

Fernald Preserve, Ohio, Site Master Plan

April 2019



U.S. DEPARTMENT OF
ENERGY

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Management

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Attachments

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Abbreviations

CAWWT	Converted Advanced Wastewater Treatment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
FCA	Fernald Community Alliance
GPS	Global Positioning System
IC	Institutional Control
IRRA	Interim Residual Risk Assessment
LEED	Leadership in Environmental Engineering and Design
lidar	light detection and ranging
LM	Office of Legacy Management
LMICP	Legacy Management and Institutional Controls Plan
LMS	Legacy Management Support
µg/L	micrograms per liter
NRD	Natural Resource Damage
NRRP	Natural Resource Restoration Plan
Ohio EPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	operable unit
PFC	perfluorinated chemical
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PRCP	Paddys Run Conservation Project
RAMP	Restored Area Maintenance Plan
ROD	Record of Decision
UAS	unmanned aircraft system
USFWS	U.S. Fish and Wildlife Service

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1.0 Introduction

Since the 1990's, the Fernald Preserve, Ohio, Site has transitioned from a Cold War industrial facility to a large-scale environmental remediation project to a publicly accessible nature preserve. The U.S. Department of Energy (DOE) has worked with stakeholders, regulators, and DOE contractors to convert the Fernald Preserve from a contaminated former industrial site to a community asset. The DOE Office of Legacy Management (LM) has been responsible for the Fernald Preserve since January 2007, and LM works to ensure that continued groundwater remediation and regulatory requirements are met while at the same time providing access and educational opportunities to the public.

When planning the environmental cleanup, the DOE and regulators left final land use decision-making to stakeholders. The community used a number of resources to develop the current vision of a publicly accessible undeveloped park with an emphasis on wildlife. DOE's Office of Environmental Management (EM) developed the *Master Plan for Public Use of the Fernald Environmental Management Project* (DOE 2002), also called the 2002 Master Plan, to help define the community vision for the Fernald site. The 2002 Master Plan was one of the tools used to establish the configuration of the current Fernald Preserve. Master plans are non-regulatory planning documents that DOE uses to help define future site needs as the site, the community, and stakeholder interests evolve over time. Today, management decisions outside of regulatory requirements are guided by the following mission statement:

As a community asset, the Fernald Preserve fosters wildlife habitat and provides educational opportunities through environmental stewardship.

The site transitioned from remediation to long-term stewardship in late 2006, and the Fernald Preserve has been open to the public since August 2008. As the site has evolved over time, the greater Cincinnati region and the community around the Fernald Preserve have evolved as well. The 2002 Master was meant to be a living document, to be updated and reissued as key decisions are made regarding configuration and management of the site. Because the Fernald Preserve has been open to the public for 10 years, LM decided to create this revised Master Plan to help ensure that the Fernald Preserve continues to remain relevant in meeting the needs of the community.

1.1 Purpose and Need

The purpose of this 2019 update to the Master Plan is to help guide decisions about the future of the Fernald Preserve in coordination with the separately established regulatory requirements for environmental remedies. Requirements for site remediation and long-term stewardship were established through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). All previous decisions regarding cleanup levels, continuing groundwater remediation, and institutional controls (ICs) remain in place and are outside the scope of this 2019 Master Plan.

An emphasis of the 2019 Master Plan is to ensure that DOE is meeting post-closure responsibilities in support of the following components:

- Continued protection of human health and the environment
- Continued land use as an undeveloped park with an emphasis on wildlife

- Sustainable management and optimization of land use and assets
- Engagement with the public, government, and other interested parties

Stakeholder engagement for the 2019 Master Plan was sought via an online survey and two workshops that were conducted in summer 2018. The 2019 Master Plan includes an evaluation of local, regional, and national trends in population and land use. It also addresses stakeholder concerns and questions on how the site can better serve the community in the future. This evaluation is consistent with the below LM Strategic Plan Goals 1, 4, and 6 (DOE 2016a):

- Goal 1: Protect Human Health and the Environment
- Goal 4: Sustainably Manage and Optimize the Use of Land and Assets
- Goal 6: Engage the Public, Governments, and Interested Parties

1.2 Scope

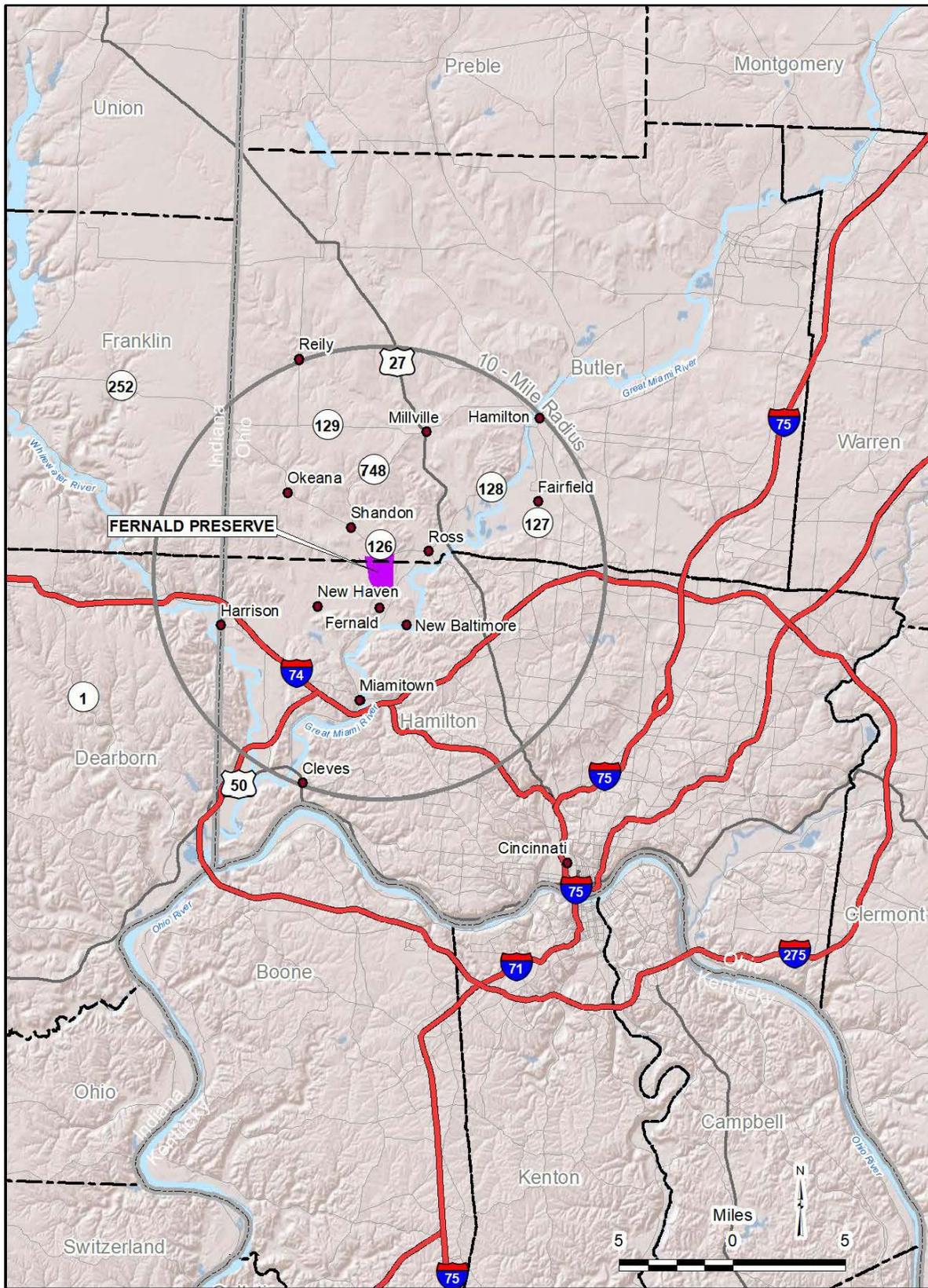
The 2019 Master Plan evaluates the Fernald Preserve from both local and regional contexts. The preserve is a 1,050-acre tract of land approximately 18 miles northwest of Cincinnati, Ohio. It is near the unincorporated communities of Ross and Shandon in Butler County and New Haven and Fernald in Hamilton County. As shown in Figure 1, the local focus area is defined as a 10-mile radius around the site. Regionally, Fernald is within a nine-county tristate area (Figure 2). The majority of the site falls within northern Hamilton County. Approximately 222 acres of the site are in Butler County.

This 2019 Master Plan looks at current conditions and future trends to evaluate how the site fits within the local community. An online survey and two public workshops were used to collect stakeholder input for the following components:

- Public amenities (the Visitors Center, hiking trails, reservable spaces)
- Interpretive services (onsite and offsite programs)
- Ecosystem management (wetland, forest, and prairie maintenance)

This 2019 Master Plan also considers asset management and the role of the Legacy Management Support (LMS) contractor in the fulfillment of DOE legacy management responsibilities. The current LMS contractor, Navarro Research and Engineering, Inc., is responsible for operations and maintenance activities at the Fernald Preserve as well as nearly 100 other LM sites across the nation.

It is important to understand what is *not* in the scope of this document. As stated earlier, components of CERCLA remediation are not in the scope of this 2019 Master Plan. Instead, any regulator-approved decisions regarding cleanup status and ICs are communicated through (1) CERCLA Five-Year Reviews and (2) the Fernald Preserve *Comprehensive Legacy Management and Institutional Controls Plan* (LMICP) (DOE 2019). Annual reporting of site activities and monitoring results are presented in the Site Environmental Report (DOE 2018a). The LMICP, Site Environmental Report, inspection reports, and other Fernald Preserve documents are available to the public at <https://www.lm.doe.gov/ferald/Sites.aspx>. Community meetings are held periodically to update stakeholders as well.



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Figure 1. Fernald Preserve 2019 Master Plan Local Focus Area

LM's responsibility to manage records is another item that is not in the scope of this 2019 Master Plan. Information regarding that continuing DOE obligation is available at the Fernald Preserve Visitors Center.

1.3 Background

The Fernald Preserve is a former uranium processing facility that was shut down in 1989 as the Cold War ended and concern over environmental contamination grew. Since then, the site has undergone extensive remediation pursuant to CERCLA. Remedial activities and subsequent ecological restoration projects have converted the site from an industrial production facility to an undeveloped park that encompasses a series of wetlands, prairies, and forested communities. With the exception of groundwater, sitewide remediation was completed in the fall of 2006. In January 2007, the Fernald site transitioned from EM to LM. LM is responsible for completing groundwater remediation, maintaining other remedies, including the On-Site Disposal Facility (OSDF), implementing and monitoring required ICs, and general site maintenance. A comprehensive summary of the Fernald Preserve production and remediation history is provided in the LMICP (DOE 2019).

A key component of the CERCLA remedy was to engage stakeholders in cleanup and final land use decision-making. The site remediation was organized into five Operable Units (OUs) based on each OU's location on site and the type of remediation needed. OU5 consists of environmental media, such as groundwater, soil, and surface water. The OU5 Record of Decision (ROD) (DOE 1996) includes a commitment to involve stakeholders in final land use decisions at Fernald. A subsequent National Environmental Policy Act *Environmental Assessment for Proposed Final Land Use at the Fernald Environmental Management Project* identified the preferred alternative for final land use as a series of ecologically restored areas, potentially with hiking trails and educational displays (DOE 1999). The 2002 Master Plan further outlined the potential for public use, including the development of a list of prohibited activities and the establishment of public amenities (DOE 2002).

The Fernald Citizens Advisory Board proposed a "multiuse educational facility" as a means to provide the local community with access to information about the history, remediation, and long-term stewardship of the site. As a result, a former warehouse (used for storage of clean equipment) was refurbished into the Visitors Center and opened to the public in the summer of 2008.

Other structures remaining on the site include (1) the 100-acre OSDF; (2) the groundwater treatment facility called the Converted Advanced Wastewater Treatment (CAWWT) facility, with its supporting infrastructure, extraction wells, and associated piping and utilities (Figure 3); and (3) the outfall line to the Great Miami River.

2.0 Regulatory Requirements

DOE is responsible for completing the CERCLA remediation at the Fernald Preserve. Aquifer remediation is ongoing, and the stakeholder vision of a "balanced approach" to remediation resulted in construction of the OSDF and the approved soil cleanup levels based on site use as an undeveloped park. Regulators (U.S. Environmental Protection Agency [EPA],

Ohio Environmental Protection Agency [Ohio EPA], and U.S. Fish and Wildlife Service [USFWS]) worked with stakeholders to establish restrictions at the Fernald Preserve and to define acceptable use of the site. In addition, sitewide ecological restoration was factored into site remediation plans and final land use. Any decisions regarding the site must align with regulatory commitments that are already in place. More information is provided below.

2.1 Maintain Institutional Controls

The five RODs for operable units at the Fernald Preserve established a set of ICs that are designed to protect the public and the environment. The latest CERCLA Five-Year Review (DOE 2016b) summarized the ICs for the site, which include continued federal ownership of the site, drinking water restrictions, site activity and use limitations that are documented via an Environmental Covenant, and management of off-property utility corridors associated with the groundwater remedy.

DOE ensures compliance with these CERCLA ICs through routine inspection and maintenance of the Fernald Preserve property, infrastructure, and amenities. In accordance with the Environmental Covenant, quarterly inspection reports are submitted to regulators to ensure that site activity and use limitations are in place and complied with. Quarterly inspection reports are available to the public via the LM website as described in Section 1.2.

2.2 Complete Site Cleanup

Aquifer restoration activities are part of the remedial action governed by the OU5 ROD and consists of an ongoing pump-and-treat remedy for the groundwater contamination on and off the Fernald Preserve property. The total uranium concentrations within the footprint of the uranium plume continue to decrease in response to pumping. Figure 4 shows the total uranium plume and its decrease in size from 2006 to 2017. DOE continues to monitor the groundwater and track remedy performance. When DOE has certified that the groundwater remedy is complete (as defined in the *Fernald Groundwater Certification Plan* [DOE 2006]) and EPA has approved that certification, the extraction well field infrastructure will be decommissioned and disposed of. All necessary soil excavation and certification associated with demolition of the CAWWT facility and the removal of extraction well field infrastructure will comply with the *Site-Wide Excavation Plan* (DOE 1998) requirements.

In accordance with the *Fernald Groundwater Certification Plan* (DOE 2006), post remedy long-term groundwater monitoring will be implemented through the *Integrated Environmental Monitoring Plan*, which is an attachment to the LMICP (DOE 2019). Post remedy long-term groundwater monitoring will be evaluated as part of the CERCLA Five-Year Review process, the most recent of which was in 2016.

An Interim Residual Risk Assessment (IRRA) was prepared to assess the risk to human health and the environment from post remediation contaminants in the air, soil, and surface water at the Fernald Preserve (DOE 2007). The IRRA calculations documented that the remedial activities at the Fernald Preserve are protective of human health and the environment. Since groundwater remediation is ongoing, a final risk assessment including groundwater will be performed when the groundwater restoration goals have been achieved.

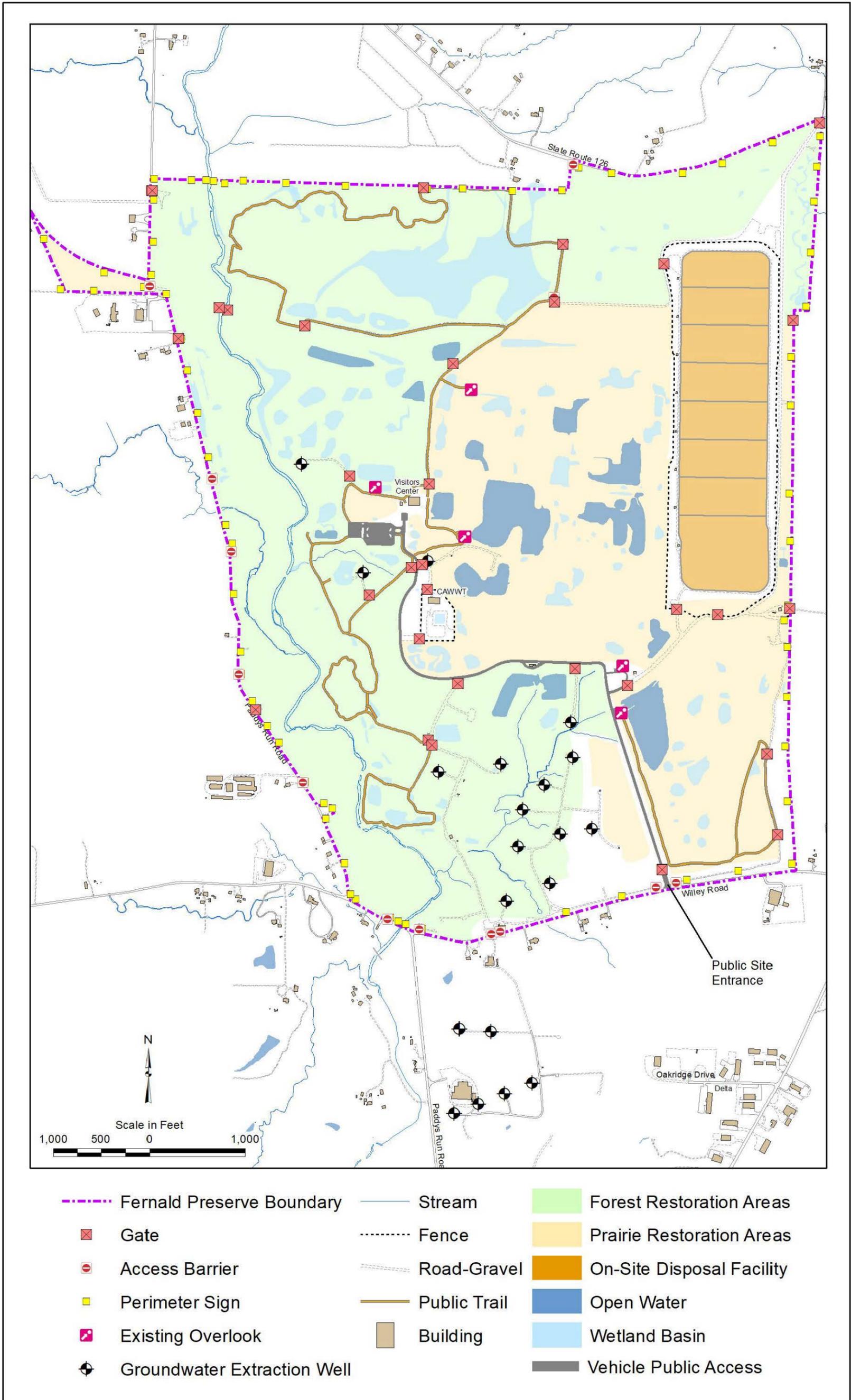
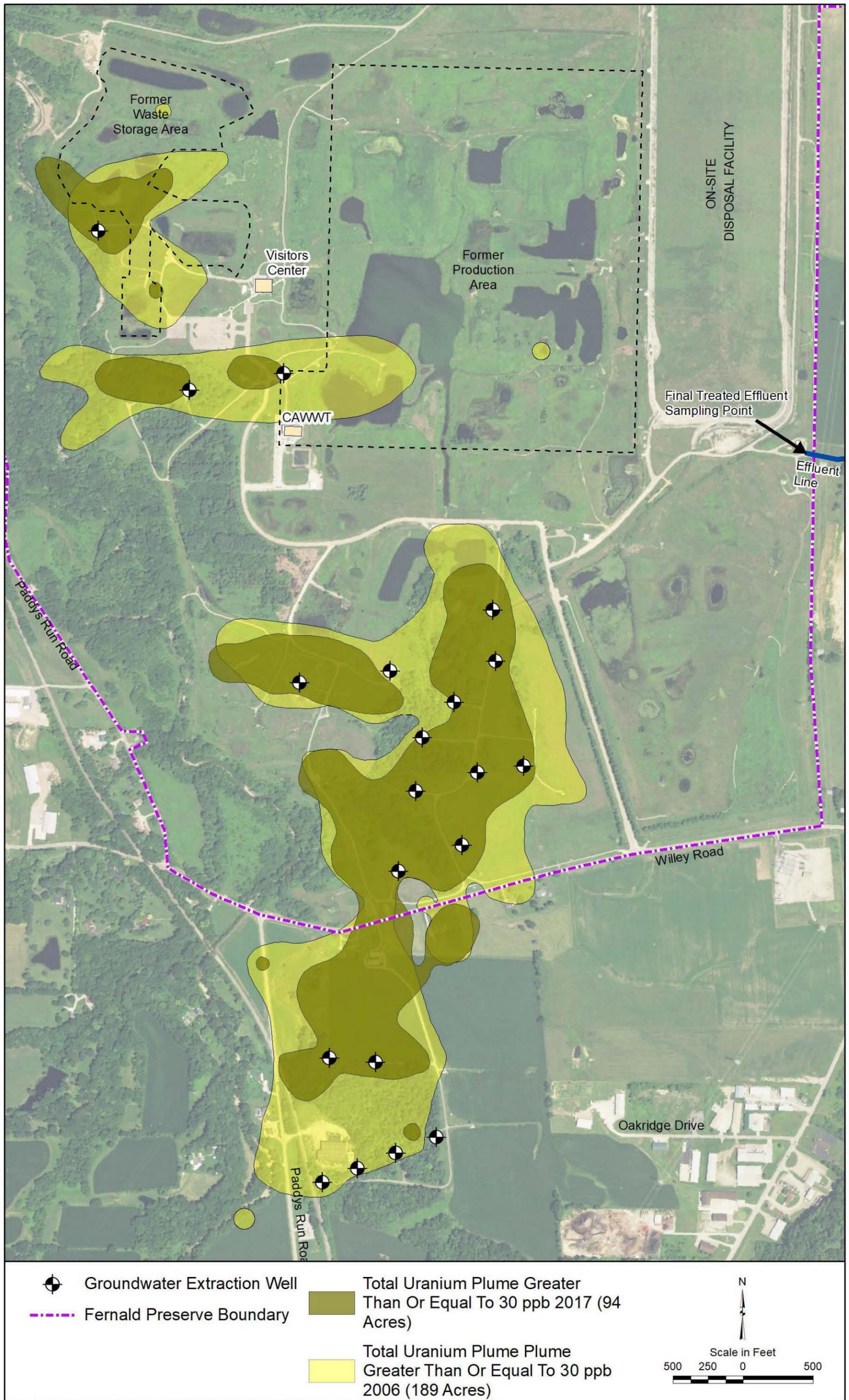


Figure 3. Structures and Facilities at the Fernald Preserve



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Abbreviation: ppb = parts per billion

Figure 4. Comparison of Groundwater Uranium Plumes in 2006 and in 2017

2.3 Fulfill Natural Resource Damage (NRD) Settlement

DOE and Ohio EPA signed a consent decree in November 2008, finalizing the natural resource damage claim that the State of Ohio filed in 1986. A \$205 million claim for natural resource damages was sought pursuant to Section 120 of CERCLA (State of Ohio 2008). As a federal land-holding agency, DOE was considered both the potentially responsible party and a natural resource trustee under CERCLA. DOE, Ohio EPA, and the U.S. Department of Interior (DOI) formed a Fernald Natural Resource Trustees Council in 1994 to resolve the damage claim from the State of Ohio. Ohio EPA represented the State of Ohio, and the USFWS represented DOI.

Sitewide ecological restoration was discussed early on as a component of settling the damage claim. A conceptual restoration plan was drafted that established goals for site restoration, and several projects were initiated in the late 1990s. This approach was consistent with site cleanup scenarios and stakeholder discussions regarding final land use. The Fernald Natural Resource Trustees signed a Memorandum of Understanding in 2001 that committed DOE to conduct sitewide ecological restoration. Restoration design plans were subsequently integrated into remediation planning. From 1999 to 2006, 13 ecological restoration projects were completed, and the site transitioned into a mosaic of forest, prairie, and wetland communities. The Natural Resource Restoration Plan (NRRP) was finalized as part of the 2008 NRD settlement and is included as an attachment to the consent decree (State of Ohio 2008). The NRRP specified a long-term monitoring and maintenance program for ecologically restored areas.

A portion of the consent decree required DOE to pay \$13.75 million into a settlement account to compensate for natural resource injury. These funds were designated for restoring, replacing, or acquiring equivalent natural resources at or near the Fernald Preserve. Following finalization of a Funds Use Plan in February 2010 (Ohio EPA, DOE, and USFWS 2010), the Fernald Natural Resource Trustees agreed to implement a watershed protection program that encompasses the Fernald Preserve. The Paddys Run Conservation Project (PRCP) involves permanent preservation of undeveloped and agricultural land within the Paddys Run watershed. Paddys Run is a third-order stream that flows through the western portion of the Fernald Preserve. Under this project, landowners voluntarily preserve land via conservation easements or sale of property to a land trust organization on behalf of the Fernald Natural Resource Trustees. Figure 5 shows the PRCP focus area and its relation to the Fernald Preserve.

