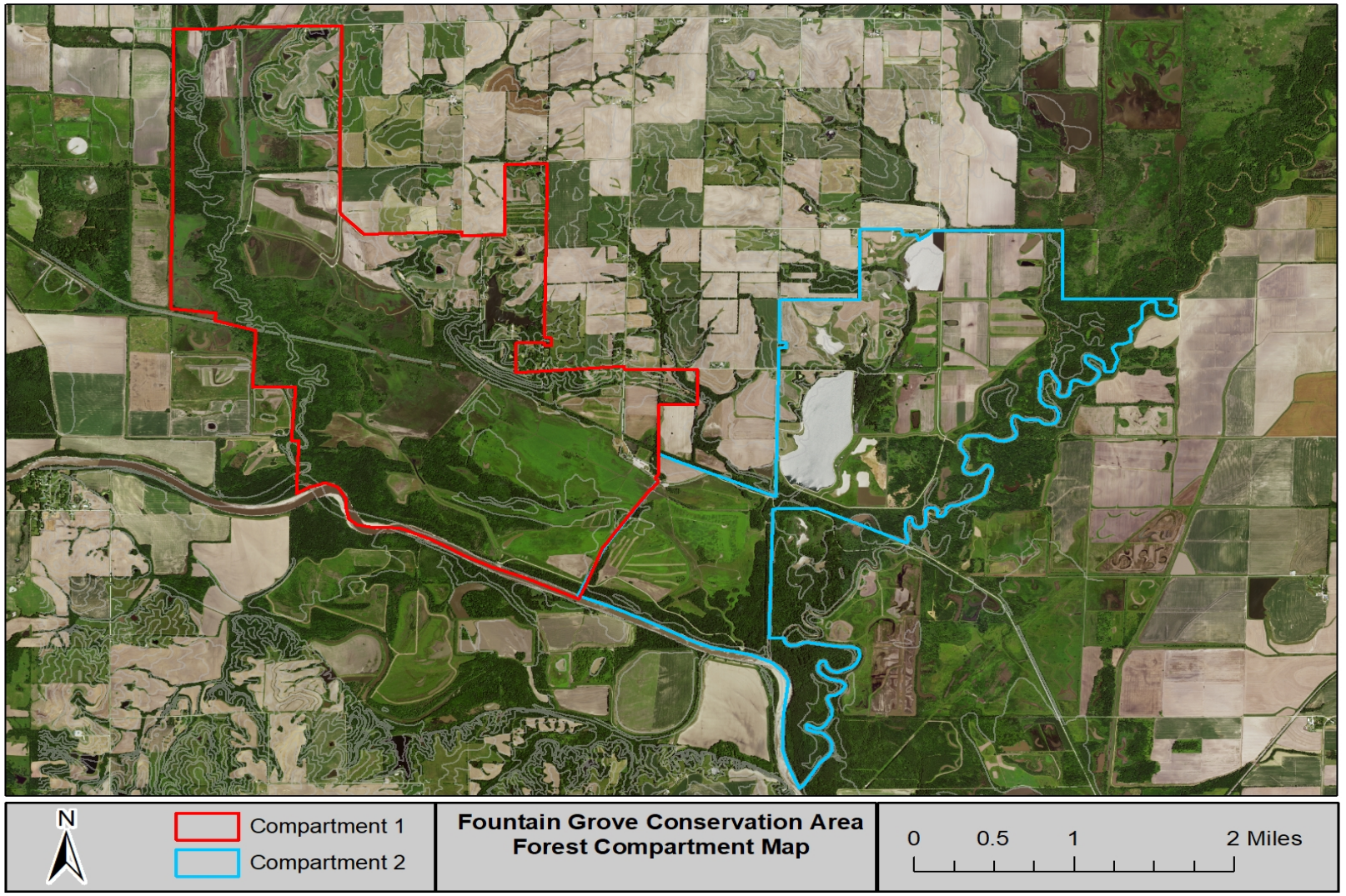
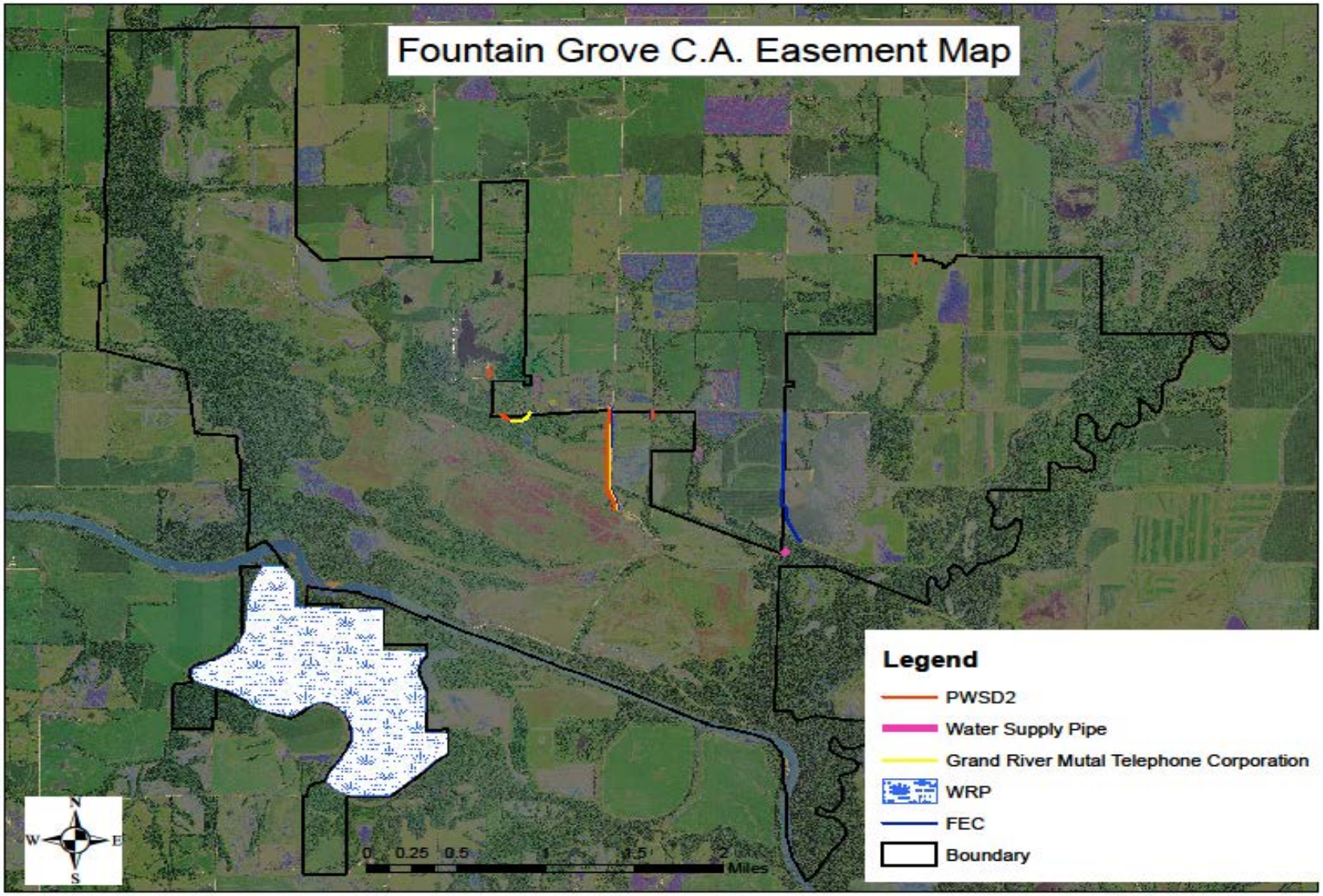


Figure 5: Easement Map



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