The Funds Use Plan also provided for conducting additional restoration activities at the Fernald Preserve. Several projects have been completed since 2012 on the western and northern portions of the site. These projects were designed to fit within the existing conceptual restoration approach as detailed in the NRRP.

3.0 Current Configuration

The Fernald Preserve is fully integrated into the LM program, and site personnel are conducting long-term stewardship activities in accordance with the LMICP. The current scope of fieldwork at the site includes surveillance and maintenance of the site, ecological restoration monitoring and maintenance activities, environmental monitoring, operation and maintenance of the aquifer restoration groundwater extraction system, operation and maintenance of the CAWWT system, and maintenance and monitoring of the OSDF. Site personnel also staff the Visitors Center,

conduct interpretive services programs, and maintain public amenities such as trails and scenic overlooks. A summary of LM activities at the Fernald Preserve is provided below. The LMICP provides a more thorough status of site activities (DOE 2019).

3.1 Status of Remedy

Waste disposition, demolition of former production-era buildings, soil remediation, and construction of the OSDF have all been completed. Groundwater remediation is ongoing. Demolition of the groundwater infrastructure and final soil remediation (as necessary beneath aquifer restoration system infrastructure) will be completed once groundwater remediation is finished. Progress is being made in reducing the size of the uranium plume. The maximum total uranium plume at the end of 2017 was 94 acres, which is an almost 70% reduction from the original target certification footprint of 313 acres. The target certification footprint is the extent of potentially affected groundwater as established in the Fernald Groundwater Certification Plan (DOE 2006). Figure 4 compares the estimated total uranium plume at site closure in 2006 (189 acres) to the estimated plume at the end of 2017.

A wastewater treatment system will remain in place for the duration of the groundwater remedy and will be used as needed to treat groundwater and other wastewater streams. The CAWWT facility was renovated in 2018. Details regarding the renovated system are provided in the *Operations and Maintenance Master Plan for Aquifer Restoration and Wastewater Treatment*, which is an attachment to the LMICP (DOE 2019).

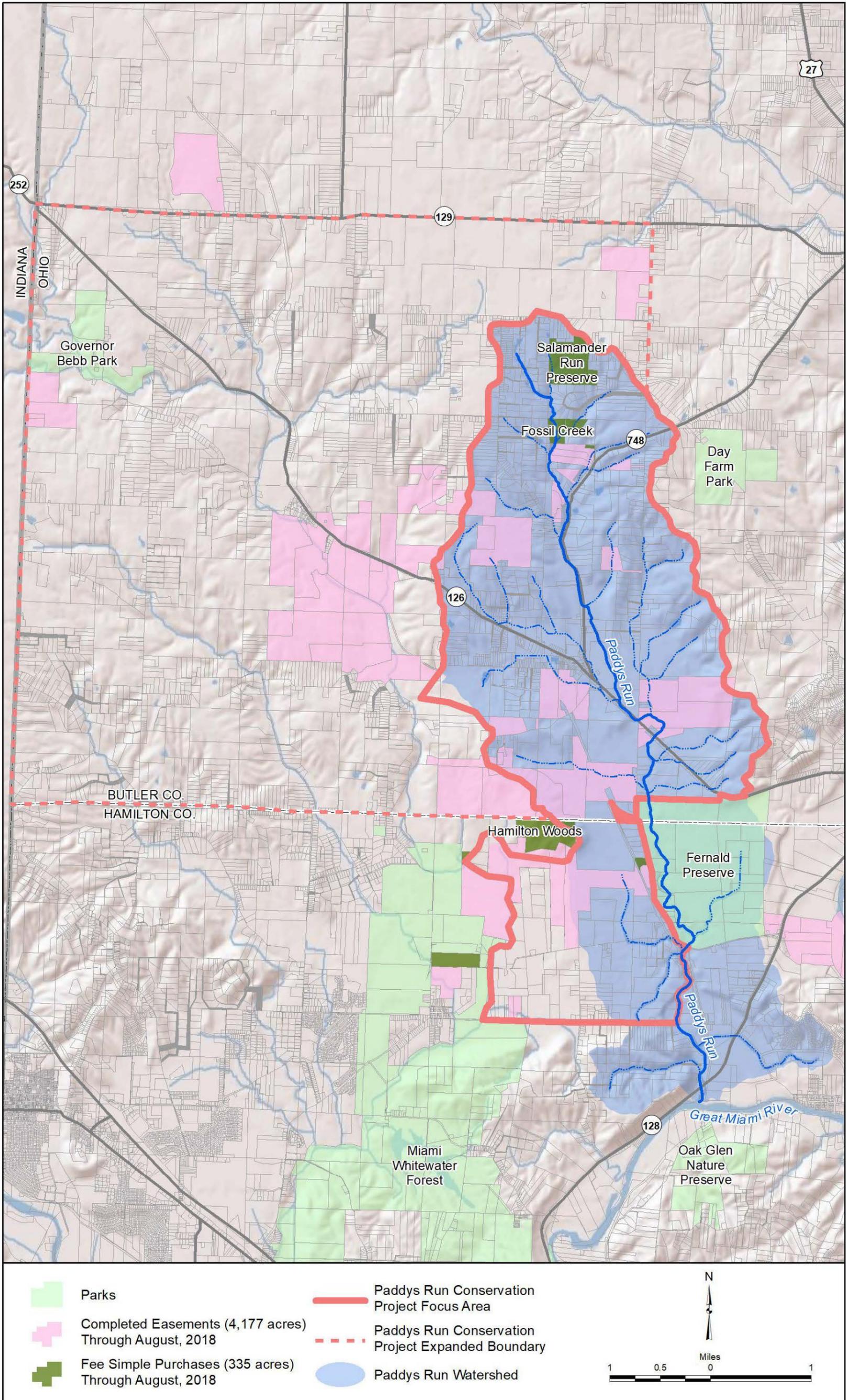
3.2 Status of Site Ecological Restoration

The ecological restoration projects that were undertaken during site remediation have resulted in large, contiguous stands of forest, prairie, and wetland communities. The habitat at the Fernald Preserve consists of the following:

- 395 acres of forest
- 385 acres of prairie, savanna, and grasslands
- 83 acres of wetlands
- 60 acres of open water

In addition to the above habitat, an additional 75 acres of prairie cover the OSDF. Figure 6 shows the current footprint of ecologically restored areas across the site. The NRRP provides additional information regarding design and construction of the ecological restoration projects (State of Ohio 2008).

Since LM assumed responsibility for the site in late 2006, activities at Fernald have transitioned from vegetation establishment to vegetation management. Site personnel maintain prairie communities through prescribed burning and mowing. Forest communities are managed primarily through control of invasive species such as the Amur honeysuckle. This nonnative shrub crowds out native species and inhibits successional growth of forest habitats. Honeysuckle is controlled through physical removal and the use of herbicides. Herbicides are also used for spot control of noxious weeds in prairies and wetlands. Maintenance activities are conducted pursuant to the Fernald Preserve, Ohio, Restored Area Maintenance Plan (RAMP) (DOE 2012a).



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Figure 5. Paddys Run Conservation Project



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Figure 6. Ecologically Restored Areas and Public Amenities

DOE has instituted several initiatives that promote ecological conservation at LM sites. Goals for conservation reuse have been established as part of DOE's Beneficial Reuse program (DOE 2016c). In addition, the DOE Pollinator Protection Plan (Pollinator Health Task Force 2015) has been established to assist with federal strategies to promote conservation of pollinator species. The Fernald Preserve is a key participant in both of these federal initiatives. The restored ecosystems at the site contribute to the combined acreages that LM uses to track progress at an LM programmatic level.

Often, ecosystem management is closely related to interpretive services. For example, LM has an ongoing agreement with USFWS and the Cincinnati Zoo to release federally-endangered American burying beetles at the Fernald Preserve. Beetles are raised at the Cincinnati Zoo and then released in pairs, with the hope of establishing a local population of the endangered beetle within its historical range. The site has participated in these recovery efforts since 2013. The site was approached as a candidate for release following a tour of the site by Zoo personnel.

3.3 Cultural Resources

The Fernald site is located within an area of rich historical and prehistorical cultural resources. Several laws are in place to protect these resources, including the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act. DOE has entered into a Programmatic Agreement with the Ohio Historic Preservation Office (OHPO) that addresses compliance with the National Historic Preservation Act (DOE 2012b). Archaeological surveys have been completed across the majority of the site, resulting in the delineation of five sites that require protection. An additional on-property site contains prehistoric human remains that were reinterred following discovery during installation of public water lines to the area. The location of these sites is not made available to the public to protect the site's integrity. DOE must consult with OHPO if any Fernald Preserve activities have the potential to disturb these sites or if other cultural resources are inadvertently discovered during site activities.

3.4 Institutional Controls

The ICs that were established through the CERCLA process are listed in Section 2.1. Additional restrictions are further detailed in Volume II of the LMICP (DOE 2019). Unescorted public access to the Fernald Preserve is limited to designated trails and paved roads. Figure 3 shows public access points and where portions of the site are fenced to further limit public access. A list of prohibited activities and items is posted at the site entrance (Figure 7). As stated above, LM conducts routine inspection of the site to ensure adherence to ICs.

3.5 Environmental Monitoring

Environmental monitoring programs were developed to ensure that the CERCLA remedy remains protective of human health and the environment. The requirements of these programs are described in detail in the LMICP (DOE 2019) and results of the monitoring are reported annually in the Fernald Preserve Site Environmental Report. Monitoring of the groundwater, surface water, and liquid effluent from the site occurs routinely. Monitoring of the various engineered layers of the OSDF are also monitored and reported in the annual Site Environmental Report.

THE FOLLOWING ACTIVITIES AND ITEMS ARE PROHIBITED:

- **Alcohol and illegal drugs**
- **Firearms**
- **Removing or damaging archaeological materials**
- **Removing or damaging plants or parts (e.g., seed pods, fruit, leaves, firewood)**
- **Mushroom gathering**
- **Soil excavation**
- **Swimming or wading**
- **Pets**
- **Camping**
- **Hunting, trapping, or fishing**
- **Dumping**
- **Fires, open flames, or smoking**
- **Traveling off public roadways or trails**
- **Using unmanned aircraft systems (drones)**
- **Tampering or damaging structures, fences, signs, or other property**

Figure 7. Prohibited Activities and Items

3.6 Public Use

Ecologically restored areas are accessible to the public at the Fernald Preserve via approximately seven miles of trails, several observation decks, the Visitors Center, an outdoor Program Shelter, paved roadways, and parking areas. Figure 6 shows the location of trails and other public amenities at the site.

Site personnel provide a wide variety of programs and other interpretive services related to the cultural and natural history of the site. Programs that are offered cover topics such as site history, environmental remediation, ecological restoration, wildlife, ongoing site cleanup and environmental monitoring, and site ecosystems and habitats. An emphasis is placed on assisting local educators with science and technology curricula. The Fernald Preserve provides a variety of

programs for K-12 education. Site personnel also participate in the DOE Science Bowl, which is a nationwide academic competition for high school students that promotes science and math education.

Over 115,000 people have interacted with Fernald Preserve Interpretive Services personnel since the site opened in 2008. This number includes people who use the Visitors Center, as well as people who attend public or private programs or exhibits provided by site personnel at onsite and offsite locations. Visitors who hike trails or observe wildlife but do not engage with site personnel are not included in this figure. Figure 8 shows the Fernald Preserve Interpretive Services contact numbers by year through 2018.

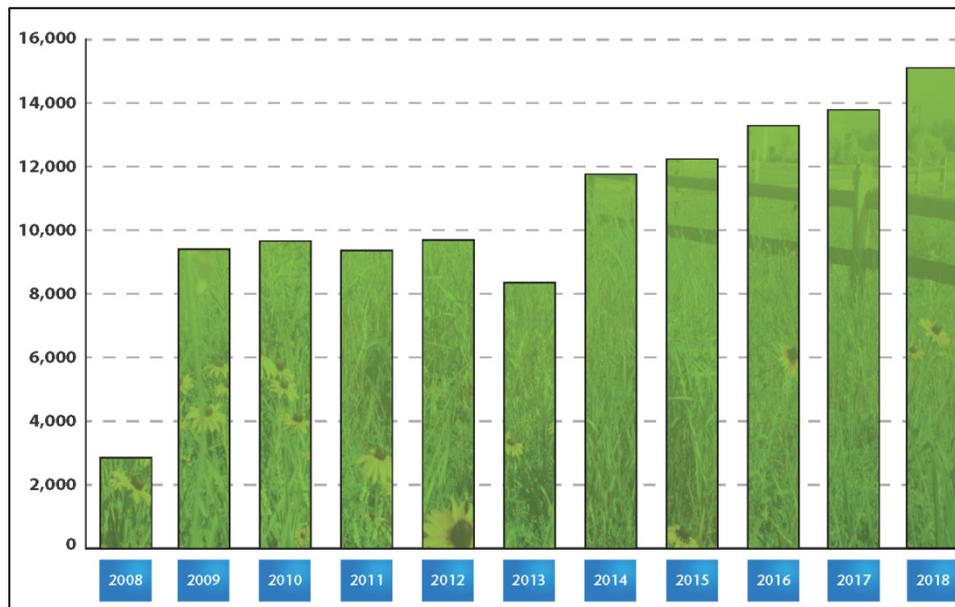


Figure 8. Fernald Preserve Interpretive Service Contact Numbers by Year

Bird watching and other wildlife observation appear to be a main focus of public use at the site. Local bird watchers routinely post information and photographs regarding wildlife sightings on social media. Geocaching is an activity that involves finding hidden objects using GPS coordinates. Several geocaches have been placed onsite over the years by the public. Site personnel do not manage geocaches but do permit their placement, as long as placement meets public access requirements. Geocaching websites are periodically monitored to ensure that any on-property geocaches are in publicly accessible areas.

3.7 Stakeholders

DOE recognizes the value and importance of engaging with stakeholders. As discussed in Section 1.3, the Fernald Citizens Advisory Board played a central role in crafting decisions regarding final land use. This principle continues today through routine communications with the currently active community stakeholders group, the Fernald Community Alliance, and through ongoing community engagement via Interpretive Services activities. Stakeholder input was solicited for development of this 2019 Master Plan. The LMICP includes a Community Involvement Plan (CIP) that describes the drivers and process for stakeholder engagement

(DOE 2019). The CIP outlines public participation requirements under CERCLA. This 2019 Master Plan is a stand-alone effort that is separate from conventional avenues for stakeholder involvement under the CERCLA process. The CIP will be updated to reflect the process used for the 2019 Master Plan.

The CIP summarizes how the community is informed of activities at the Fernald Preserve. A variety of methods are used, including a stakeholder mailing list, published flyers, community meetings, and the site website (<https://www.lm.doe.gov/ferald/Sites.aspx>). The use of social media is being considered by DOE, but until robust policies are developed (e.g., cybersecurity), traditional approaches are used at the Fernald Preserve. These existing stakeholder communication tools have proven effective in the past and continue to be employed.

An online survey was developed that sought stakeholder input on site amenities, interpretive services, and management of restored areas. The stakeholder survey took place from May 24 to June 24, 2018. There were 27 questions, including both multiple choice and opportunities for open responses. A total of 147 surveys were completed, including 244 responses to the five questions that asked for an open response. In addition, two public workshops were conducted in June and July 2018. Both the survey and the workshops were conducted by MKSK, a local planning subcontractor. Results of the stakeholder survey and workshops are provided in Attachment 1.

4.0 Future Trends

This section describes the future trends that will affect the Fernald Preserve. Both internal requirements and external factors are evaluated. The surrounding community is considered in both a local and regional context. National trends are also discussed. More detailed information regarding local, regional, and national trends is provided in Attachment 2. To the extent practical, any future decisions regarding the site should take these factors into consideration.

4.1 Site Management

The Fernald Preserve is one of eight CERCLA sites that are managed by LM, and it is one of 10 “staffed” sites across the country. LM maintains offices in the Visitors Center and manages the site with contractor personnel. Approximately 35 people are employed in support of the Fernald Preserve. Contractor office space is located off property in a nearby office park. Most personnel work from this facility, while other employees work at the Visitors Center and the CAWWT facility. The size of the site work force is not expected to significantly change until aquifer remediation is complete. Site activities are accomplished with the help of additional contractor personnel at other LM sites. Support services such as engineering, procurement, and project controls are provided from LM offices in Colorado and West Virginia. The LM office at the Fernald Preserve also supports work at the Mound, Ohio, Site in Miamisburg, Ohio, and at several other sites within the LM program.

The LM mission at Fernald will continue in perpetuity; consequently, staff succession is an important factor in planning for the future. Many employees have been involved with site production, remediation, and ongoing long term stewardship support. As personnel leave the site (e.g., through retirement), it is important to ensure that institutional knowledge is maintained.

Future considerations include the need for sufficient space for LM-wide contractor support. As the LM program grows in the coming years, additional employee space may be needed.

4.2 Remedy

Sitewide remediation is complete except for aquifer restoration and eventual demolition of the associated infrastructure. The site must meet a groundwater concentration–based cleanup limit pursuant to the OU5 ROD. An approved *Fernald Groundwater Certification Plan* (DOE 2006) is in place to guide how cleanup of the aquifer will be certified complete. More details regarding the groundwater remediation and certification program are available in the *Operations and Maintenance Master Plan for Aquifer Restoration and Wastewater Treatment*, which is an attachment to the LMICP (DOE 2019). Annual updates are provided in Site Environmental Reports.

CERCLA regulations provide for a process to review and update cleanup remedies for sites such as the Fernald Preserve. A Five-Year Review is conducted to ensure that remediation continues to operate as designed and remain protective of human health and the environment. New regulations and guidance are also reviewed, and stakeholders participate in the review process. Four CERCLA Five-Year Reviews have taken place at the site, with the latest completed in 2016 (DOE 2016b). The next CERCLA Five-Year Review will be conducted in 2021.

4.3 Ecosystem Management

DOE has fully implemented sitewide ecological restoration at the Fernald Preserve pursuant to the 2008 NRD settlement. The settlement was documented in a consent decree that included finalization of the Fernald NRRP (State of Ohio 2008). In addition to the NRD settlement fund discussed in Section 2.3 above, the NRRP called for the following components:

- Development of a maintenance plan for ecologically restored areas
- Resumption of long-term ecological monitoring
- Implementation of an enhanced wetland mitigation monitoring program

Section 3.1.8 of the NRRP addresses the need for long-term maintenance of ecologically restored areas. This section calls for the development of a RAMP, which was originally published in 2010. Section 5.2 of the NRRP does state that the Fernald Natural Resource Trustees will evaluate the need for continued maintenance after 10 years of implementation of the RAMP. Based on the original publication of the RAMP, this evaluation by the Fernald Natural Resource Trustees will take place in 2020.

A monitoring program was established as part of the draft NRRP in 2002. This consisted of a two-tier approach that involved implementation monitoring and functional monitoring. Implementation-phase monitoring is conducted to ensure that restoration projects are completed as intended in their designs. This effort includes mortality counts and herbaceous cover estimates that are conducted after a project is completed. The NRRP established goals for vegetation establishment of 50% native species and 90% total cover. For woody vegetation, the goal is 80% survival.

Functional-phase monitoring is more general and considers projects in terms of their contribution to the ecological community as a whole. This is accomplished by comparing projects to preremediation baseline conditions and to ideal reference sites. Reference sites are high-quality communities in southwest Ohio that serve as a model for restored areas at the Fernald Preserve. Communities include wetland, upland and riparian forests, prairie, emergent wetland, and open water habitats. Characterization of baseline and reference sites were first reported in the 2002 Consolidated Monitoring Report (DOE 2003).

DOE initiated ecological monitoring in 2001, with characterization of baseline and reference sites. Implementation monitoring was conducted for all restoration projects, and functional monitoring took place from 2003 to 2005. The functional monitoring program was suspended after 2005, and it was not until the NRD settlement in 2008 that a comprehensive monitoring program was finalized. Community types (prairies, wetlands, and forests) were characterized within restoration projects from 2009 through 2011, as specified in the NRRP (State of Ohio 2008).

Enhanced wetland mitigation monitoring also took place from 2009 to 2011. This effort is documented in the *Fernald Preserve Wetland Mitigation Monitoring Report* (DOE 2012c). Approximately 31 acres of regulator-approved “jurisdictional” wetlands were delineated, which met the negotiated requirement for at least 18 acres of mitigation. As part of final approval of the report, the Fernald Natural Resource Trustees agreed to continue the functional monitoring program and to include additional parameters for wetland mitigation projects. These parameters include amphibian surveys and water elevations. Measuring water elevations helps to ensure that the restored areas are sufficiently holding water so that wetland vegetation and soil can continue to develop.

Functional monitoring has continued annually at the site since 2009. Monitoring consists of extensive field data collection and data analysis. Results from both implementation and functional monitoring and wetland mitigation parameters are presented in annual Site Environmental Reports. Results from recent years have shown that restored communities are well established and have generally exhibited much improvement over baseline conditions.

Ecosystems are never static and are constantly influenced by natural and human factors. Changes can occur gradually over many decades or very rapidly in response to an event. Recent site examples include (1) changes in wetland hydrology due to beaver activity and (2) loss of forest canopy due to infestation by emerald ash borer beetles. These events may result in a reduction of performance metrics (e.g., herbaceous cover), but this does not necessarily mean that a restoration project has failed. The resiliency and response of the community over time is a better indicator of restoration than evaluation against individual performance standards.

The reevaluation of the RAMP in 2020 will provide a good opportunity for the Fernald Natural Resource Trustees to evaluate restored areas monitoring and maintenance requirements in the future. Based on feedback from the stakeholder survey and workshops in 2018, there was much support among stakeholders for continued management of ecologically restored areas. At the same time, monitoring results are showing that field conditions have stabilized. Often, monitoring results bolster what has already been observed in the field. Therefore, in future years, the experience of site personnel, rather than extensive data collection, might be used to direct adaptive management decisions.

Also, emerging technologies may provide new, more efficient means of collecting data. In August 2017, DOE partnered with the U.S. Geological Survey and the U.S. Army Corps of Engineers to investigate innovative technologies for assessing the success of ecological restoration projects at the Fernald Preserve. The goal of this effort was to compare remote sensing technologies to traditional field surveys so that optimal monitoring strategies for restoration projects can be developed. Researchers are evaluating the different approaches based on effectiveness and level of effort. The Fernald Preserve is an ideal candidate for this type of evaluation because the site has undergone extensive forest and grassland restoration and has a traditional restoration monitoring program already in place. Results from the 2017 study are still being tabulated. Once finalized, this effort may justify more innovative approaches to restored area monitoring at the site. DOE and the Natural Resource Trustees must carefully consider the type and quality of data that are needed in future years.

Innovative technologies could have an added benefit of supporting the CERCLA-required site and OSDF inspection processes. For instance, use of light detection and ranging (lidar) sensors might prove to be more precise than observation by field personnel in mapping the OSDF cap and detecting subtle changes in cell cap topography over time. Likewise, video obtained by an unmanned aircraft system (UAS) may assist with site inspection field walkdowns, especially in areas that are difficult or unsafe to access, such as steep slopes or areas with dense vegetation. LM has initiated collection of both lidar and photogrammetric data using UAS at other LM sites to support site inspections and monitoring of vegetation. Photogrammetry involves the use of high-definition aerial photographs for surveying. Currently, the Fernald Preserve uses field inspections and occasional aerial photography for landscape-level evaluation of site conditions.

4.4 Cultural Resources

Protection of cultural resources will continue pursuant to the DOE Programmatic Agreement with OHPO (DOE 2012a) and applicable laws and regulations. Additional reinterment of prehistoric Native American remains was envisioned as part of the 2002 Master Plan and other final land use recommendations. Several possible reinterment locations were identified on the western portion of the site, and federally recognized Tribes were contacted in 2003. No Tribe expressed interest at the time, and the matter has not been pursued further. Any future requests to reinter prehistoric human remains will be addressed on a case-by-case basis.

4.5 Visitor Experience and Stakeholder Survey Results

Public use of the site is expected to increase in the coming years. The 2018 stakeholder survey described in Section 3.7 and presented in Attachment 1 demonstrates much interest and demand for the visitor experiences at the Fernald Preserve. A review of the survey results shows that a typical user of the Fernald Preserve is someone who:

- Is older than the general population.
- Lives more than 10 miles from the site.
- Enjoys hiking.
- Is likely to visit the site at any time during the week.
- Is satisfied with the current visitor experience, including public amenities and programs offered.

- Is interested in continued management of ecologically restored areas.
- Is familiar with the history, cleanup, and remediation of the site.

Survey responses were overwhelmingly positive, and there seemed to be a desire for increased accessibility to the site. Accessibility options were addressed in several different ways, including requests for expanded Visitors Center hours, additional paved trails, and new amenities for nature observation (wetland boardwalks and wildlife blinds). Survey respondents also encouraged DOE to increase marketing efforts to promote the “Fernald Story,” including the site’s contribution to the nation’s Cold War effort, eventual site closure, and environmental cleanup. There was also an interest in continued and varied interpretive services, including an emphasis on the ongoing wildlife and habitat restoration and management.

One survey question asked, “What do you envision for Fernald in the next 10–15 years?” Respondents showed general interest in continuing with current interpretive services and restored area management. There was also interest in establishing regional connections via hiking and biking trails. Any decisions regarding this or changes to other public amenities would need to be consistent with cost, design, and regulatory constraints at the site.

A number of respondents stressed the need to continue with groundwater remediation and long-term care of the site. As stated in Section 1.1, site remediation and long-term stewardship will continue pursuant to CERCLA requirements and other established agreements with the regulators.

4.6 Surrounding Community

A key component for ensuring the Fernald Preserve continues to serve as a community asset is to assess how the community might change in the coming years. DOE commissioned a planning analysis that evaluated demographics and land use from both local and regional contexts. The local and regional communities are described in Section 1.2. The local area is defined as the area within a 10-mile radius of the site (Figure 1). Regional information is based on the nine-county tristate area (Figure 2). The planning report also documented national trends regarding attitudes and actions relating to environmental concerns, recreation, education, and use of technology. MKSK conducted the research, and the final report is provided as Attachment 2.

4.6.1 Community Analysis

Results of the community analysis showed that the local community around the Fernald Preserve is typical for the region. The population is stable and is growing slightly slower than the tristate area as a whole. The local community is also slightly older and more diverse than the greater region. Education levels are similar to the region, and there are slightly more blue-collar workers than white-collar workers in the local community.

Land use within the area is mostly agricultural, and row crops and pasture land are found adjacent to most of the Fernald site property. Housing and business development are typical for a less dense area like Fernald. While home ownership has decreased slightly in recent years, residential housing developments are increasing, especially north and west of the site.

The trends in housing development are reflected in population numbers and density. Crosby Township, in which most of the Fernald Preserve resides, has shown more than 4% growth in the last eight years. This growth is increasing the population density of the township. Nearby Morgan Township is expected to increase its population density in the coming years as well.

4.6.2 National Trends

Attitudes toward conservation, recreation, education, technology, and connection with nature can help to shape the perception and use of the Fernald Preserve. Analysis by MKSK shows a number of interesting findings that are detailed in Attachment 2. A summary of the findings is presented below.

First, there is a shift toward incorporation of “green” infrastructure by communities across the country. Planning and resources are spent to use sustainable design as a partial solution to issues like storm water runoff and air pollution. Sustainable design includes the use of bioswales and rain gardens to capture runoff, urban green spaces, and tree canopies that help offset the urban heat island effect. Buildings can be built with a focus on energy efficiency. DOE is an early adopter of this movement, with construction of the Fernald Preserve Visitors Center as a U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Certified Platinum building. The 2008 LEED Platinum designation was the first in Ohio.

Education is shifting toward a focus on conservation as well. Curricula relating to natural resources are expanding as educators respond to the growing demand for environmental sciences. This shift is evident in higher education as well, with an observed increase in science and engineering degrees since 2010. An increased focus on environmental education has indirect benefits of building learning skills and empowerment in students.

Leisure and recreation are reflecting an increase in activities such as day hiking and trail running through undeveloped areas, two activities that access to the Fernald Preserve already provides. Millennials (those born in the 1980s and '90s), appear to be spending time and money on these types of experiences rather than material goods. Bird-watching has actually experienced a slight decline in popularity nationally in recent years; however, stakeholder survey results and anecdotal observations noted on local social media indicate that birding remains a very popular activity at the Fernald Preserve.

Park attendance data are variable, with steady increases overall but some decreases year to year when adjusted for population growth. Nevertheless, use of parks remains very popular across the country, and growing evidence shows the benefits of parks and open space. Nature connection has proved to reduce stress, improve moods and creativity, and even increase workplace performance. Health care and insurance providers are becoming advocates of increased opportunities for people to connect with nature.

Visits to historical and commemorative sites have decreased in recent years. However, there is a relation between interest in these sites and the age of the participant. As the nation’s population ages in the coming years, it is anticipated that there will be an increased interest in historical and commemorative information.

Social media and technology are changing how people receive and share information. More than two-thirds of all Americans received information from social media in 2017. The sharing of information is evolving rapidly as more platforms are being introduced. With the adoption of fitness tracking gear, more and more people are using GPS and wearable technology to track activities and share experiences.

5.0 Path Forward

Based on the future trends discussed for both the site and the surrounding community, there are several options for refining future use of the Fernald Preserve. As stated in Section 1.2, decisions regarding the CERCLA remedy are outside the scope of the 2019 Master Plan. In addition, any proposed activities associated with the Master Plan must be consistent with the ICs detailed in the LMICP (DOE 2019).

5.1 Site Management

As stated above, the Fernald Preserve DOE contractor work force is expected to stay relatively stable until the completion of groundwater remediation, at which point staff levels are expected to decline. However, additional personnel may be stationed at the Fernald Preserve in support of increasing LM workload across the DOE complex as LM becomes responsible for additional sites, before and after conclusion of Fernald groundwater remediation. In addition, current off-site office facilities are leased, and periodic market surveys are needed to ensure that such buildings are adequate and cost effective. For these reasons, a feasibility study has been conducted for the Fernald site to evaluate the appropriate future office and field support needs at the site. Options considered include purchasing or leasing facilities offsite, building facilities offsite, building facilities on the Fernald Preserve property, or remaining at the current off-site office park with or without renovations. The feasibility study estimated contractor space needs in the coming years and evaluated siting requirements to recommend options. Results of this effort indicated that the current approach of leased space near the site is the most feasible option at this time. This approach may change as future space needs evolve. Similar facility evaluations were conducted for other LM site and business offices across the country.

Institutional knowledge of the site work force is invaluable when dealing with issues relating to the production era and remediation history. DOE and its contractors are ensuring a comprehensive succession plan is in place that provides ongoing education of staff and robust documentation so that site knowledge is passed on as employees retire or take on new roles. This is needed in all phases of site management, including groundwater remediation, environmental monitoring, ecosystem management, and interpretive services. Recordkeeping and on-the-job training are key components of this effort.

5.2 Ecosystem Management

Restored areas have been maintained and monitored since the late 1990s. Site natural resources continue to transition from highly disturbed construction areas to native communities that support diverse wildlife. Ecological monitoring data from recent years have demonstrated that restored areas are sufficiently established and mostly meeting the goals established in the NRRP. This was reinforced by results from the 2018 stakeholder survey. Respondents generally enjoyed

experiencing the restored communities and associated wildlife and expressed interest in continued management of these resources. At the same time, DOE must manage resources responsibly. As stated in Section 4.3, the RAMP is due for review in 2020. Working with the Fernald Natural Resource Trustees to revise this document will provide a good opportunity to optimize plans for future ecological monitoring and maintenance at the site.

Data needs for monitoring and adaptive management decisions in the coming years could be obtained with a combination of existing site inspection processes and the possible adoption of novel data collection technologies such as UAS, lidar, and satellites. Use of new technologies should be promoted for use in support of site and OSDF inspections as well. For instance, comparison of lidar-generated topographical maps over time could reveal issues with the OSDF cap (erosion, slumping, etc.) sooner than when they would be visible during a field walkdown. As discussed in Section 4.3, adoption of UAS for assisting with field inspections would also enable observation of areas that cannot be safely accessed by field personnel. These technologies have the potential to provide more thorough information at a more reasonable cost than conventional field observations.

DOE recognizes that continued maintenance activities are needed to properly manage ecologically restored areas. Invasive species are an ongoing issue, and field personnel will continue to seek effective and efficient methods for control. The RAMP review in 2020 will allow for a thorough evaluation of existing techniques and options for future management activities.

Site resources may be supplemented with the use of volunteers. The Fernald Community Alliance (FCA) stakeholder organization already conducts semiannual public roadway cleanup days along the western boundary of the site. FCA has also shown a willingness to become more involved with hands-on support at the Fernald Preserve. Partnering with the FCA or other volunteer organizations may allow for large-scale physical clearing of invasive species within a given area. This would reduce the need for herbicide treatment and would establish new partnerships with local organizations. Such partnering arrangements are consistent with the LM conservation reuse strategy. Fernald has an existing volunteer policy that establishes a process for review and approval of volunteers at the site. This policy addresses all aspects of volunteer management, including selection, training, use and recognition. To this point, Fernald Preserve's volunteers have been used to assist with interpretive services activities. The policy would be updated to ensure that safety, health, and labor standards are captured when using volunteers for ecosystem management. LM will review how other federal agencies use volunteers and adopt best practices as needed.

The PRCP provides another opportunity for developing local partnerships. This is a successful program that has thus far protected more than 4,500 acres in and near the Paddys Run watershed (Figure 5). Most of the \$13.75 million NRD settlement fund from DOE was used for this project. DOE may want to consider expanding its role within PRCP by promoting research and land management partnerships. The watershed-scale conservation effort provides a unique opportunity to benefit the community. Examples of involvement include participation or funding research in the evolution of local ecosystem services, such as water quality, soil conservation, and wildlife use. DOE could also team with other local land managers such as Great Parks of Hamilton County to provide training and support to interested conservation easement holders.

Fernald site personnel have provided technical support for evaluation and management of PRCP properties.

Ongoing partnerships with USFWS and the Cincinnati Zoo will continue. A Memorandum of Agreement is in place to conduct annual releases and associated monitoring for the American burying beetle through 2022. It is anticipated that this type of support would continue and can be expanded. For example, the site has been approached recently to assist a local university with ecological monitoring research.

5.3 Public Amenities

The recent MKSK planning analysis and stakeholder feedback both support what has been observed at the Fernald Preserve: The use of the site and its public amenities is popular. Stakeholders showed a preference for increased access to the site in the form of expanded paved trails, wetland boardwalks, and connection to a regional trail system. Several options exist for an expanded trail network, if resources are available and if such expansion does not violate site institutional controls. For example, the site's former train trestle could be repurposed as a bridge to cross Paddys Run, allowing public access to the western portion of the site. DOE could potentially extend this western access into the surrounding community. By partnering with Great Parks of Hamilton County, a connector path could be established between the existing Shaker Trace hike and bike trail and the Fernald Preserve. Shared bike lanes may also be established along existing paved roads. This could involve the use of enhanced line painting and wayfinding signage. Smaller-scale options include (1) the construction of wetland boardwalks along existing site trails and (2) paving level stretches of gravel roads. At a minimum, additional trailside benches, particularly closer to trailheads, would allow for increased accessibility to nearby site trails. Figure 9 shows a conceptual plan for adoption of new public amenities at the Fernald site. These are concepts that represent a vision from stakeholder feedback. As stated before, any development of such amenities shall not infringe on the CERCLA remedy, and would be subject to availability of funds. Stakeholder expectations will also be considered during design.

It should be noted that participants at the 2018 public workshops preferred the development of paved trails and general accessibility over the construction of additional amenities such as boardwalks and overlooks.

Expanded opportunities for recreation represents a shift from the 2002 Master Plan recommendations. At that time, stakeholders expressed that public use of the site should focus on educational opportunities as opposed to recreational activities. A shift to purely recreational use of trails at Fernald would not be consistent with the 2002 Master Plan. While the 2019 Master Plan is considered a review and update to the 2002 plan, it is important to ensure that the original intent of stakeholder input during the environmental cleanup is maintained. Therefore, any specific plans for additional trails should include an educational component and be acceptable to stakeholders. Future amenities must also meet the requirements for maintaining the site as an undeveloped park. For instance, no permanent restroom facilities would be constructed along existing or new trails. Likewise, sports facilities are not envisioned (e.g., dog park, soccer field).

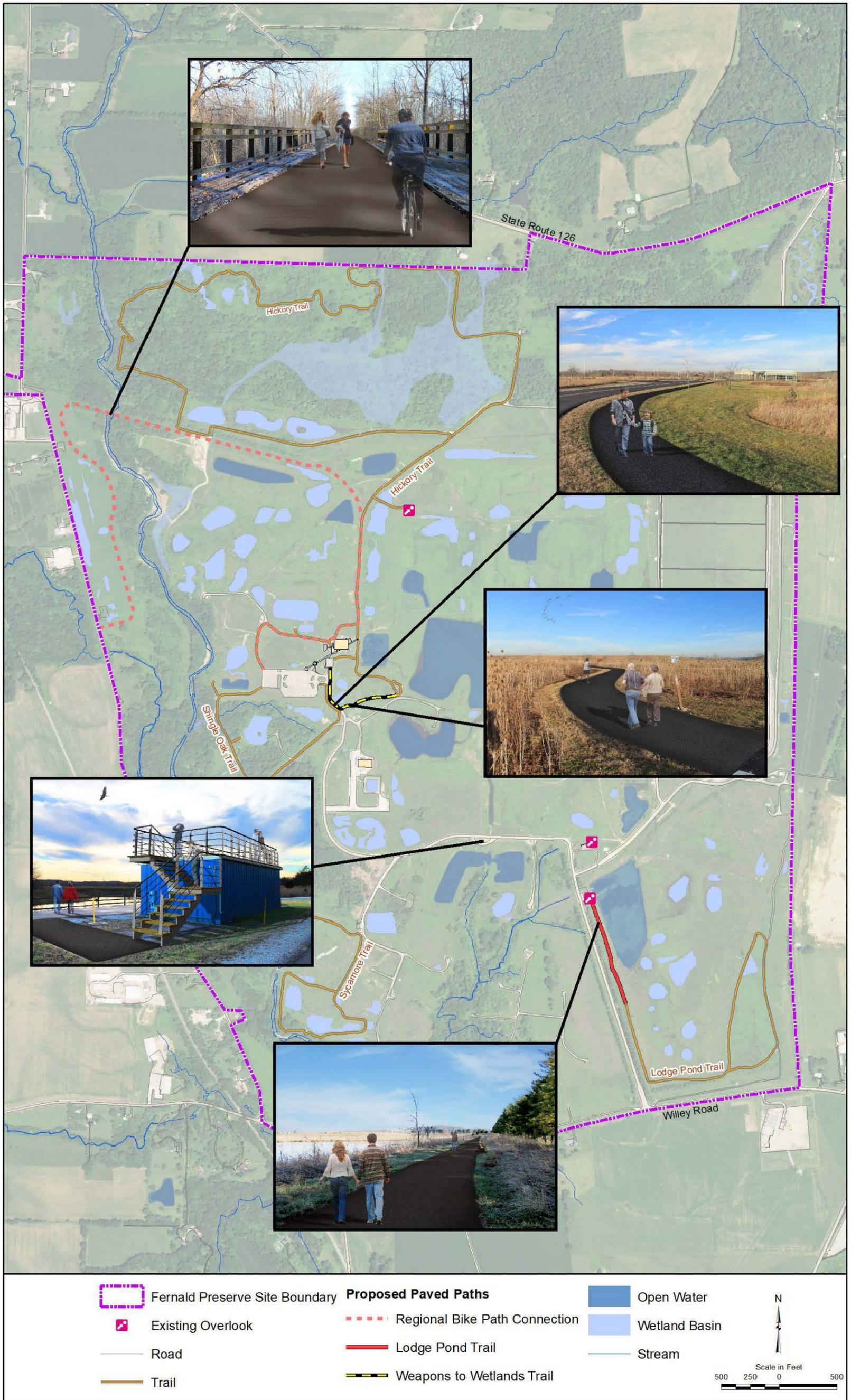


Figure 9. Conceptual Future Public Amenities at the Fernald Preserve

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Much potential exists for the use of new signage and exhibits at the Fernald Preserve. This could enhance the visitor experience by providing more information regarding the history and ecology of the site, as well as more detailed visitor safety and site access information. Digital interactive maps and exhibits are being adopted by a wide variety of institutions to quickly and conveniently convey information to the public. MKSK has provided an overview of currently available applications in Attachment 2. These include development of both indoor and outdoor interactive displays that could provide a wide variety of content to site visitors. The use of such amenities would closely coordinate with potential mobile and web-based applications as discussed below.

The Visitors Center could also host temporary exhibits that highlight Fernald's role in the nationwide weapons complex. This would be accomplished by collaborating with other DOE complex sites or outside agencies to host traveling exhibits that relate to the Fernald site Cold War production era, environmental remediation, or other related content.

Temporary signage is occasionally used at the Fernald Preserve to provide information on site access, trail status, and interpretive services. It is anticipated that temporary signage will continue to be used and enhanced as technology develops.

One issue that was mentioned several times in stakeholder comments, both in the past and in the 2018 stakeholder survey and public workshops, was request for permission to bring dogs on the property. Responses were more in support of allowing dogs onsite rather than not allowing. Dogs are not allowed at the Fernald Preserve because it is a nature preserve and dogs could disturb wildlife and possibly become a nuisance to other park visitors. DOE maintains this position with respect to trails that access undeveloped portions of the site. It might be possible in the future to allow leashed-pet access to a small portion of the site trail system, where minimal disturbance to the public and wildlife would be anticipated. DOE must also consider resources necessary to install and maintain signage, cleanup bag dispensers, and additional trash collection receptacles. Additional effort would also be needed to inform the public of which areas are off-limits for pets. In any event, no pets (other than service animals) would be allowed on property if regulators determine that the presence of pets would violate site institutional controls. Concerns and desires of the FCA and other local community groups would also be taken into consideration.

It should be noted that Great Parks of Hamilton County provides the Simmonds Family Dog Park less than seven miles from the site. The Fernald Preserve webpage could explain DOE's position on dogs at the site and suggest or link to other nearby pet-friendly trails.

Several requests have been received in recent years to install charging stations at the Visitors Center for electric vehicles. DOE evaluated the concept and concluded that it is not feasible at this time. Recent experience at other DOE sites resulted in several concerns related to installation and safe operation of charging stations. Also, the cost to install the commercial-grade infrastructure is prohibitive, and it would be difficult to process payments for the electricity. The DOE may revisit this in future years as transportation technology evolves. Several initiatives are already in place across the DOE complex that promote energy savings and sustainability. The Fernald Preserve uses solar panels to power portions of the site, and the LEED Platinum Visitors Center uses geothermal heating and a biowetland to treat domestic wastewater. Sustainability is a strategic goal of LM and the Fernald site will continue to adopt new strategies and technologies when feasible.

The stakeholder feedback in 2018 demonstrated support for site public amenities. However, lack of quantitative data regarding trail use is recognized as a limiting factor when analyzing their use at the Fernald Preserve. Installation of trail counters would allow for a more accurate estimate of public use of specific trails and amenities. This would help to prioritize existing trail management and the siting of new amenities. DOE recognizes this benefit and has included in the fiscal year 2019 baseline schedule the installation of pedestrian counters on site trails and the installation of vehicle counters on the site access road to capture both hikers and site visitors who do not use the trails.

5.4 Interpretive Services

The 2018 stakeholder survey showed that the local community enjoys interpretive services offered at the Fernald Preserve. Respondents were interested in expanded hours for the Visitors Center. A trial of expanded Sunday hours is currently being evaluated. If DOE were to agree to expanded hours, it is anticipated that the Visitors Center would be open from noon to 4 p.m. on Sundays.

Web-based and custom applications could provide additional information to the public when the Visitors Center is not open and would enhance visitors' experience while onsite. Web-based and mobile-based content would also give those not able to visit the site the ability to experience the Fernald Preserve. The site already has several tablet computers available for public use. These currently include plant and wildlife identification guides and a site photo gallery. Future enhanced site-specific information could be made available on these devices as well as a downloadable smartphone application. Mobile applications have the additional benefit of allowing DOE to provide real-time messaging regarding site closures (e.g., during inclement weather) and upcoming events, as well as the ability to receive enhanced feedback from visitors. LM has recently initiated the development of ESRI Story Maps to provide the public with information about LM sites. Story Maps is an internet-based application that combines interactive maps with narrative text, images, and multimedia content. More information regarding ESRI Story Maps is provided in Attachment 2.

Feedback from the two public workshops conducted by MKSK shows Fernald stakeholders are interested in developing additional programs and events centered on wildlife and habitat management. A focus on natural resources was reflected in the survey results as well, with respondents especially interested in learning about site ecological restoration.

When assessing national trends and attitudes, the use of social media was shown to play an important role in how people receive and share information. Also, a number of survey respondents encouraged DOE to increase marketing efforts to promote the Fernald Preserve. Again, the use of new technologies can expand how DOE interacts with the community. An enhanced social media presence would allow for quick and widespread dissemination of accurate and updated information. The use of social media is quickly evolving. LM recognizes this and is developing an approach that complies with DOE public affairs and cybersecurity policies. Any incorporation of social media at the Fernald Preserve would need to be evaluated to ensure compliance with DOE requirements. As stated in Section 3.7, existing traditional approaches for communicating with stakeholders continue to be used at the site.

6.0 Conclusion

The 2019 Fernald Preserve Master Plan presents a variety of options for managing the site and ensuring it remains as a community asset for years to come. The ideas presented in the plan are based on input from DOE, the DOE contractor, subcontract planning support, and Fernald stakeholders. Options described in the 2019 Master Plan are nonbinding and are contingent upon a variety of constraints, including regulatory compliance, cost, availability of resources, and stakeholder acceptance. At this point, these options are considered informed ideas that DOE may choose to pursue. Detailed project planning and stakeholder input would be needed to implement any specific activity. Nevertheless, this Master Plan provides a sound basis for DOE project planning at the Fernald Preserve in future years.

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Attachment 1

MKSK Stakeholder Survey and Workshop Results

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A stylized, light-colored woodpecker logo is positioned on the left side of the page. The woodpecker is facing right, with its long beak pointing towards the center. It has a crest on its head and a dark band across its chest. The background of the entire page is a blue-tinted photograph of a rural landscape featuring a gravel path, a wooden fence, and a field of tall grasses under a clear sky.

STAKEHOLDER SURVEY AND WORKSHOP RESULTS

FERNALD PRESERVE MASTER PLAN

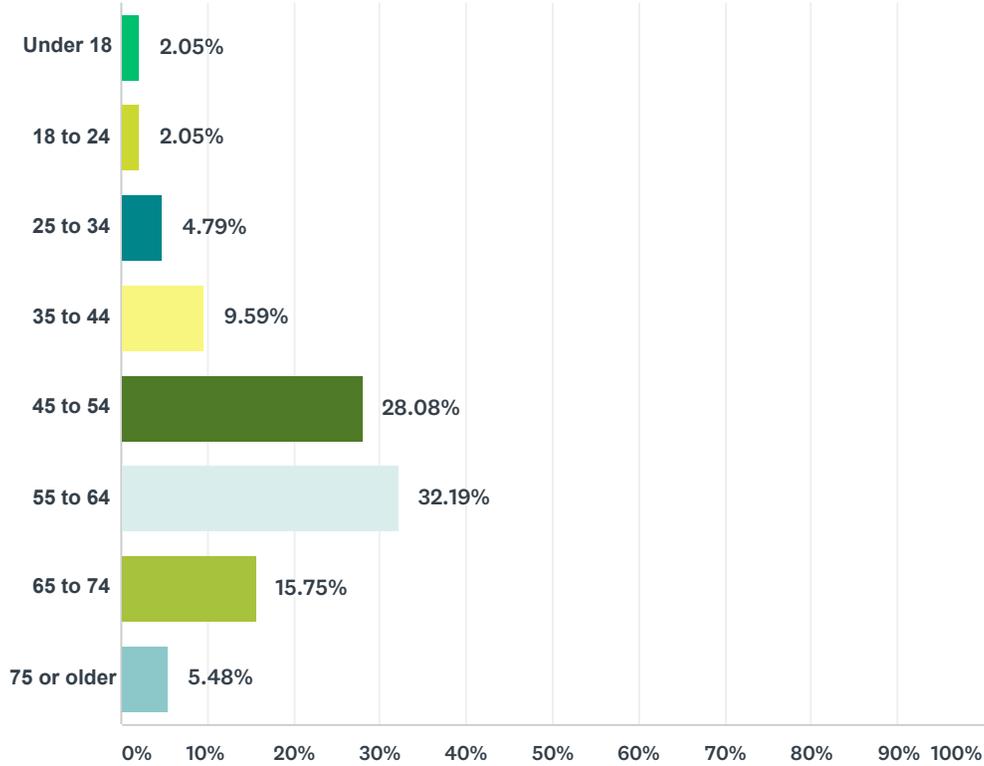
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May and June 2018 Stakeholder Survey Results

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Q1 What is your age?

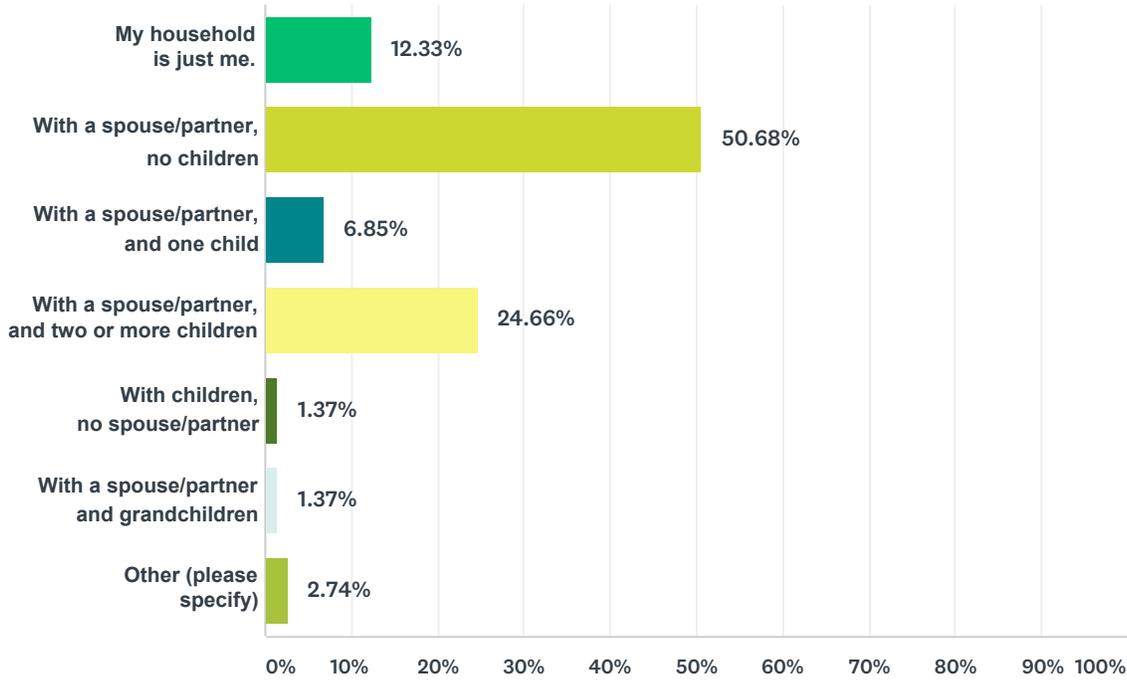
Answered: 146 Skipped: 1



ANSWER CHOICES	RESPONSES	
Under 18	2.05%	3
18 to 24	2.05%	3
25 to 34	4.79%	7
35 to 44	9.59%	14
45 to 54	28.08%	41
55 to 64	32.19%	47
65 to 74	15.75%	23
75 or older	5.48%	8
TOTAL		146

Q2 Describe your household or family size.

Answered: 146 Skipped: 1

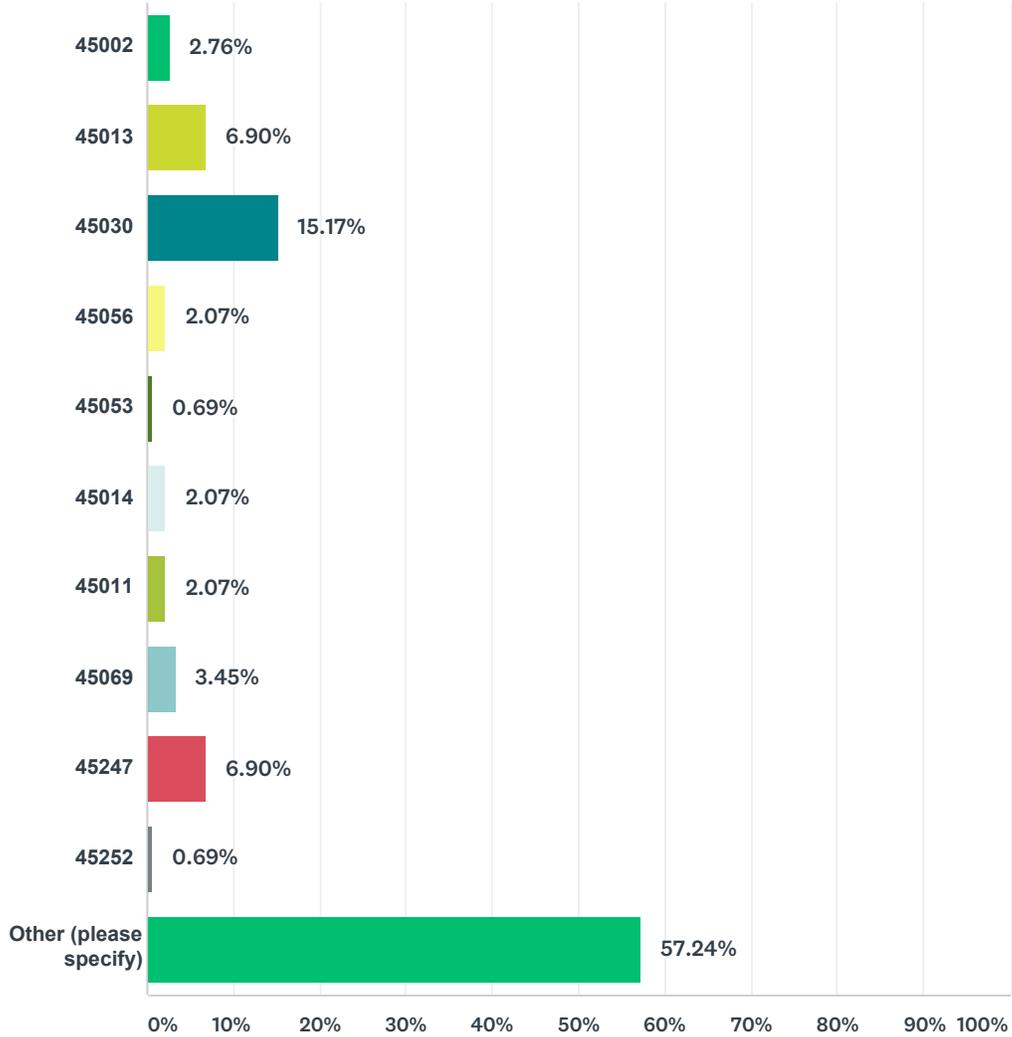


ANSWER CHOICES	RESPONSES	
My household is just me.	12.33%	18
With a spouse/partner, no children	50.68%	74
With a spouse/partner and one child	6.85%	10
With a spouse/partner and two or more children	24.66%	36
With children, no spouse/partner	1.37%	2
With a spouse/partner and grandchildren	1.37%	2
Other (please specify)	2.74%	4
TOTAL		146

#	OTHER (PLEASE SPECIFY)	DATE
1	My self and 2 sisters.	6/19/2018 8:33 AM
2	myself and 1 adult child	6/10/2018 12:03 PM
3	parents and 3 brothers	6/5/2018 1:50 PM
4	Mom, dad, and sister	5/25/2018 9:42 AM

Q3 In what zipcode do you live?

Answered: 145 Skipped: 2



ANSWER CHOICES	RESPONSES	
45002	2.76%	4
45013	6.90%	10
45030	15.17%	22
45056	2.07%	3
45053	0.69%	1
45014	2.07%	3
45011	2.07%	3
45069	3.45%	5
45247	6.90%	10
45252	0.69%	1

Fernald Preserve Survey

Other (please specify)	57.24%	83
TOTAL		145

#	OTHER (PLEASE SPECIFY)	DATE
1	45243	6/25/2018 1:51 PM
2	45211	6/21/2018 12:53 PM
3	99352	6/21/2018 9:30 AM
4	41017	6/19/2018 8:56 PM
5	45244	6/19/2018 9:54 AM
6	45211	6/19/2018 9:12 AM
7	45220	6/19/2018 12:05 AM
8	45236	6/18/2018 9:46 PM
9	41018	6/18/2018 8:28 PM
10	45212	6/18/2018 11:42 AM
11	47006	6/18/2018 10:35 AM
12	45233	6/18/2018 10:17 AM
13	47022	6/18/2018 10:16 AM
14	47240	6/18/2018 9:57 AM
15	47025	6/18/2018 9:51 AM
16	43215	6/18/2018 8:09 AM
17	47025	6/18/2018 7:53 AM
18	47001	6/18/2018 7:53 AM
19	45236	6/17/2018 5:34 PM
20	45238	6/17/2018 4:53 PM
21	45424	6/16/2018 6:32 PM
22	41074	6/16/2018 3:44 PM
23	45255	6/16/2018 11:32 AM
24	45248	6/16/2018 10:58 AM
25	45231	6/16/2018 9:23 AM
26	45239	6/15/2018 6:22 PM
27	80130	6/15/2018 4:15 PM
28	45039	6/15/2018 4:12 PM
29	45052	6/15/2018 2:07 PM
30	45231	6/15/2018 1:32 PM
31	45238	6/15/2018 1:18 PM
32	45211	6/15/2018 12:31 PM
33	45040	6/15/2018 10:04 AM
34	45238	6/15/2018 8:33 AM
35	45213	6/15/2018 4:58 AM
36	45005	6/14/2018 8:29 PM
37	45233	6/14/2018 5:45 PM

Fernald Preserve Survey

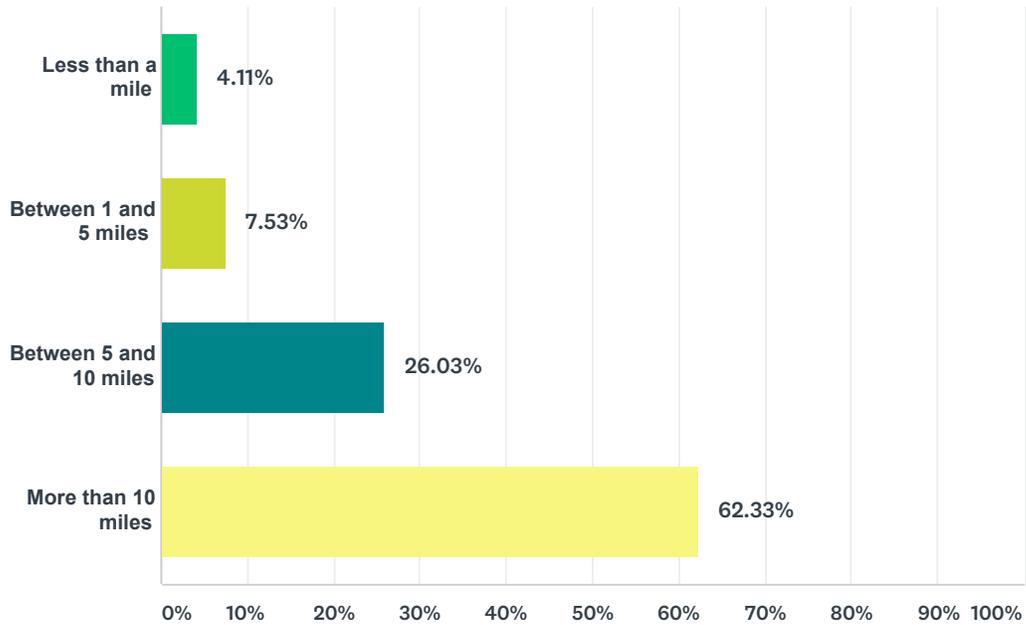
38	45387	6/14/2018 5:14 PM
39	45229	6/14/2018 4:28 PM
40	45211	6/14/2018 4:28 PM
41	45227	6/14/2018 3:00 PM
42	47060	6/14/2018 2:06 PM
43	45202	6/13/2018 1:08 PM
44	45241	6/13/2018 8:35 AM
45	45052	6/12/2018 9:59 PM
46	45209	6/12/2018 6:18 PM
47	45236	6/12/2018 6:14 PM
48	45238	6/12/2018 5:13 PM
49	45226	6/12/2018 4:10 PM
50	41017	6/12/2018 3:49 PM
51	45220	6/12/2018 3:44 PM
52	46038	6/12/2018 3:33 PM
53	45251	6/12/2018 3:11 PM
54	41017	6/12/2018 2:43 PM
55	45211	6/12/2018 1:51 PM
56	45214	6/12/2018 1:39 PM
57	45238	6/12/2018 1:20 PM
58	45245	6/12/2018 12:23 PM
59	45248	6/12/2018 9:16 AM
60	47025	6/12/2018 8:07 AM
61	45220	6/11/2018 5:05 PM
62	45327	6/11/2018 8:34 AM
63	48473	6/10/2018 9:50 PM
64	45230	6/10/2018 11:25 AM
65	45140	6/10/2018 10:21 AM
66	47060	6/8/2018 2:34 PM
67	45429	6/8/2018 1:04 PM
68	45690	6/7/2018 4:34 PM
69	45005	6/7/2018 2:05 PM
70	23185	6/6/2018 3:56 PM
71	45150	6/6/2018 1:36 PM
72	45233	6/6/2018 1:10 PM
73	45601	6/6/2018 12:50 PM
74	45244	6/4/2018 1:21 PM
75	45245	6/2/2018 11:02 AM
76	47060	5/31/2018 2:05 PM
77	45227	5/29/2018 12:17 PM
78	45248	5/29/2018 10:49 AM

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79	41075	5/25/2018 9:19 AM
80	45231	5/25/2018 7:02 AM
81	41042	5/25/2018 6:38 AM
82	43062	5/24/2018 4:06 PM
83	45211	5/24/2018 3:18 PM

Q4 How far do you live from the Fernald Preserve?

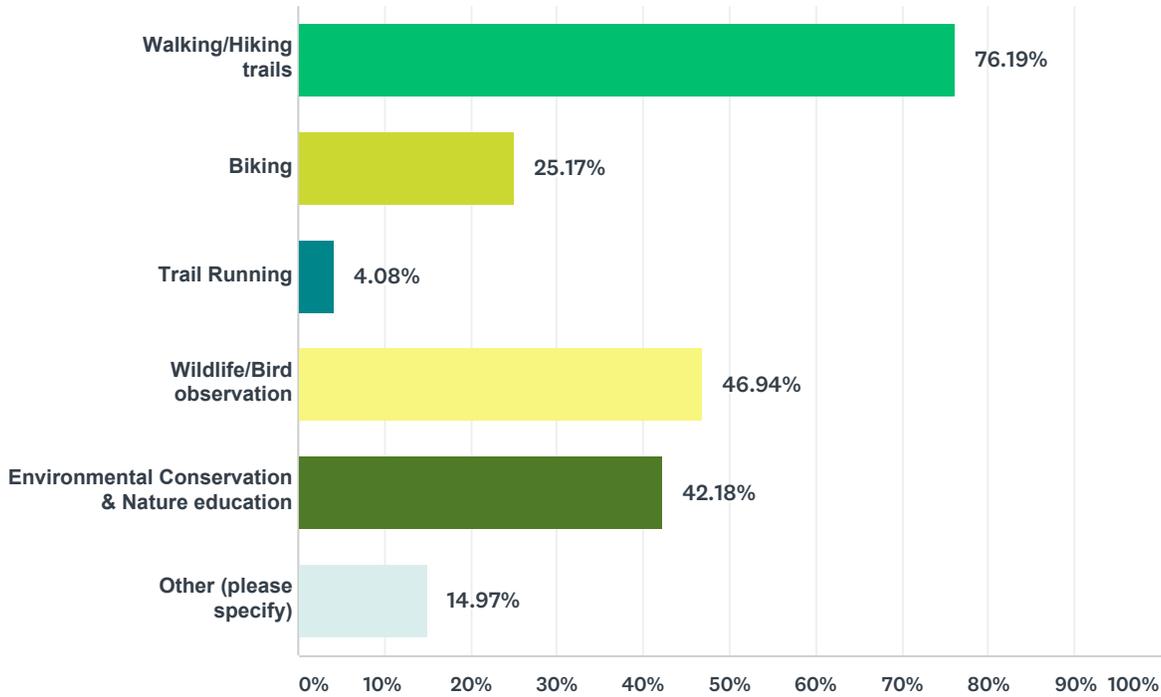
Answered: 146 Skipped: 1



ANSWER CHOICES	RESPONSES	
Less than a mile	4.11%	6
Between 1 and 5 miles	7.53%	11
Between 5 and 10 miles	26.03%	38
More than 10 miles	62.33%	91
TOTAL		146

Q5 In general, what recreation/outdoor activities do you most frequently engage in? (Select up to three)

Answered: 147 Skipped: 0



ANSWER CHOICES	RESPONSES	
Walking/Hiking trails	76.19%	112
Biking	25.17%	37
Trail Running	4.08%	6
Wildlife/Bird observation	46.94%	69
Environmental Conservation & Nature education	42.18%	62
Other (please specify)	14.97%	22
Total Respondents: 147		

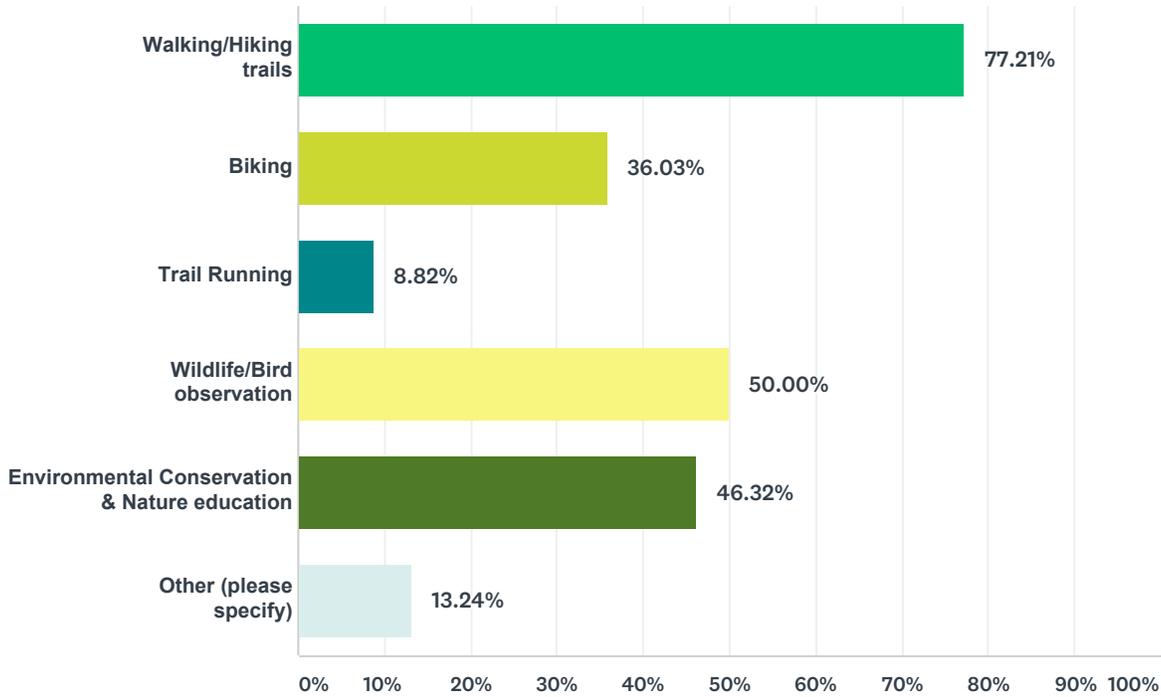
#	OTHER (PLEASE SPECIFY)	DATE
1	yard, sports	7/2/2018 8:26 AM
2	Fishing	6/21/2018 9:30 AM
3	Photography	6/19/2018 8:56 PM
4	kayaking	6/19/2018 9:54 AM
5	We have a farm, outdoor concerns and activities abundtant	6/18/2018 9:11 AM
6	Photography	6/16/2018 6:32 PM
7	We use the museum facilities for events	6/15/2018 4:15 PM
8	Workshops given at Fernald by outside sources	6/15/2018 4:12 PM

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9	Kayaking	6/15/2018 1:18 PM
10	Sitting on a bench and meditate and contemplate-relax	6/15/2018 12:31 PM
11	kayaking	6/15/2018 10:37 AM
12	plants	6/15/2018 8:03 AM
13	rarely go there. Have toured museum a couple of times.	6/14/2018 8:29 PM
14	Classroom field trips	6/14/2018 4:28 PM
15	tennis	6/13/2018 1:08 PM
16	Historical research	6/12/2018 6:18 PM
17	Gardening	6/12/2018 4:42 PM
18	Provide nesting boxes and stove pipe predator baffles for Eastern Bluebird nesting opportunities and success !	6/12/2018 2:01 PM
19	Volunteer	6/8/2018 12:58 PM
20	Yardwork and property maintenance	6/6/2018 1:36 PM
21	Horseback riding	6/6/2018 12:50 PM
22	Flower Gardening	5/31/2018 2:05 PM

Q6 Do you travel farther than 5 miles from your home to do any of these activities? (Select all that apply)

Answered: 136 Skipped: 11



ANSWER CHOICES	RESPONSES	
Walking/Hiking trails	77.21%	105
Biking	36.03%	49
Trail Running	8.82%	12
Wildlife/Bird Observation	50.00%	68
Environmental Conservation & Nature Education	46.32%	63
Other (please specify)	13.24%	18
Total Respondents: 136		

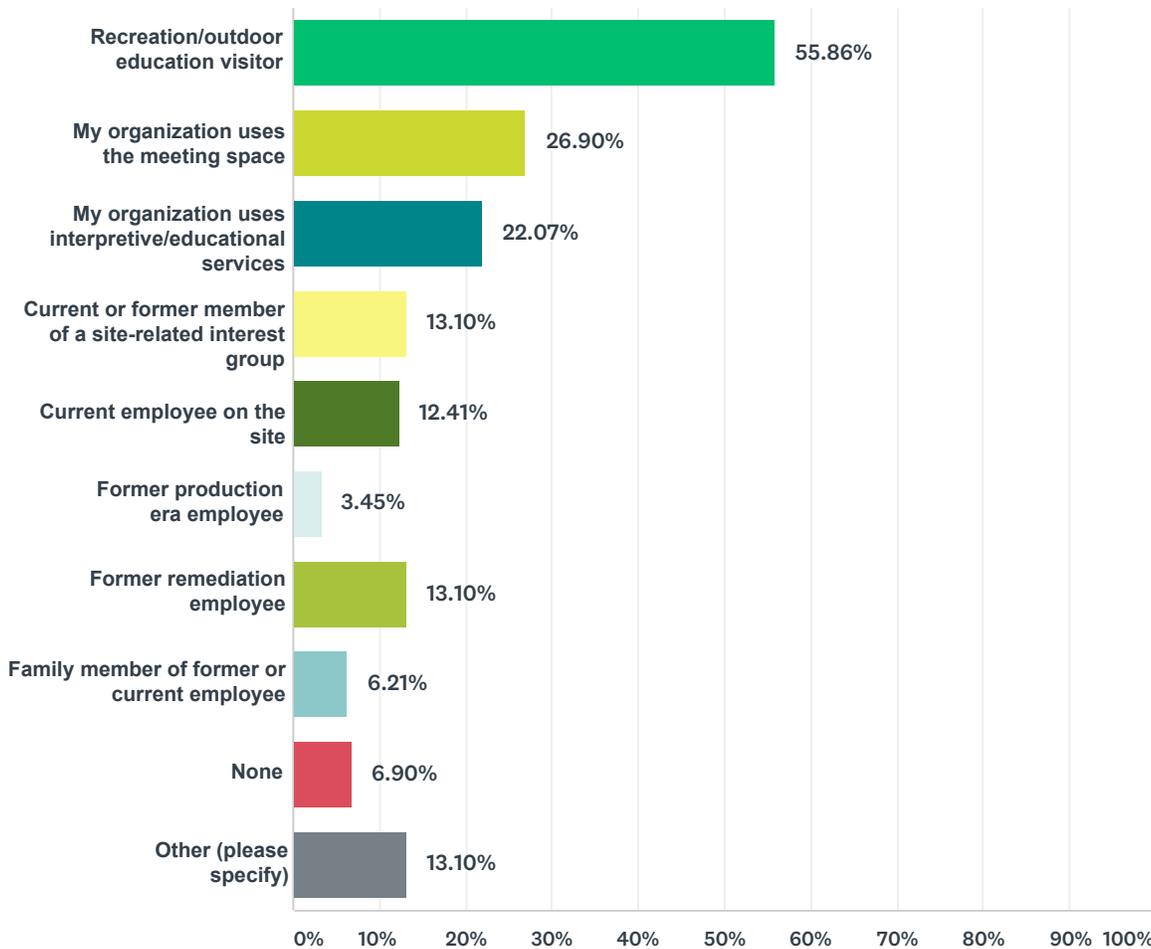
#	OTHER (PLEASE SPECIFY)	DATE
1	car	7/2/2018 8:26 AM
2	Photography	6/19/2018 8:56 PM
3	n.a.	6/18/2018 9:11 AM
4	Photography	6/16/2018 6:32 PM
5	Hunting / Fishing	6/16/2018 9:23 AM
6	Events	6/15/2018 4:15 PM
7	Kayaking	6/15/2018 3:35 PM
8	kayaking	6/15/2018 1:32 PM

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9	kayaking	6/15/2018 1:18 PM
10	rollerblade	6/15/2018 12:31 PM
11	kayaking	6/15/2018 10:37 AM
12	none	6/14/2018 8:29 PM
13	tennis	6/13/2018 1:08 PM
14	Hunting Deer	6/12/2018 2:01 PM
15	Volunteer	6/8/2018 12:58 PM
16	Touring National Parks and USA	6/6/2018 3:56 PM
17	NO	6/6/2018 1:36 PM
18	Horseback riding	6/6/2018 12:50 PM

Q7 Describe your relationship with the Fernald Preserve. (Select all that apply)

Answered: 145 Skipped: 2



ANSWER CHOICES	RESPONSES	
Recreation/outdoor education visitor	55.86%	81
My organization uses the meeting space	26.90%	39
My organization uses interpretive/educational services	22.07%	32
Current or former member of a site-related interest group	13.10%	19
Current employee on the site	12.41%	18
Former production era employee	3.45%	5
Former remediation employee	13.10%	19
Family member of former or current employee	6.21%	9
None	6.90%	10
Other (please specify)	13.10%	19

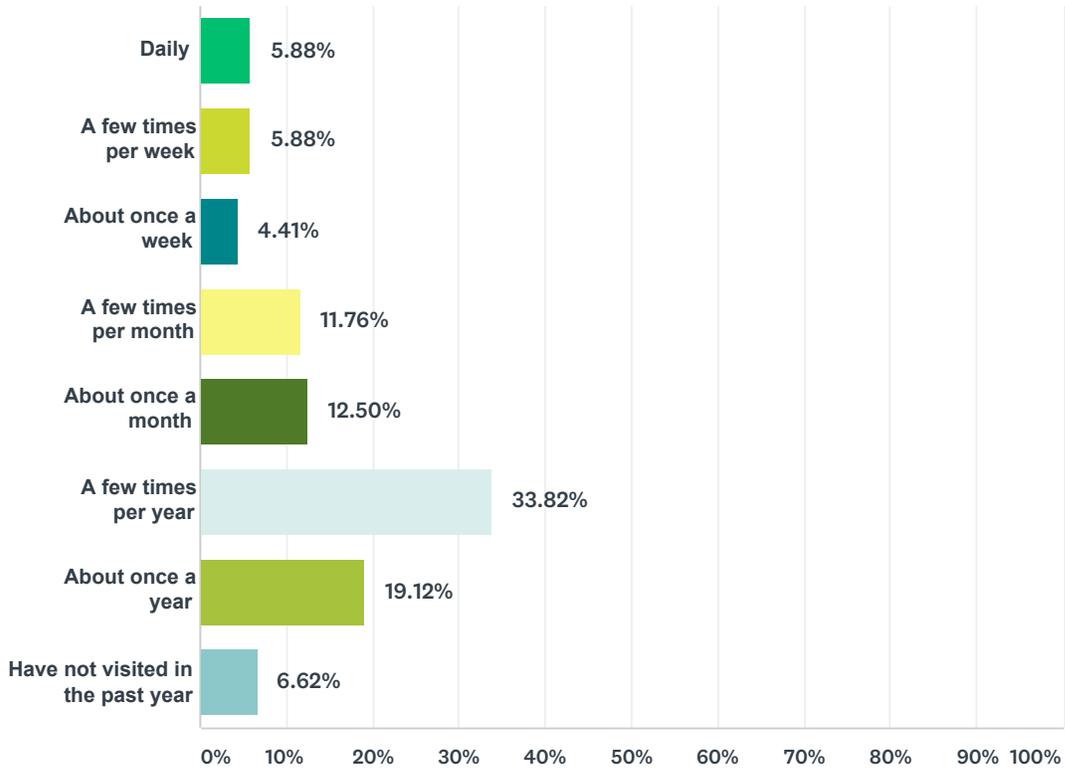
Fernald Preserve Survey

Total Respondents: 145

#	OTHER (PLEASE SPECIFY)	DATE
1	live next door	7/2/2018 8:32 AM
2	live across the street	7/2/2018 8:26 AM
3	came for homeschool field trip	6/22/2018 4:49 AM
4	participated in the burying beetle release project	6/20/2018 3:51 PM
5	Contractor for Environ impacts on GMR	6/19/2018 9:12 AM
6	Neighbor during the bad years	6/18/2018 10:14 AM
7	Field Trip with my clas each year	6/18/2018 9:57 AM
8	Served on FHES, HES EWG, FCC Advisory Group, FCHEC,Inc.	6/18/2018 9:11 AM
9	Cincinnati State instructor taking students on tour of the site	6/17/2018 4:53 PM
10	We come to go birding	6/16/2018 6:32 PM
11	birder	6/16/2018 10:58 AM
12	birder, lover of wildlife	6/15/2018 9:57 PM
13	think it is an important wild life ancor and part of a nature corridor from Hueston Woods and Rush Run to Big Bone Landing. Get rid of invasives. Denontration area of conservation and rehabilitation-save and restore extinpated species.	6/15/2018 12:31 PM
14	Second grade teacher	6/14/2018 4:28 PM
15	Researcher	6/12/2018 6:18 PM
16	regulator	6/8/2018 1:04 PM
17	federal employee working on future planning at portsmouth	6/7/2018 4:34 PM
18	Retired DOE employee	6/6/2018 3:56 PM
19	Community Stakeholder, Stewardship of site.	5/25/2018 3:21 PM

Q8 How often do you visit the Fernald Preserve? (Select the option that most closely applies)

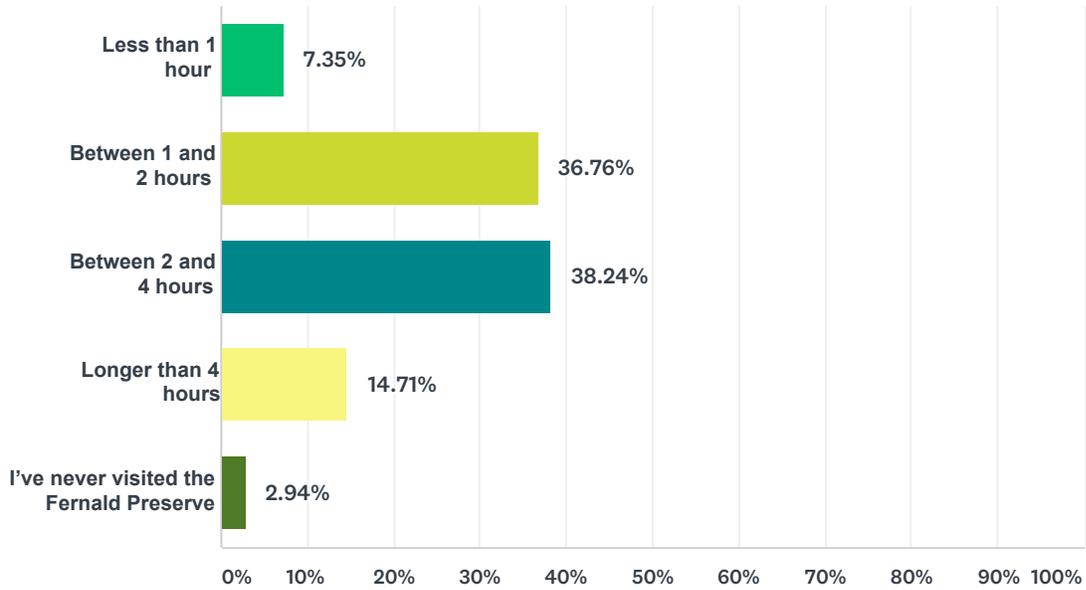
Answered: 136 Skipped: 11



ANSWER CHOICES	RESPONSES	
Daily	5.88%	8
A few times per week	5.88%	8
About once a week	4.41%	6
A few times per month	11.76%	16
About once a month	12.50%	17
A few times per year	33.82%	46
About once a year	19.12%	26
Have not visited in the past year	6.62%	9
TOTAL		136

Q9 When you visit the Fernald Preserve, how much time do you typically spend there?

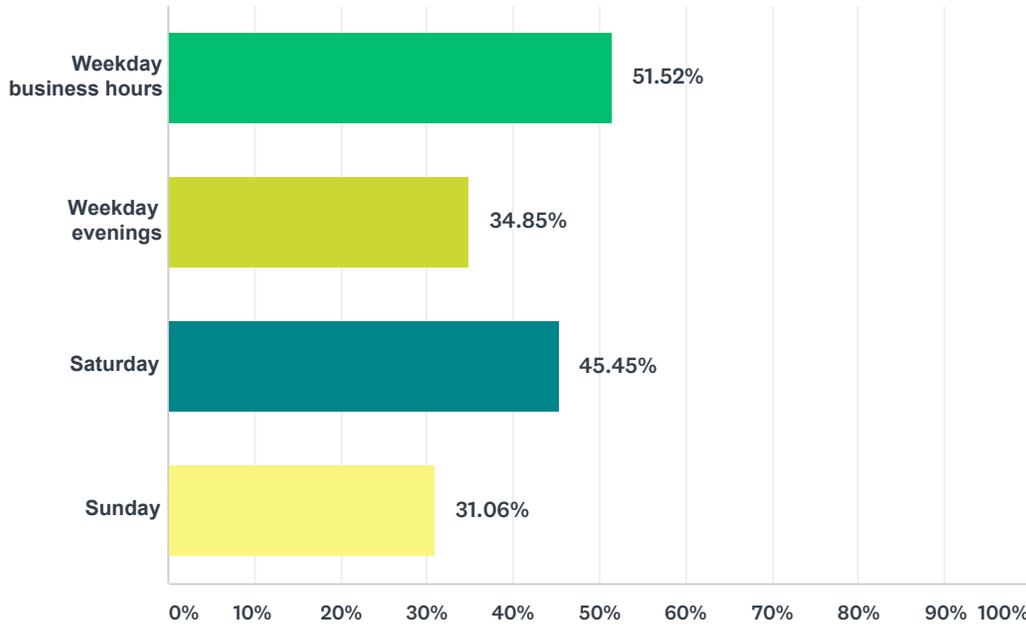
Answered: 136 Skipped: 11



ANSWER CHOICES	RESPONSES	
Less than 1 hour	7.35%	10
Between 1 and 2 hours	36.76%	50
Between 2 and 4 hours	38.24%	52
Longer than 4 hours	14.71%	20
I've never visited the Fernald Preserve	2.94%	4
TOTAL		136

Q10 When do you typically visit the Fernald Preserve (Select all that apply):

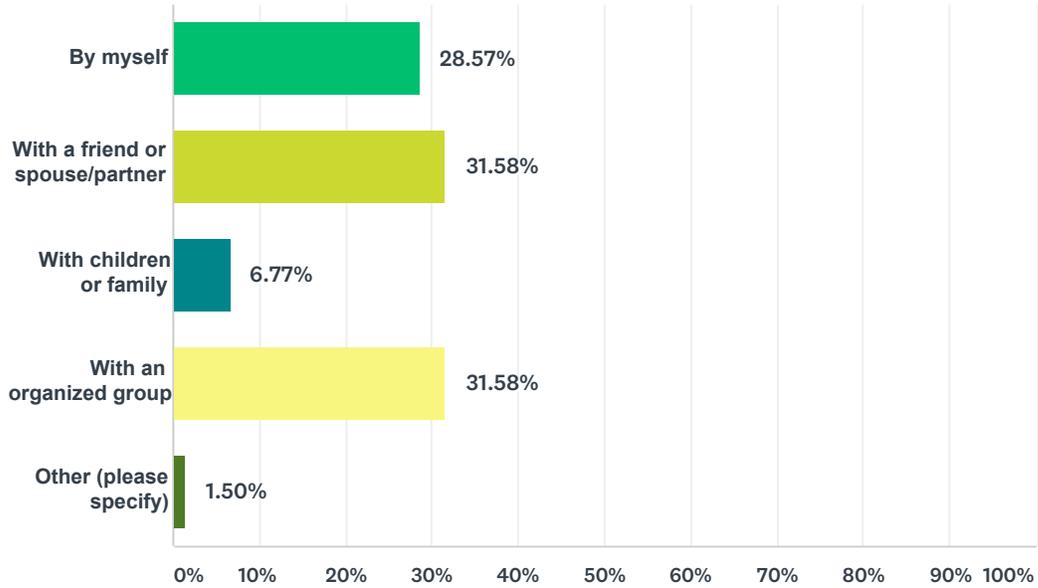
Answered: 132 Skipped: 15



ANSWER CHOICES	RESPONSES	
Weekday business hours	51.52%	68
Weekday evenings	34.85%	46
Saturday	45.45%	60
Sunday	31.06%	41
Total Respondents: 132		

Q11 When you visit the Fernald Preserve, you are typically:

Answered: 133 Skipped: 14

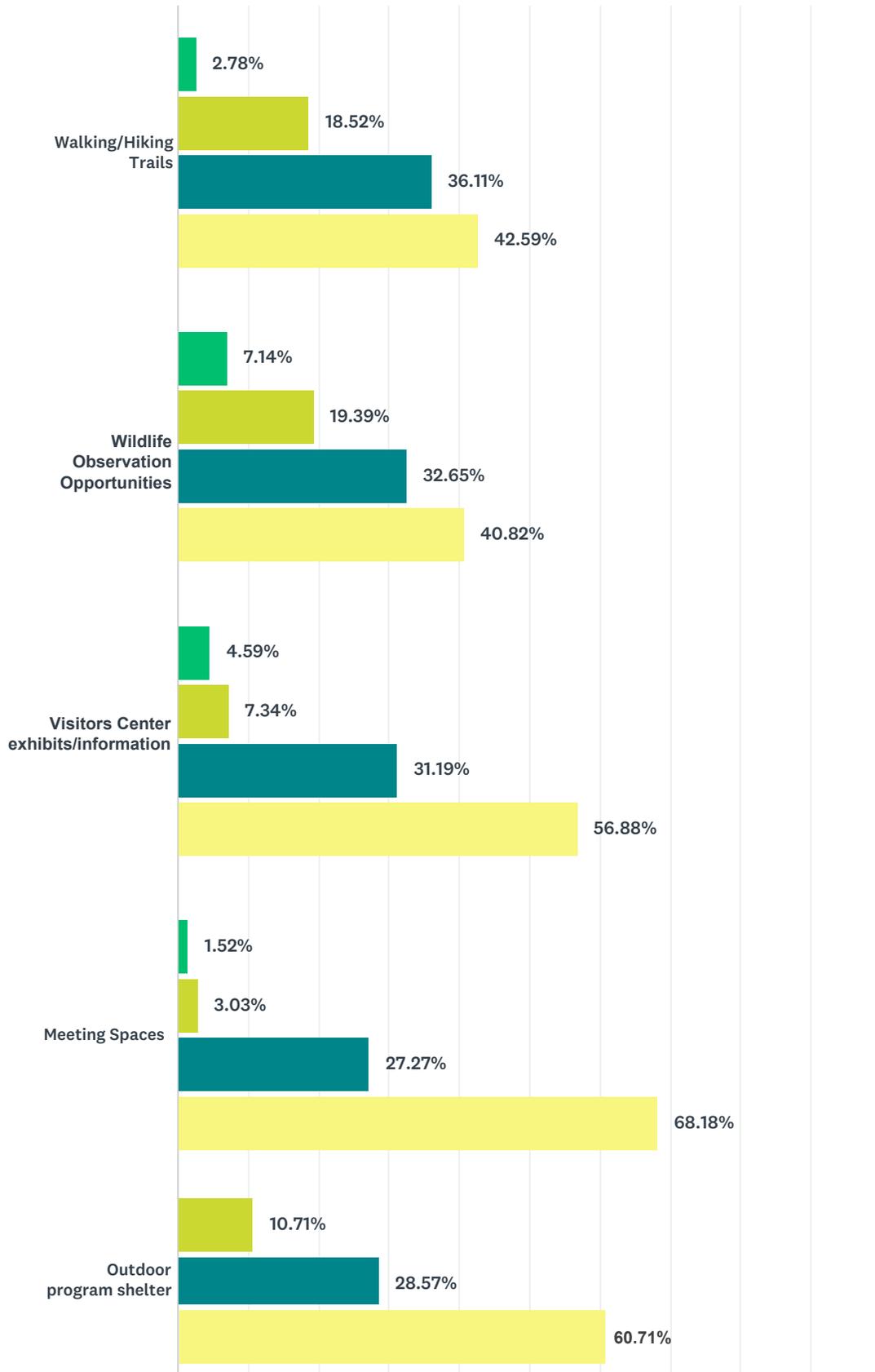


ANSWER CHOICES	RESPONSES	
By myself	28.57%	38
With a friend or spouse/partner	31.58%	42
With children or family	6.77%	9
With an organized group	31.58%	42
Other (please specify)	1.50%	2
TOTAL		133

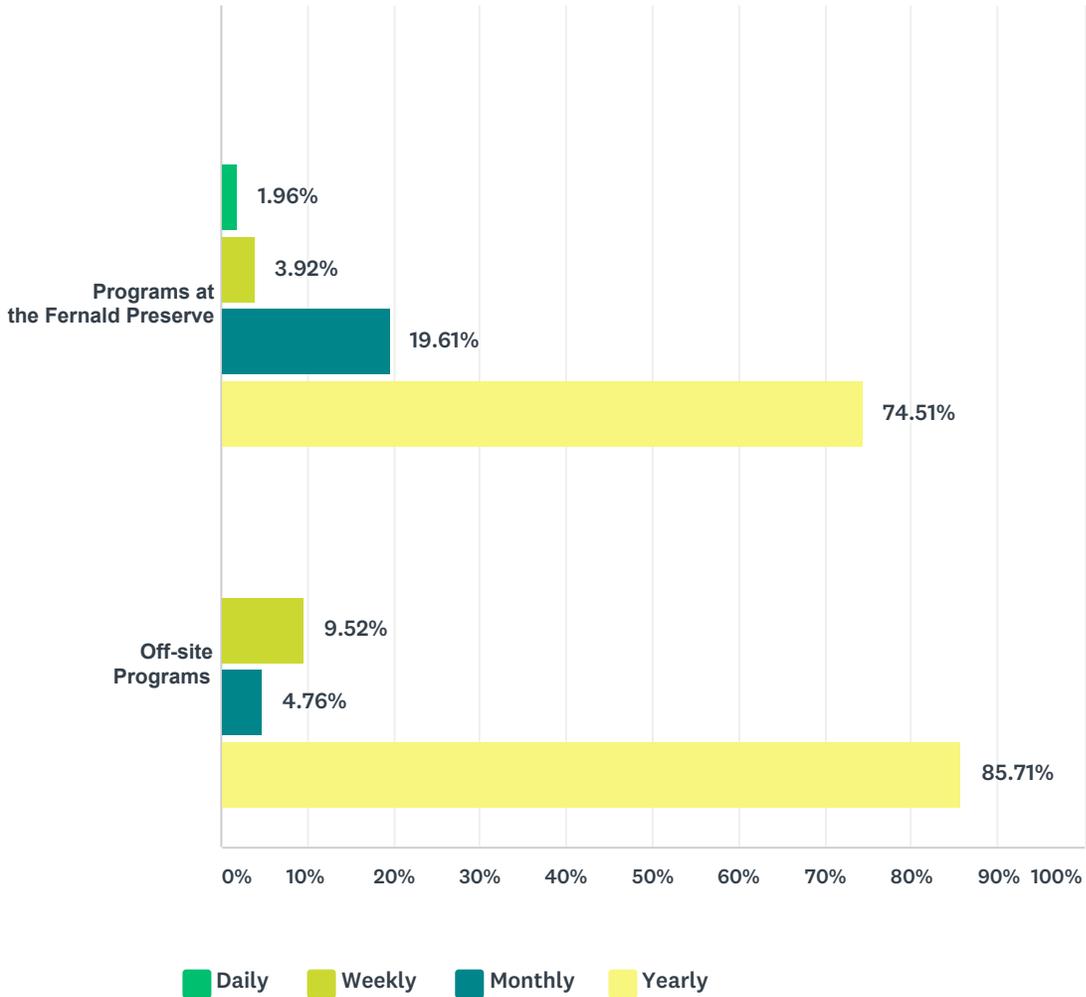
#	OTHER (PLEASE SPECIFY)	DATE
1	work	6/25/2018 9:41 AM
2	Working	6/12/2018 7:45 AM

Q12 How often do you use each of these?

Answered: 130 Skipped: 17



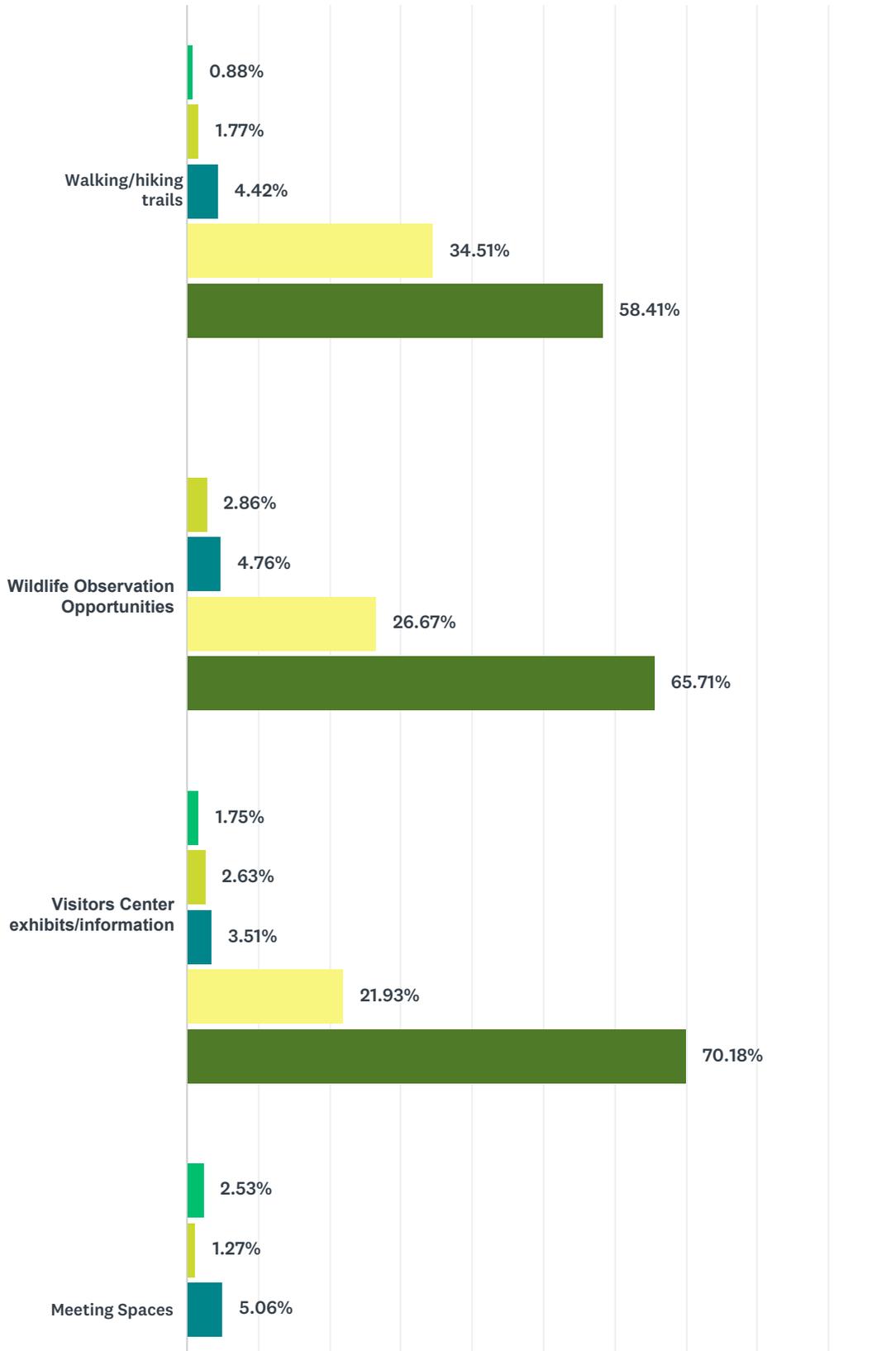
Fernald Preserve Survey



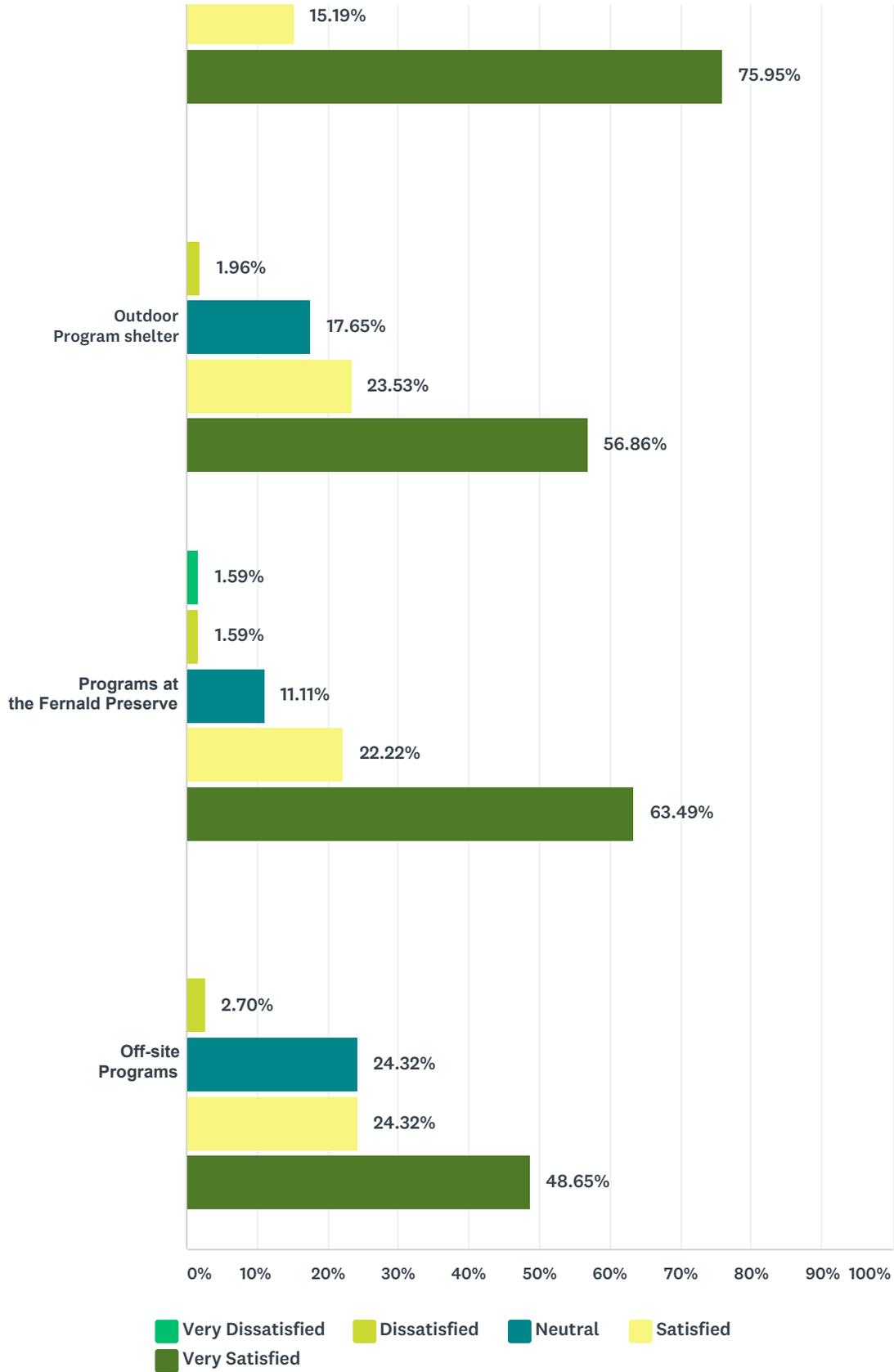
	DAILY	WEEKLY	MONTHLY	YEARLY	TOTAL
Walking/Hiking Trails	2.78% 3	18.52% 20	36.11% 39	42.59% 46	108
Wildlife Observation Opportunities	7.14% 7	19.39% 19	32.65% 32	40.82% 40	98
Visitors Center exhibits/information	4.59% 5	7.34% 8	31.19% 34	56.88% 62	109
Meeting Spaces	1.52% 1	3.03% 2	27.27% 18	68.18% 45	66
Outdoor program shelter	0.00% 0	10.71% 3	28.57% 8	60.71% 17	28
Programs at the Fernald Preserve (for example: Night Hike, Kaleidoscope Craft, Bats and Moths)	1.96% 1	3.92% 2	19.61% 10	74.51% 38	51
Off-site Programs (for example: speaking engagement or information booth)	0.00% 0	9.52% 2	4.76% 1	85.71% 18	21

Q13 Indicate your level of satisfaction with the following programs, services, facilities and/or amenities.

Answered: 130 Skipped: 17



Fernald Preserve Survey



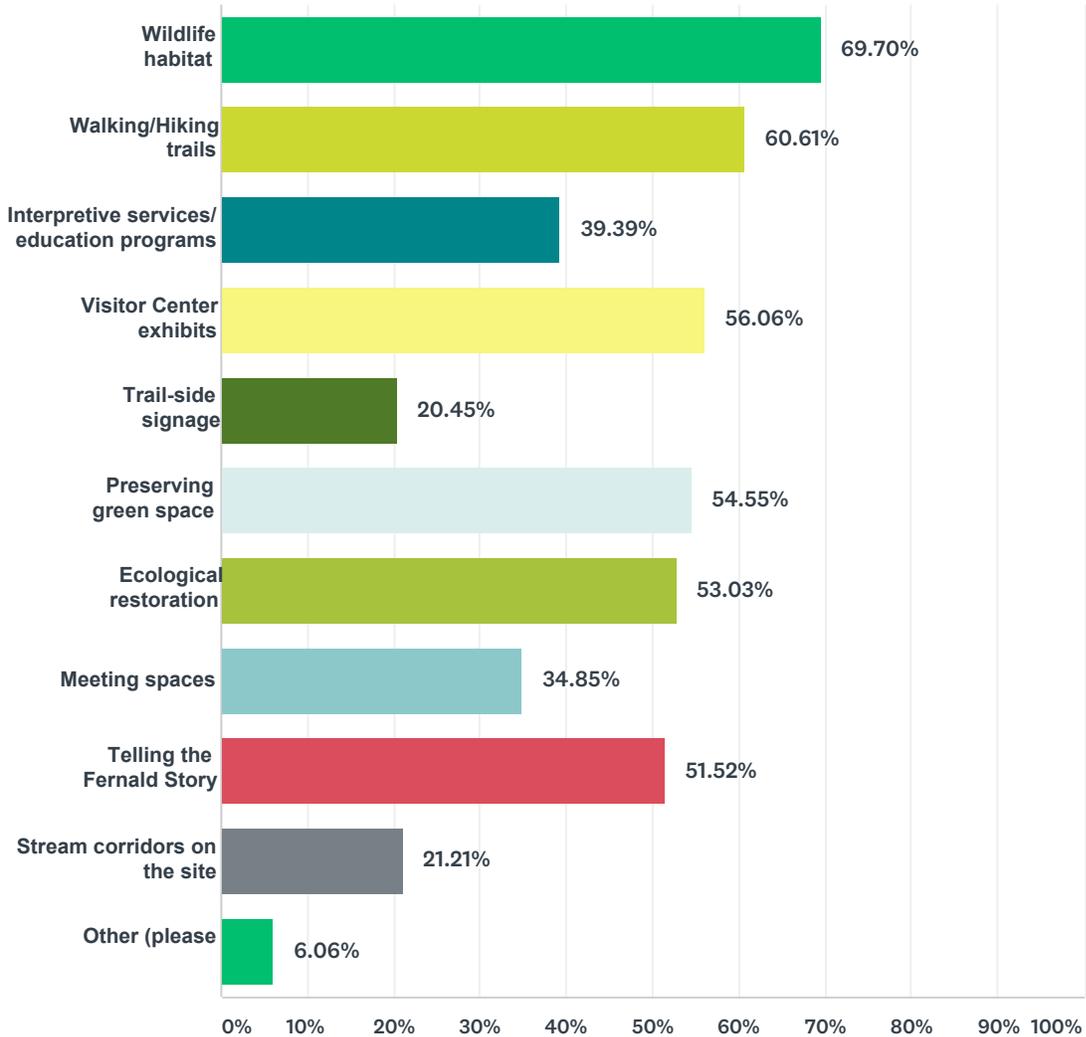
	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED	TOTAL
Walking/hiking trails	0.88%	1.77%	4.42%	34.51%	58.41%	113
	1	2	5	39	66	

Fernald Preserve Survey

Wildlife Observation Opportunities	0.00% 0	2.86% 3	4.76% 5	26.67% 28	65.71% 69	105
Visitors Center exhibits/information	1.75% 2	2.63% 3	3.51% 4	21.93% 25	70.18% 80	114
Meeting Spaces	2.53% 2	1.27% 1	5.06% 4	15.19% 12	75.95% 60	79
Outdoor Program shelter	0.00% 0	1.96% 1	17.65% 9	23.53% 12	56.86% 29	51
Programs at the Fernald Preserve (for example: Night Hike, Kaleidoscope Craft, Bats and Moths)	1.59% 1	1.59% 1	11.11% 7	22.22% 14	63.49% 40	63
Off-site Programs (for example: speaking engagement or information booth)	0.00% 0	2.70% 1	24.32% 9	24.32% 9	48.65% 18	37

Q14 What aspects of Fernald Preserve are working best today?

Answered: 132 Skipped: 15



ANSWER CHOICES	RESPONSES	
Wildlife habitat	69.70%	92
Walking/Hiking trails	60.61%	80
Interpretive services/education/programs	39.39%	52
Visitor Center exhibits	56.06%	74
Trail-side signage	20.45%	27
Preserving green space	54.55%	72
Ecological restoration	53.03%	70
Meeting spaces	34.85%	46
Telling the Fernald Story	51.52%	68
Stream corridors on the site	21.21%	28

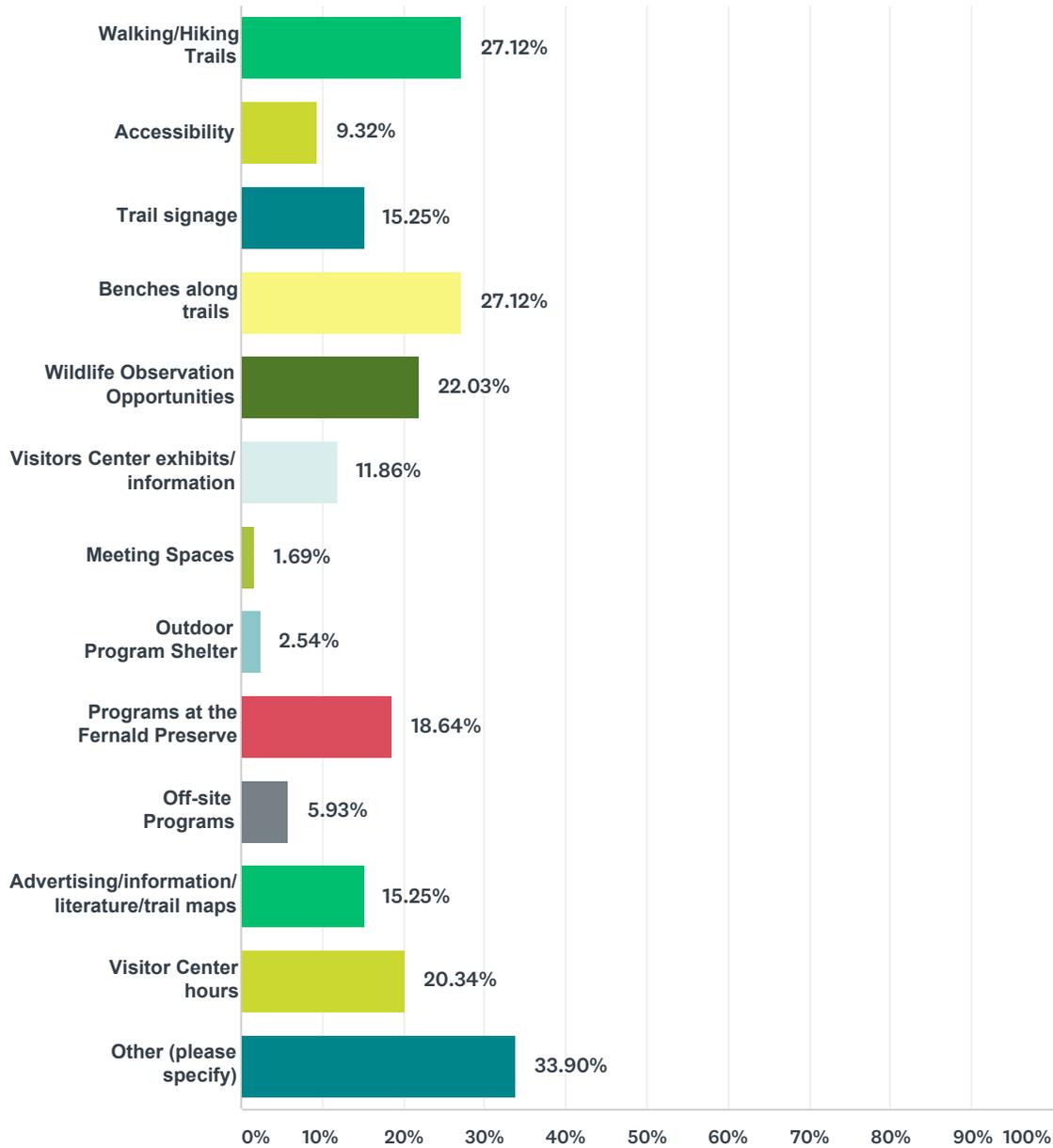
Fernald Preserve Survey

Other (please specify)	6.06%	8
Total Respondents: 132		

#	OTHER (PLEASE SPECIFY)	DATE
1	none	7/2/2018 8:27 AM
2	It is a great meeting place for bike riders to meet and start/finish their rides.	6/18/2018 10:41 AM
3	I would like to see the trails paved so that people with disabilities could use the trails too.	6/16/2018 6:38 PM
4	need more trails, wider trails that go in the woods	6/14/2018 4:30 PM
5	All of the above are wonderful educational opportunities	6/14/2018 2:09 PM
6	None	6/10/2018 12:08 PM
7	The fact that it is closed	6/10/2018 12:06 PM
8	Unknown due to infrequency of visiting	6/6/2018 3:57 PM

Q15 Which of the following current programming, services, facilities and/or amenities would you like to see changes to in the future?

Answered: 118 Skipped: 29



ANSWER CHOICES	RESPONSES	
Walking/Hiking Trails	27.12%	32
Accessibility	9.32%	11
Trail signage	15.25%	18
Benches along trails	27.12%	32
Wildlife Observation Opportunities	22.03%	26

Fernald Preserve Survey

Visitors Center exhibits/information	11.86%	14
Meeting Spaces	1.69%	2
Outdoor Program Shelter	2.54%	3
Programs at the Fernald Preserve	18.64%	22
Off-site Programs	5.93%	7
Advertising/information/literature/trail maps	15.25%	18
Visitor Center hours	20.34%	24
Other (please specify)	33.90%	40
Total Respondents: 118		

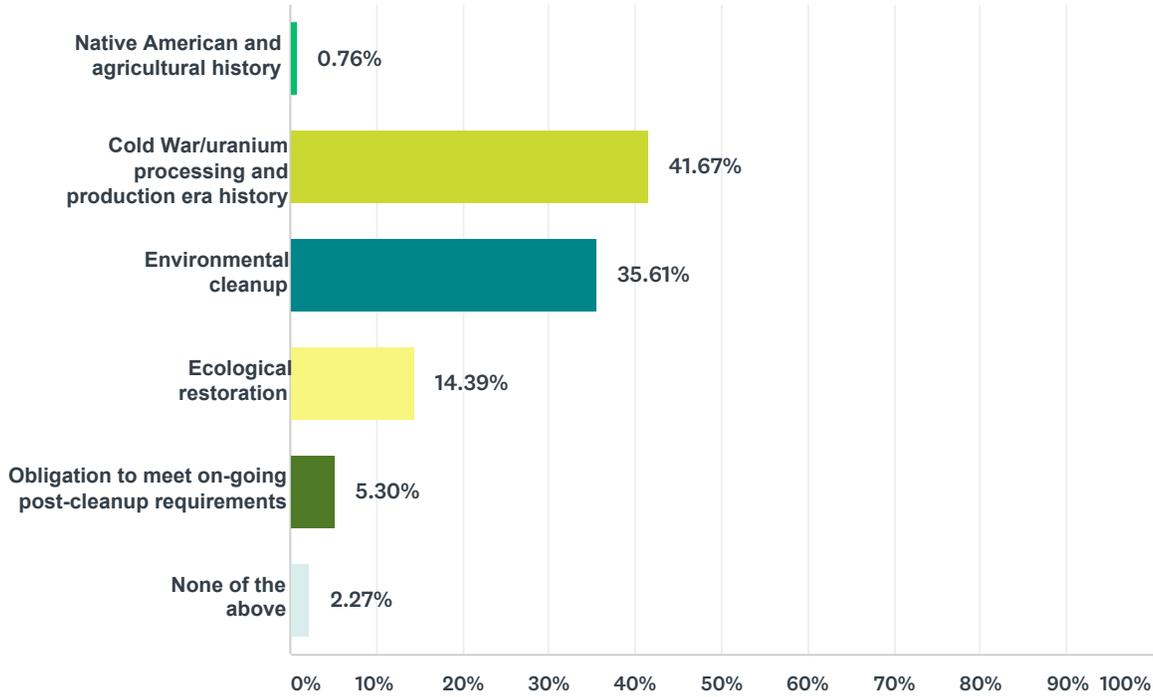
#	OTHER (PLEASE SPECIFY)	DATE
1	none	7/2/2018 8:27 AM
2	Very happy with it as it is!	6/19/2018 9:00 PM
3	I am not a frequent visitor and cannot respond.	6/19/2018 8:36 AM
4	None	6/19/2018 12:09 AM
5	no problems noted	6/18/2018 10:18 AM
6	Increase availability of information regarding remediation	6/18/2018 10:06 AM
7	More of the above	6/18/2018 9:20 AM
8	advertising volunteer opportunities if available	6/18/2018 7:56 AM
9	none	6/18/2018 7:55 AM
10	NOTHING AT ALL!! GREAT PLACE!	6/17/2018 4:55 PM
11	It would be nice if you could drive through the whole preserve. For us elderly people and disabilities	6/16/2018 6:38 PM
12	Happy with current services	6/16/2018 11:35 AM
13	better bird blind, with 3 choices of window heights. If you are 5 feet 3 inches, you are too tall or too short to use cameras out the viewing windows. need more choices and larger...put a bench in there, too....and keep out the wasps!	6/15/2018 10:01 PM
14	More of the roads accessible; additional trails; add some porta-potties along trails (yes, I am female)	6/15/2018 8:17 PM
15	none that I can think of	6/15/2018 1:21 PM
16	Complete history. Tell and have more on ancient Indian activity in the past.	6/15/2018 12:48 PM
17	Night wildlife viewing with night-vision optics available	6/14/2018 9:55 PM
18	NA	6/14/2018 5:16 PM
19	more trails, benches with built in shade, please build a beaver observation deck over the water, open on weekends both Sat and Sun	6/14/2018 4:30 PM
20	None	6/14/2018 3:02 PM
21	natural surface trails	6/12/2018 4:12 PM
22	I personally would love to see Fernald connected to Miami Whitewater Forest via bike path, then ultimately connect to the Great Miami Path which currently has its southern terminus in Fairfield.	6/12/2018 3:13 PM
23	Bike trail connection	6/12/2018 2:45 PM
24	Bike trails connecting MWF.	6/12/2018 2:42 PM
25	I would like to see the Preserve connected to other area parks via a bike/walkingpath.	6/12/2018 2:17 PM

Fernald Preserve Survey

26	Uncertain	6/12/2018 2:03 PM
27	would like to see it tied and made accessable to Miami Whitewater	6/12/2018 1:55 PM
28	Expand the visitor center exhibits - there is so much history to the Fernald site	6/12/2018 12:26 PM
29	I want it closed who put a nature preserve where there use to be a power plant	6/10/2018 12:08 PM
30	CLOSE IT DOWN	6/10/2018 12:06 PM
31	possible bike trail connection	6/8/2018 1:15 PM
32	some sort of blocking large windows to avoid bird injuries.	6/8/2018 1:07 PM
33	N/A	6/7/2018 4:36 PM
34	Unknown	6/6/2018 3:57 PM
35	build a bird blind by the water at the lodge pond and wetlands to weapons pond	6/5/2018 4:05 PM
36	No real changes currently come to mind.	5/31/2018 1:57 PM
37	Paved biking/walking path connected to Miami Whitewater Forest	5/29/2018 10:53 AM
38	NO changes all programs are important.	5/25/2018 3:28 PM
39	It's great the way it is!!! No changes needed!!!	5/24/2018 4:56 PM
40	I would like to see the hiking trails expanded to the western portion of the site over the old RR bridge. And perhaps an biking trail that joins the Shaker Trace Trail off-site. I also think the programs offered are nice. But it would be special to have some kind of a "must-see" event once per year. What that would be I suppose is a concert, picnic, Striker's Fernald Preserve Day, or a kind of awareness-oriented festival.	5/24/2018 4:05 PM

Q16 What part of Fernald Preserve's history are you most familiar with?

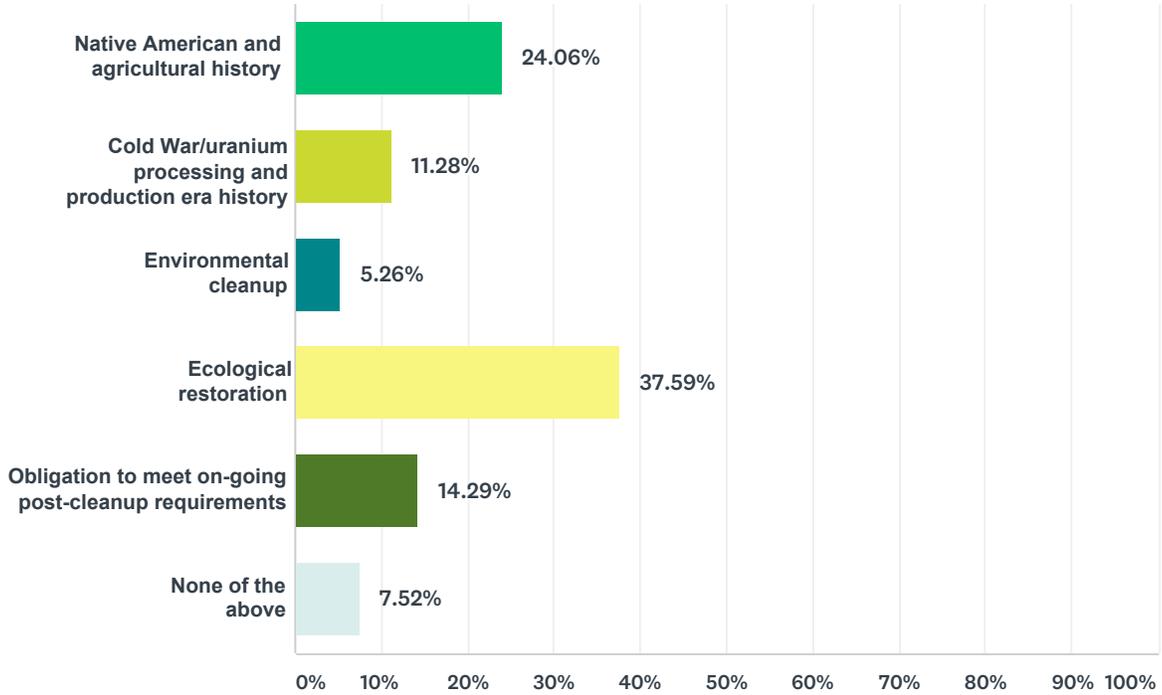
Answered: 132 Skipped: 15



ANSWER CHOICES	RESPONSES	
Native American and agricultural history	0.76%	1
Cold War/uranium processing and production era history	41.67%	55
Environmental cleanup	35.61%	47
Ecological restoration	14.39%	19
Obligation to meet on-going and post-cleanup requirements	5.30%	7
None of the above	2.27%	3
TOTAL		132

Q17 What part of Fernald Preserve's history are you most interested in learning about?

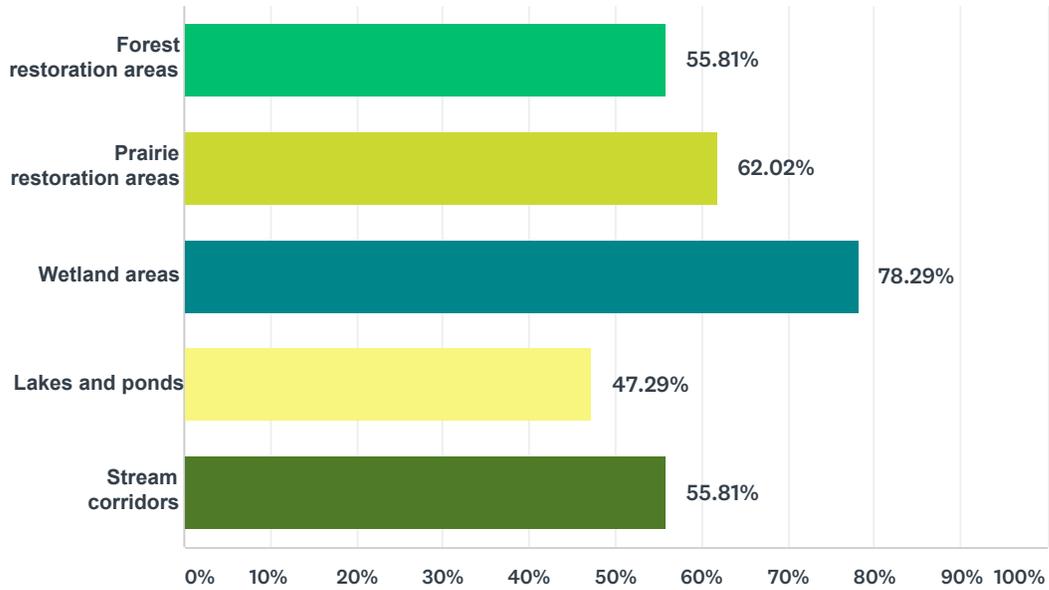
Answered: 133 Skipped: 14



ANSWER CHOICES	RESPONSES	
Native American and agricultural history	24.06%	32
Cold War/uranium processing and production era history	11.28%	15
Environmental cleanup	5.26%	7
Ecological restoration	37.59%	50
Obligation to meet on-going and post-cleanup requirements	14.29%	19
None of the above	7.52%	10
TOTAL		133

Q18 Which of the following natural areas and ecosystems at Fernald Preserve do you feel are most important? (Select all that apply)

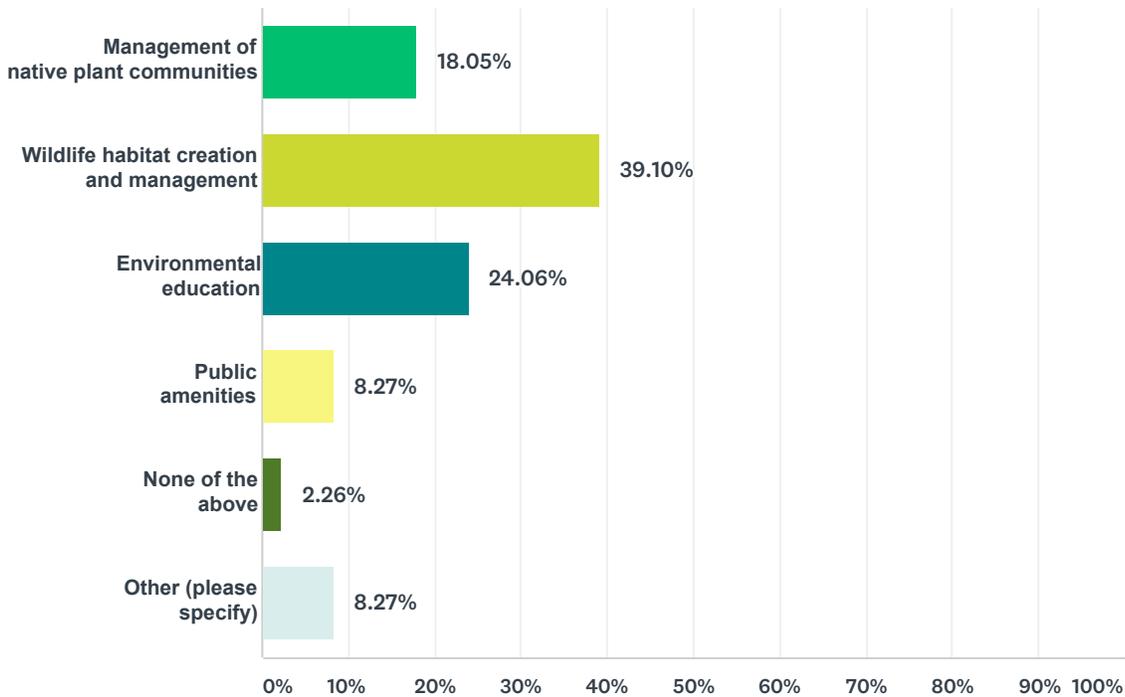
Answered: 129 Skipped: 18



ANSWER CHOICES	RESPONSES	
Forest restoration areas	55.81%	72
Prairie restoration areas	62.02%	80
Wetland areas	78.29%	101
Lakes and ponds	47.29%	61
Stream corridors	55.81%	72
Total Respondents: 129		

Q19 Which of the following current land uses should Fernald Preserve primarily focus its resources on in the future?

Answered: 133 Skipped: 14



ANSWER CHOICES	RESPONSES	
Management of native plant communities	18.05%	24
Wildlife habitat creation and management	39.10%	52
Environmental education	24.06%	32
Public amenities	8.27%	11
None of the above	2.26%	3
Other (please specify)	8.27%	11
TOTAL		133

#	OTHER (PLEASE SPECIFY)	DATE
1	all of the above	6/22/2018 4:53 AM
2	The first 2 go together	6/15/2018 1:36 PM
3	Enlarge riparrian corridor, save all of dry fork creek and pattys run.	6/15/2018 12:59 PM
4	Limit activities to clean up.	6/13/2018 1:13 PM
5	Maintaining the OSDF	6/12/2018 4:49 PM
6	Cycling Trail	6/12/2018 3:52 PM
7	More trails	6/12/2018 3:47 PM
8	Bike trail that would connect to MWF	6/12/2018 2:06 PM

Fernald Preserve Survey

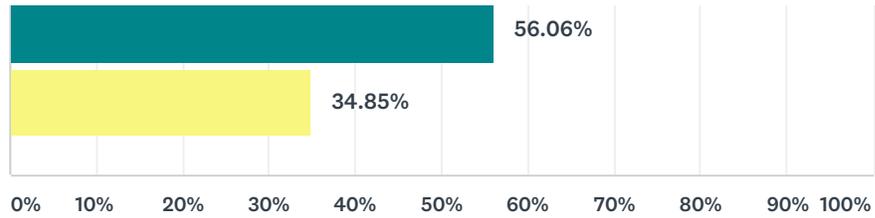
9	History of the site	6/12/2018 12:27 PM
10	Nothing it use to be a place that caused cancer why don't you build your house there	6/10/2018 12:09 PM
11	close it down	6/10/2018 12:07 PM

Q20 Indicate your level of satisfaction with the following management techniques for natural areas at Fernald Preserve.

Answered: 129 Skipped: 18



Fernald Preserve Survey

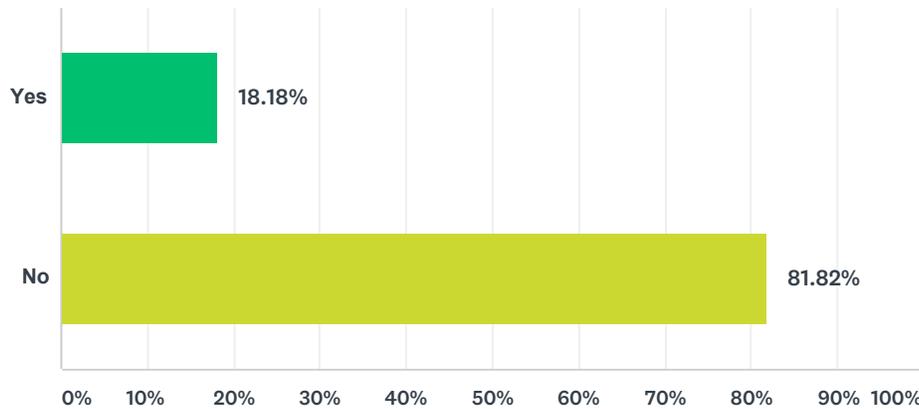


■ Very Dissatisfied
 ■ Dissatisfied
 ■ Satisfied
 ■ Very Satisfied

	VERY DISSATISFIED	DISSATISFIED	SATISFIED	VERY SATISFIED	TOTAL
Mowing	0.00% 0	2.50% 2	61.25% 49	36.25% 29	80
Herbicide treatments/invasive species control	4.92% 3	11.48% 7	54.10% 33	29.51% 18	61
Prescribed burns (prairie management)	2.74% 2	1.37% 1	47.95% 35	47.95% 35	73
Streambank stabilization	1.82% 1	3.64% 2	50.91% 28	43.64% 24	55
Deer fencing and tree protection	1.52% 1	7.58% 5	56.06% 37	34.85% 23	66

Q21 Have you been involved in planning/visioning efforts concerning Fernald in the past?

Answered: 132 Skipped: 15



ANSWER CHOICES	RESPONSES	
Yes	18.18%	24
No	81.82%	108
TOTAL		132

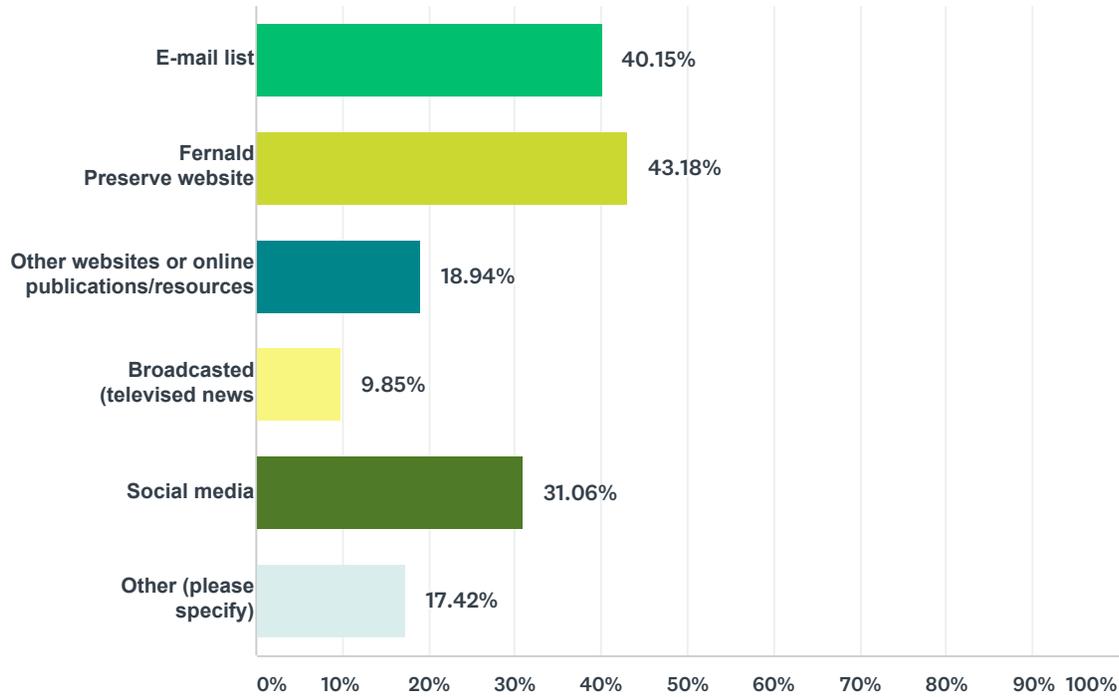
#	IF YES (PLEASE SPECIFY WHICH EFFORTS)	DATE
1	discussing what was to become of the site when it was cleaned up.	6/18/2018 11:46 AM
2	Involved in planning & establishment of site clean-up standards and completion of site clean-up.	6/18/2018 10:47 AM
3	FHES, HES EWG, Public meetings and Programs	6/18/2018 9:30 AM
4	prior to current operating company, visited site to discuss options	6/18/2018 7:57 AM
5	called on phone before	6/15/2018 12:59 PM
6	plant ID consultations	6/15/2018 8:05 AM
7	As a community member, discussions of how to shape the current Preserve	6/14/2018 10:02 PM
8	legacy management meetings, all of the cleanup meetings over the years	6/12/2018 4:52 PM
9	FCAB member 2000-05	6/12/2018 4:11 PM
10	Public input to the Design of Visitors Center	6/12/2018 2:19 PM
11	Original FCAB planning efforts	6/8/2018 1:22 PM
12	future use of fernald; possible economic reuse (CRO); long-term strategy	6/7/2018 2:15 PM
13	Former DOE LM Site Manager	6/6/2018 3:59 PM
14	Helped build Visitor Center. FCAB activities.	6/6/2018 12:55 PM
15	Visitors center ecological restoration/cleanup	6/6/2018 12:54 PM
16	Member of SSAB, FRESH, attending public meetings, providing comments on documents, i.e., RIFS; ROD's; future use.	5/31/2018 2:01 PM
17	Future site use meetings in the late 1990's early 2000's	5/29/2018 10:56 AM
18	An asset to the Community after completing the Cleanup of the Site.	5/25/2018 3:35 PM
19	final land use planning in the late 90s/early 00's	5/25/2018 9:24 AM

Fernald Preserve Survey

20	My organization FRESH, Inc. was the first enviro group to pull the cloak of secrecy away from the Fernald Site. Have been involved for 34 years and will continue to be involved.	5/24/2018 4:58 PM
21	selection and implementation of remediation alternatives	5/24/2018 3:22 PM

Q22 How do you receive your information about the Fernald Preserve? (Select all that apply)

Answered: 132 Skipped: 15



ANSWER CHOICES	RESPONSES	
E-mail list	40.15%	53
Fernald Preserve website	43.18%	57
Other websites or online publications/resources	18.94%	25
Broadcasted (televised) news	9.85%	13
Social media	31.06%	41
Other (please specify)	17.42%	23
Total Respondents: 132		

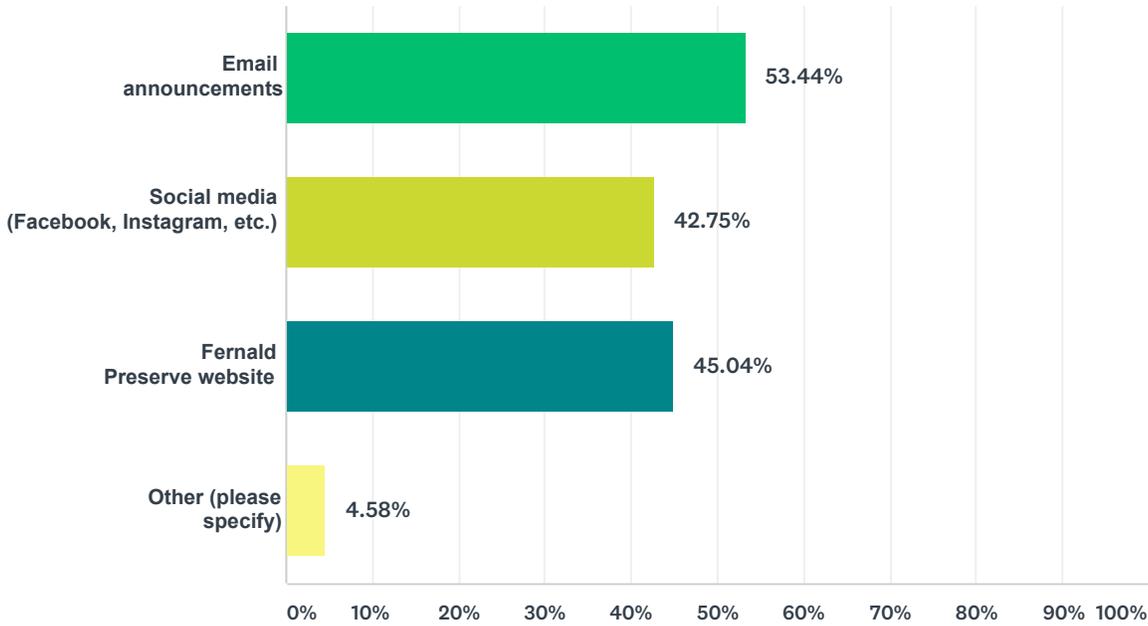
#	OTHER (PLEASE SPECIFY)	DATE
1	mail	7/2/2018 8:28 AM
2	word of mouth from colleagues and friends	6/20/2018 3:55 PM
3	The folks who man the front desk.	6/19/2018 9:02 PM
4	Participated in group meeting held there.	6/19/2018 8:38 AM
5	friends	6/19/2018 12:10 AM
6	Friend in my organization.	6/18/2018 10:27 AM
7	Local organizations,FCA, FRESH, FCHEC	6/18/2018 9:30 AM
8	through work contacts	6/18/2018 7:57 AM

Fernald Preserve Survey

9	Signs at Fernald	6/16/2018 11:01 AM
10	informative printouts, newspapers, lectures at Fernald, update literature at the Preserve.	6/15/2018 12:59 PM
11	please create a facebook page for Fernald Preserve	6/14/2018 4:37 PM
12	In person since I visit so frequently	6/14/2018 4:36 PM
13	Paper flyer	6/12/2018 10:05 PM
14	FRESHFRESH	6/12/2018 4:52 PM
15	friends	6/12/2018 3:14 PM
16	Word of mouth	6/12/2018 12:27 PM
17	LM/LMS-internal communications	6/11/2018 8:41 AM
18	eBird bird sightings	6/10/2018 9:56 PM
19	friends	6/10/2018 12:08 PM
20	Flyers here	6/8/2018 1:09 PM
21	Friends and Family	6/5/2018 1:52 PM
22	Phone calls	5/31/2018 2:01 PM
23	Friends	5/26/2018 12:29 PM

Q23 How would you prefer to receive your news and updates about the Preserve in the future? (Select all the apply)

Answered: 131 Skipped: 16



ANSWER CHOICES	RESPONSES
Email announcements	53.44% 70
Social media (Facebook, Instagram, etc.)	42.75% 56
Fernald Preserve website	45.04% 59
Other (please specify)	4.58% 6
Total Respondents: 131	

#	OTHER (PLEASE SPECIFY)	DATE
1	mail	7/2/2018 8:28 AM
2	Informative printouts.	6/15/2018 12:59 PM
3	FRESH	6/12/2018 4:52 PM
4	None	6/10/2018 12:10 PM
5	none	6/10/2018 12:08 PM
6	F C A meetings	5/26/2018 12:29 PM

Fernald Preserve Survey

Q24 What do you envision for Fernald in the next 10-15 years?

Answered: 111 Skipped: 36

#	RESPONSES	DATE
1	Green space with managed wildlife population with the deer and geese especially	7/2/2018 8:41 AM
2	Would like the groundwater cleaned up, more public info - lots of people don't know it's open to public	7/2/2018 8:37 AM
3	To have less employee, less visitors, less bike riders	7/2/2018 8:29 AM
4	Trail connections to adjacent natural resources (i.e.-Great Miami River Trail, Miami Whitewater Forest trails)	6/25/2018 2:00 PM
5	An area with a backstory of its metamorphosis from nuclear waste site to wildlife bastion.	6/24/2018 11:51 AM
6	Continued ecological restoration, wildlife habitat creation and protection, outdoor recreational area	6/20/2018 3:57 PM
7	Less people. More wild nature.	6/20/2018 7:32 AM
8	that the access to the meeting room doesn't change.	6/19/2018 9:05 PM
9	Continued restoration of the site and connectivity to surrounding areas.	6/19/2018 10:00 AM
10	unique wildlife restoration	6/19/2018 12:11 AM
11	More public programs	6/18/2018 9:51 PM
12	A nice place to enjoy nature and wildlife.	6/18/2018 8:36 PM
13	continue being a wonderful respite for migrating birds.	6/18/2018 11:47 AM
14	Continued maintenance of the site as an undeveloped park with increased usage by public. Continue/complete groundwater clean-up and other regulatory obligations (OSDF Monitoring/maintenance, Environmental monitoring, etc. Maintain continue ecological restoration and maintenance to maintain and enhance site ecosystems.	6/18/2018 10:53 AM
15	Continued followup and work on the water systems on the complex.	6/18/2018 10:28 AM
16	safe accessible greenspace	6/18/2018 10:22 AM
17	I believe Fernald does good work, but that the efforts are not well promoted. I would like to see Fernald improve public image through increased communication with regards to remediation and better publicity regarding the programming available.	6/18/2018 10:11 AM
18	Continued Aquifer cleanup, expanded use of Visitor Center, continued habitat restoration, continued site surveillance and remediation, Leadership in the effective management of DOE Sites.	6/18/2018 9:55 AM
19	Continued progress with the goals you have set. Education days, Youth and Kids Day Camps. There is so much to learn at Fernald about the environment.	6/18/2018 9:27 AM
20	Efforts being made to educate people that, although there was some great restoration, parts of the site MUST NOT be disturbed., ie the tumulus.	6/18/2018 8:15 AM
21	Be a bigger voice for the future of the environment - how we all need to buy into the bigger picture, and not repeat history	6/18/2018 8:00 AM
22	Increase environmental education and restoration	6/18/2018 7:39 AM
23	Continued great work. Would love to have a couple dog-friendly trails.	6/17/2018 5:38 PM
24	Continued success in the clean-up of the water and continued growth in the environmental education to the public who visits the facility.	6/17/2018 4:58 PM
25	A place for wildlife and nature. Where people can go and learn about wildlife and nature.	6/16/2018 6:43 PM
26	I hope it will continue to be the best birding location in the tri-state area!	6/16/2018 3:54 PM
27	I envision it to continue to be a great location to visit to view native wildlife and habitats	6/16/2018 2:55 PM

Fernald Preserve Survey

28	Overnight camping and environmental education programming for youth groups.	6/16/2018 12:38 PM
29	Continuation of environmental / ecological restoration and conversation initiatives. I would also like to see a more open public face about the history, timeline, and future endeavors of Fernald. Being a government facility, I understand the privatized processes, but because it is so well loved by the public (or on the other hand, skeptisized in certain processes), I believe open conversations will help bring a more collaborative public appeal and help in future endeavors to better Fernald.	6/16/2018 9:33 AM
30	to get healthier and more wildlife	6/15/2018 10:05 PM
31	A wonderful wildlife green space area for all to enjoy	6/15/2018 9:36 PM
32	I hope continued effort towards conservation and restoration. I didn't check it before, but striving towards native plants, etc. is great. I hope generations coming up get to come to learn some history and see the possibilities and to enjoy wildlife in a safe, clean environment.	6/15/2018 8:27 PM
33	More access	6/15/2018 6:30 PM
34	Continued restoration and management of native plant communities.	6/15/2018 5:05 PM
35	more growth of a SAFE natural environment	6/15/2018 4:17 PM
36	Increase in scout, school and family activities.	6/15/2018 1:53 PM
37	Increased restoration of wildlife habitats. I hope that it will be one of the best places to observe wildlife in the area.	6/15/2018 1:44 PM
38	Continue doing what you are doing and encourage further adjacent properties to be protected to allow for wildlife corridors and water quality protection.	6/15/2018 1:38 PM
39	To be a safe place to bring your family to learn about nature, by seeing experiencing it and learning from you awesome staff.	6/15/2018 1:27 PM
40	Continue to do the good work you have been. Collaborate with the GPHC on programming:)	6/15/2018 1:26 PM
41	Stronger connections to streams and green space areas near by. Gravel Pit Lake on St Rt 128 overlook, or some entity perches for wild life area for Bald Eagle.	6/15/2018 1:20 PM
42	Great place to take my 2nd grade class to see how the land has changed over time and usage	6/15/2018 10:42 AM
43	Continuing preservation	6/15/2018 10:08 AM
44	improvements in landscape as site matures; more signage along trails, visitor center open more days of each week	6/15/2018 8:40 AM
45	Becoming a refuge for rare organisms; environmental education	6/15/2018 8:06 AM
46	I would like to see a better, cleaner design on the website. I would also like to see a plan for long-term community outreach, communication and engagement. WAY TOO many people in Cincinnati have no idea of the Fernald Story, or of the amenities currently there. This site is a great opportunity to engage the community on a variety of issues, but right now the message and outreach needs to be "tweaked" a bit so that people no about it more as a general amenity and also no the real details of the story.	6/15/2018 5:06 AM
47	Continue to improve wildlife habitat and introduction of native plant species to provide natural history excursions for all people.	6/14/2018 10:14 PM
48	Expand history program and maintain open landscape and preserve wildlife.	6/14/2018 8:35 PM
49	hotspot for nesting grassland species. Hamilton County needs a migration spot for shorebirds.	6/14/2018 6:45 PM
50	Continued remediation / monitoring of plume and water	6/14/2018 5:20 PM
51	Expanding recreational opportunities. Expanding ecological restoration on the site/prescribed burns. Maintaining wildlife habitats and controlling coyote expansion.	6/14/2018 4:56 PM
52	I'd love to see Fernald advertise more about what an amazing natural area it is now. Social media NEEDS to be in its future. The Cold War era museum In the visitors center is very nice, but I would love to see maybe a new area that focuses more on environmental education. The weekly programs are amazing and I wish more people knew about them.	6/14/2018 4:45 PM
53	more trails and observation decks placed in areas you can observe wildlife esp. birds, over water (current observation deck on Hickory trail was a poor location)	6/14/2018 4:40 PM

Fernald Preserve Survey

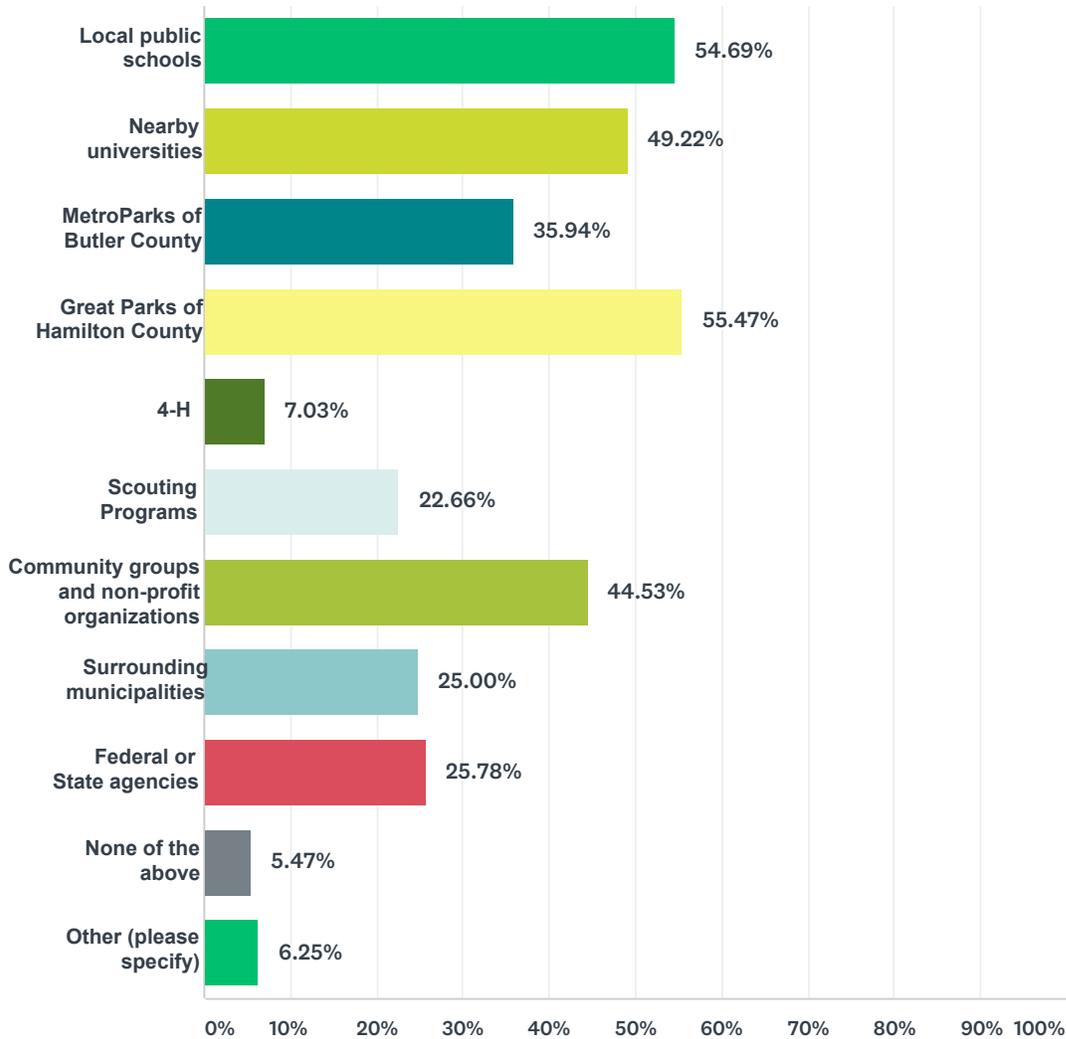
54	I hope it's the same beautiful place that it is today and that it just keeps getting better with more and more wildlife species coming to live there.	6/14/2018 4:34 PM
55	Not sure	6/14/2018 4:14 PM
56	Continued restoration and more use of educational programs.	6/14/2018 3:04 PM
57	More public education	6/14/2018 2:14 PM
58	Fernald is the center of a several thousand acre natural and farming area that is unlike most other areas in the country. It should be preserved for wildlife as much as possible.	6/13/2018 5:40 PM
59	Monitor the remedy and confirm its working.	6/13/2018 4:02 PM
60	Monitor to make certain property is cleaned up.	6/13/2018 1:15 PM
61	Return of more native wildlife, both permanent and migratory.	6/13/2018 1:13 PM
62	Manage native plants. Environment education,	6/12/2018 10:12 PM
63	More public recreation	6/12/2018 10:09 PM
64	Better protection for the On-Site Disposal Cell to keep tourists off of it. More honest discussion about the foundry activities and technologies used at the site during its operations. More transparency concerning the ongoing downwind/downstream health and environmental issues.	6/12/2018 6:25 PM
65	Cleanup completed	6/12/2018 6:19 PM
66	Maintaining it as a preserve and a safe place for the low level waste to be stored FRESH	6/12/2018 4:55 PM
67	connected trails to other local trail systems by paved or natural surface trails	6/12/2018 4:15 PM
68	Trails connecting here and Miami Whitewater park	6/12/2018 3:48 PM
69	I personally would love to see Fernald connected to Miami Whitewater Forest via bike path, then ultimately connect to the Great Miami Path which currently has its southern terminus in Fairfield.	6/12/2018 3:15 PM
70	Connecting of bike trails	6/12/2018 2:48 PM
71	More resources for those on bikes.	6/12/2018 2:45 PM
72	I would like to see the Fernald Preserve able to accept donations and/or officially work with a local non-profit organization to work on projects of common interest similar to what National Parks do. I would also like to see the Fernald Preserve connected to other local parks via a bike/walking path.	6/12/2018 2:24 PM
73	Hopefully, a bicycle-multiuse trail connection with Miami Whitewater Forest Shaker Trace Trail and to the Great Miami River Recreational Trail #(25) in Fairfield, Ohio !	6/12/2018 2:17 PM
74	Hub for active adults to walk, cycle and enjoy the natural habitat	6/12/2018 1:44 PM
75	Not sure	6/12/2018 1:41 PM
76	Connecting to Miami Whitewater Park	6/12/2018 1:28 PM
77	A wonderful site for both environmental education and the history of the Fernald production site	6/12/2018 12:29 PM
78	That the trail would be connected to Miami whitewater and other parks.	6/12/2018 9:23 AM
79	More trails. Paved trails. Dogs welcome. Trails through the old production area with signs and pictures of what used to be there.	6/12/2018 8:21 AM
80	Keep site focus on wildlife and habitat. Allow for habitat succession to woody and forest communities in the non-priority prairie areas. Focus on invasive species control and removal. More public access to areas if possible.	6/11/2018 5:19 PM
81	Continued and more frequent use of reserve-able spaces. VC open on Sundays. Greater variety of STEM curricula (partner with local K-12 & universities to define scope & develop content). Handicap accessible curbs off of main parking lot. More trail signage including featured species and interactive methods (eg, GPS). And if feasible, a small [kid-proof] wetland community set-up in VC atrium w/native plants, fish, reptiles, amphibians	6/11/2018 8:53 AM
82	Continue excellent ecological restoration work, continue providing excellent wildlife viewing opportunities and trails, and continue interpreting the site's history and ongoing restoration efforts.	6/10/2018 10:01 PM
83	Empty	6/10/2018 12:12 PM
84	empty space	6/10/2018 12:09 PM

Fernald Preserve Survey

85	More Forest and native plants Hiking & wildlife observation	6/10/2018 11:34 AM
86	Preserving the nuclear history of the site while improving the wildlife	6/10/2018 10:25 AM
87	Doing more of the same, but expanding it. Continue the ecological restoration and habitat preservation efforts. Do a better job of getting the Fernald story to the public, it seems to me there is a school outreach opportunity here. Add some a few more observation shelters in strategic locations along trails.	6/10/2018 10:23 AM
88	Continued maturation of the restoration efforts. Possibly a connection to the regional bike trails and or green corridor to Miami Whitewater Park and GMR.	6/8/2018 1:27 PM
89	Continuing the conservation efforts, not using any herbicide pesticides, and also buying more land to use as natural sites such as this. I think this is an important way to give back to the ecosystems, and we need more places like this.	6/8/2018 1:12 PM
90	Continued management of habitat and ecosystem services	6/8/2018 7:40 AM
91	n/a	6/7/2018 4:38 PM
92	Continued env education and outreach programs to teach both the history of the site, and the present status including gw cleanup and OSDF monitoring along with migrating birds and rare animals. I would also like to see a connection with any area bike trails and promotion of Fernald's amenities to assist bikers (parking, bathrooms, etc)	6/7/2018 2:27 PM
93	Continuing to serve the community as a green, educational space	6/6/2018 4:00 PM
94	Closer to end state with no additional remediation efforts - end of water treatment.	6/6/2018 1:44 PM
95	More of same. Nice facilities with variety of programs. Good trails. Enough staff to not only tell the Fernald story, but also combat negative and inaccurate media reports. Total environmental compliance with EPA regulations and previous DOE commitments and obligations.	6/6/2018 1:02 PM
96	continued public use	6/6/2018 12:54 PM
97	great habitat for animals, More native plantings, trees and covered benches along walking trails and wonderful green space for all to enjoy	6/5/2018 4:09 PM
98	More land	6/5/2018 1:53 PM
99	A well-visited natural public space. The space is tremendously under-utilized right now. It is a true gem of Cincinnati.	6/4/2018 1:28 PM
100	Continued restoration	6/2/2018 11:09 AM
101	Continue to maintain cleanup restorations that are completed; continue to work towards the restoration of the aquifer; maintain, protect, and enhance the eco system and wildlife; Continue to provide information and educational programs; maintain the visitors center.	5/31/2018 2:09 PM
102	The Fernald Preserve should work with the Great Parks of Hamilton County and the Butler County parks to connect to the Great Miami Bike Path. The Great Miami Path is already a well established trail system and would bring recreation opportunities to area residents, as well as bring a huge amount of new visitors to Fernald.	5/29/2018 11:04 AM
103	Continued care& preservation.	5/26/2018 12:32 PM
104	Thing are in place to keep the Fernald Preserve an asset to the community.	5/25/2018 3:44 PM
105	I would like to see Fernald offer more times for the various events so that i can actually make them	5/25/2018 9:47 AM
106	Continued open to the public, with a link to a regional bike/hike/recreational trail system if feasible.	5/25/2018 9:26 AM
107	Hopefully still nature preserve	5/25/2018 6:44 AM
108	Continue with what they are doing now -- this was the plan and we need to stick with the plan.	5/24/2018 5:00 PM
109	A widely visited, environmentally-themed nature preserve and public event/meeting place. A park with expanded trail access to various locations and to off-site trails nearby.	5/24/2018 4:11 PM
110	More community involvement	5/24/2018 3:54 PM
111	public nature preserve	5/24/2018 3:23 PM

Q25 Who should the Fernald Preserve continue or establish a collaboration with in the future? (Select up to four)

Answered: 128 Skipped: 19



ANSWER CHOICES	RESPONSES	
Local public schools	54.69%	70
Nearby universities	49.22%	63
MetroParks of Butler County	35.94%	46
Great Parks of Hamilton County	55.47%	71
4-H	7.03%	9
Scouting Programs	22.66%	29
Community groups and non-profit organizations	44.53%	57
Surrounding municipalities	25.00%	32
Federal or State agencies	25.78%	33

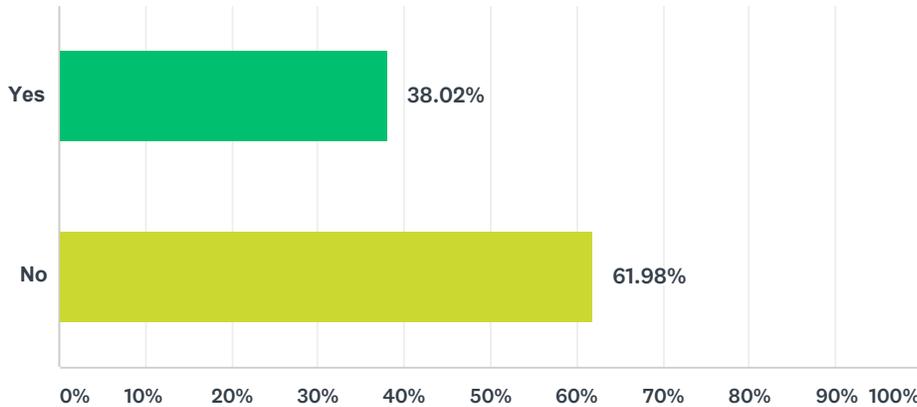
Fernald Preserve Survey

None of the above	5.47%	7
Other (please specify)	6.25%	8
Total Respondents: 128		

#	OTHER (PLEASE SPECIFY)	DATE
1	University of Cincinnati	6/24/2018 11:51 AM
2	no idea	6/19/2018 9:05 PM
3	Greater Cincinnati Earth Coalition	6/19/2018 12:11 AM
4	Birding Groups / Tours	6/16/2018 9:33 AM
5	Zoo-local wildlife groups	6/15/2018 1:20 PM
6	Audubon Society	6/14/2018 10:14 PM
7	Local Catholic schools	6/14/2018 4:34 PM
8	No one it should be concreted over and left that way	6/10/2018 12:12 PM

Q26 Are you (or your organization) interested in collaborating with the Fernald Preserve in the future?

Answered: 121 Skipped: 26



ANSWER CHOICES	RESPONSES	
Yes	38.02%	46
No	61.98%	75
TOTAL		121

#	IF YES, PLEASE IDENTIFY WHICH ORGANIZATION YOU BELONG TO AND PROVIDE CONTACT INFORMATION	DATE
1	Great Parks of Hamilton County, tzelek@greatparks.org, 513-245-7458	6/25/2018 2:00 PM
2	Cincinnati Zoo & Botanical Garden, Shasta Bray, shasta.bray@cincinnati.org	6/20/2018 3:57 PM
3	Cincinnati Camera and Photography Club	6/19/2018 9:05 PM
4	Greater Cincinnati Earth Coalition	6/19/2018 12:11 AM
5	HC Soil & Water Conservation District	6/18/2018 11:47 AM
6	Girl Scouts of Western Ohio, karencannady@gsw.org	6/18/2018 10:11 AM
7	Although curtailing organizational activities due to health limitation, there may be issues that would be fitting for my participation. Sue Verkamp, sverkamp@att.net	6/18/2018 9:55 AM
8	Shaker Farms Garden Club	6/18/2018 9:27 AM
9	Will pass along to upline in current organization	6/18/2018 8:00 AM
10	Hamilton County Soil and Water Conservation District	6/18/2018 7:39 AM
11	Various Local Birding Groups (Cincinnati Birders, etc.)	6/16/2018 9:33 AM
12	Great Parks of Hamilton County-Bret Henninger	6/15/2018 5:05 PM
13	Cold War Patriots - shannon.porter@coldwarpatriots.org	6/15/2018 4:18 PM
14	Girl Scouts	6/15/2018 1:27 PM
15	GPHC	6/15/2018 1:26 PM
16	Need strong connection to Great Miami River and Miami Whitewater Forest (a bike trail)	6/15/2018 1:20 PM
17	Mount St Joseph University	6/15/2018 8:40 AM
18	student research	6/15/2018 8:06 AM

Fernald Preserve Survey

19	University of Cincinnati Environmental Studies Program (rob.gioielli@uc.edu)	6/15/2018 5:06 AM
20	Midwest Native Plant Society	6/14/2018 6:45 PM
21	Wittenberg University scunningham@wittenberg.edu	6/14/2018 5:20 PM
22	Cincinnati Zoo. I already collaborate on the American burying beetle program, but would love opportunities to get involved with other things.	6/14/2018 4:45 PM
23	Cincinnati State College: Some of our Environmental Engineering Technology classes visit the site when studying different topics	6/14/2018 2:14 PM
24	University of Cincinnati, Department of History	6/12/2018 6:25 PM
25	FRESH	6/12/2018 4:55 PM
26	Cincinnati Off Road Alliance	6/12/2018 4:15 PM
27	Fernald Community Alliance	6/12/2018 2:24 PM
28	Collaborate with agencies to obtain funding to build the bike trail	6/12/2018 2:17 PM
29	UC Center for Environmental Genetics, Erin.Haynes@uc.edu and susan.pinney@uc.edu	6/12/2018 12:29 PM
30	State	6/8/2018 1:27 PM
31	Three Valley Conservation Trust 513-524-2150	6/8/2018 7:40 AM
32	Ohio EPA - Dayton Office	6/7/2018 2:27 PM
33	Ornithology Club at Ohio State	6/2/2018 11:09 AM
34	FRESH, FCA. DOE/Fernald has all of my contact information.	5/31/2018 2:09 PM
35	F.R.E.S.H. Inc. H 513 738 1688 & FCA,Inc	5/25/2018 3:44 PM
36	Harrison High School Ecology Club	5/25/2018 9:47 AM
37	Already do this on an as needed basis.	5/24/2018 5:00 PM

Fernald Preserve Survey

Q27 Are there any additional comments you wish to provide?

Answered: 74 Skipped: 73

#	RESPONSES	DATE
1	No good reason that leashed dogs are not allowed, that really irks me. I would be there more often if I could bring dog. If you check out other parks and dogs do not disturb wildlife.	7/2/2018 8:37 AM
2	Close to the public, no reason to keep the cost of keeping this open to the public	7/2/2018 8:29 AM
3	I love visiting the Fernald Preserve. It seems like I learn something new each time I am there. The only recommendation I would make is to have better control over the goose droppings on the sidewalks. It really takes away from the beauty of the grounds and the facility.	6/21/2018 9:39 AM
4	Keep going with the American burying beetle reintroduction program!	6/20/2018 3:57 PM
5	Increase the use of herbicide to control invasive plants and let nature take over on it's own.	6/20/2018 7:32 AM
6	Linda, who works the front desk is a great help to our club.	6/19/2018 9:05 PM
7	No	6/19/2018 12:11 AM
8	N/A	6/18/2018 9:51 PM
9	We have seen Fernald slowly improving, esp. last year. Further improvements I walking paths and signage would be nice.	6/18/2018 8:36 PM
10	n/a	6/18/2018 11:47 AM
11	No.	6/18/2018 10:28 AM
12	none	6/18/2018 10:22 AM
13	There could be more "advertisements" on the success of the remediation, restoration, return of natural habitation, etc. Some still raise their eyebrow when I say I live on Willey, down from the Fernald Preserve.	6/18/2018 9:55 AM
14	So proud that Fernald is providing such a wonderful place in our community. Excellent speakers and educational programs.	6/18/2018 9:27 AM
15	N/A	6/18/2018 7:39 AM
16	More accessible for people with special needs.	6/16/2018 6:43 PM
17	This is my favorite place to bird in the area. The bird diversity is amazing year-round! I also love that dogs are not allowed, as the focus is on protecting wildlife. My one request: Could the visitor's center (or at least the bathrooms) be open on Sundays? I would visit more often if it was.	6/16/2018 3:54 PM
18	Both my boyfriend and I love Fernald dearly and all that this property has to offer! A wonderful thing has been done here and despite the history, the future looks optimistic and I would love to further be involved in that!	6/16/2018 9:33 AM
19	keep it WILD LIFE FRIENDLY but easier access for handicaps....KEEP OUT DOGS and even bikes! Keep trails for those in wheelchairs to enjoy wildlife...it's very healing and therapeutic..and the gravel you use is terrible and too big and causes feet problems like plantar fasciitis flare ups...thank you	6/15/2018 10:05 PM
20	no	6/15/2018 9:36 PM
21	I go to the visitors center on a regular basis to see what is going on with wildlife (ok, and use the restroom). Just want to say that the staff is wonderful. Friendly, helpful, knowledgeable and passionate about their work.	6/15/2018 8:27 PM
22	More trail access in the wetlands areas would be great!	6/15/2018 6:30 PM
23	no	6/15/2018 4:17 PM
24	Continue to promote Fernald as a nature preserve. Discourage any move toward the types of recreational uses already provided by other area parks.	6/15/2018 1:44 PM

Fernald Preserve Survey

25	No	6/15/2018 1:27 PM
26	None	6/15/2018 1:26 PM
27	Try to leverage more funds to add to the 13 million to save farmland easement and fee simple purchase to make a strong corridor connection. Nature is under attack from urbanization, pollution and invasives. Where are all the extirpated butterflies and the Indiana Bats, pollinators, birds, plants, dragon fly species?	6/15/2018 1:20 PM
28	the preserve is a wonderful place both for cultural history as well as natural history.	6/15/2018 8:40 AM
29	Sorry, nothing more.	6/14/2018 10:14 PM
30	none	6/14/2018 8:35 PM
31	Thanks to all the Fernald Staff for the hard work!	6/14/2018 6:45 PM
32	I teach a course in environmental communication and Fernald provides a site for us to think about citizen engagement in processes of remediation as well as the overall impacts of past practices on present communities.	6/14/2018 5:20 PM
33	I can't say this enough: Fernald needs to be advertised more effectively. Email lists are not cutting it. You need an active presence on social media. Hire an intern with PR experience.	6/14/2018 4:45 PM
34	keep up the good work!	6/14/2018 4:40 PM
35	No	6/14/2018 4:34 PM
36	No	6/14/2018 4:14 PM
37	NO	6/14/2018 3:04 PM
38	Sue and Penny are wonderful guides, are very knowledgeable, and can adjust the presentation to accommodate the audience.	6/14/2018 2:14 PM
39	Don't change anything to make it less primitive.	6/13/2018 5:40 PM
40	Is this property really cleaned up?	6/13/2018 1:15 PM
41	No.	6/13/2018 1:13 PM
42	Control invasive plants.	6/12/2018 10:12 PM
43	I personally would love to see Fernald connected to Miami Whitewater Forest via bike path, then ultimately connect to the Great Miami Path which currently has its southern terminus in Fairfield.	6/12/2018 3:15 PM
44	Nope	6/12/2018 2:48 PM
45	No, Keep up the good work!	6/12/2018 2:45 PM
46	no, thanks!	6/12/2018 2:24 PM
47	I'm almost 65 years old. Let's get this trail built connecting MWF to Fernald then onto Fairfield and Butler County Parks !! Let's not waste time...I'm not getting any younger !	6/12/2018 2:17 PM
48	No	6/12/2018 1:44 PM
49	Na	6/12/2018 1:41 PM
50	No	6/12/2018 9:23 AM
51	From what I can tell Fernald is only used by birders and a few hikers. Improve your trails by paving some and adding more, allow people to bring leashed dogs and tons of people will come to your site. The visitor center will be seen by numerous more people and the story of Fernald will get out to more people.	6/12/2018 8:21 AM
52	I would prefer to continue to have no dogs on site.	6/11/2018 5:19 PM
53	We need to get the word out that this is 1,000+ acres of public land. It is a community asset. It is safe to visit. CERCLA cleanup is something the community and tax payers should be proud of. Site will remain an undeveloped park with emphasis on wildlife.	6/11/2018 8:53 AM
54	I only have the opportunity to visit once a year in early June due to being in Cincinnati for business (I live in Michigan). I look forward to visiting and am impressed with the restoration work being done. I'm an ecologist by profession and am very impressed with the ecological restoration work and would like to know more about exactly what you're doing.	6/10/2018 10:01 PM

Fernald Preserve Survey

55	It makes me sick that a nature preserve is there and that you or anyone else would want to go there	6/10/2018 12:12 PM
56	Don't like it please fix it	6/10/2018 12:09 PM
57	N/A	6/10/2018 10:25 AM
58	My impression is that the Fernald nature preserve is generally well-run now. I can't speak to the on-going ecological clean-up efforts. I suppose that is a "no news is good news" situation.	6/10/2018 10:23 AM
59	Glad to see you conducting this effort looking forward to seeing the results.	6/8/2018 1:27 PM
60	No	6/8/2018 1:12 PM
61	no	6/7/2018 4:38 PM
62	Keep up the good work!	6/7/2018 2:27 PM
63	Thanks for including me in the Survey, Sue.	6/6/2018 4:00 PM
64	No	6/6/2018 1:44 PM
65	Just don't focus on regulatory compliance. Also focus on anticipated criticisms and unfounded allegations. Be more proactive in touting Fernald's accomplishments (past and present). Be a puncher now and then—not just a counterpuncher.	6/6/2018 1:02 PM
66	no	6/5/2018 1:53 PM
67	I think that the Preserve is one of the most beautiful places in this region. When you combine the history of the site, it is simply mind-boggling to know what it was and how beautiful it has become. Anyone who grew up in Cincinnati should visit. You are not getting the important word out that this gem exists.	6/4/2018 1:28 PM
68	Not at this time, but if I do, I'll contact the site.	5/31/2018 2:09 PM
69	No.	5/26/2018 12:32 PM
70	no	5/25/2018 3:44 PM
71	no	5/25/2018 9:47 AM
72	Thanks!	5/25/2018 9:26 AM
73	Mo	5/25/2018 6:44 AM
74	The Fernald Preserve was designed to be a community asset and that's what it has become. I'm sure there will be changes but I like it the way it is and would prefer for it to stay the same.	5/24/2018 5:00 PM

June 13, 2018
Stakeholder Workshop Activity Results

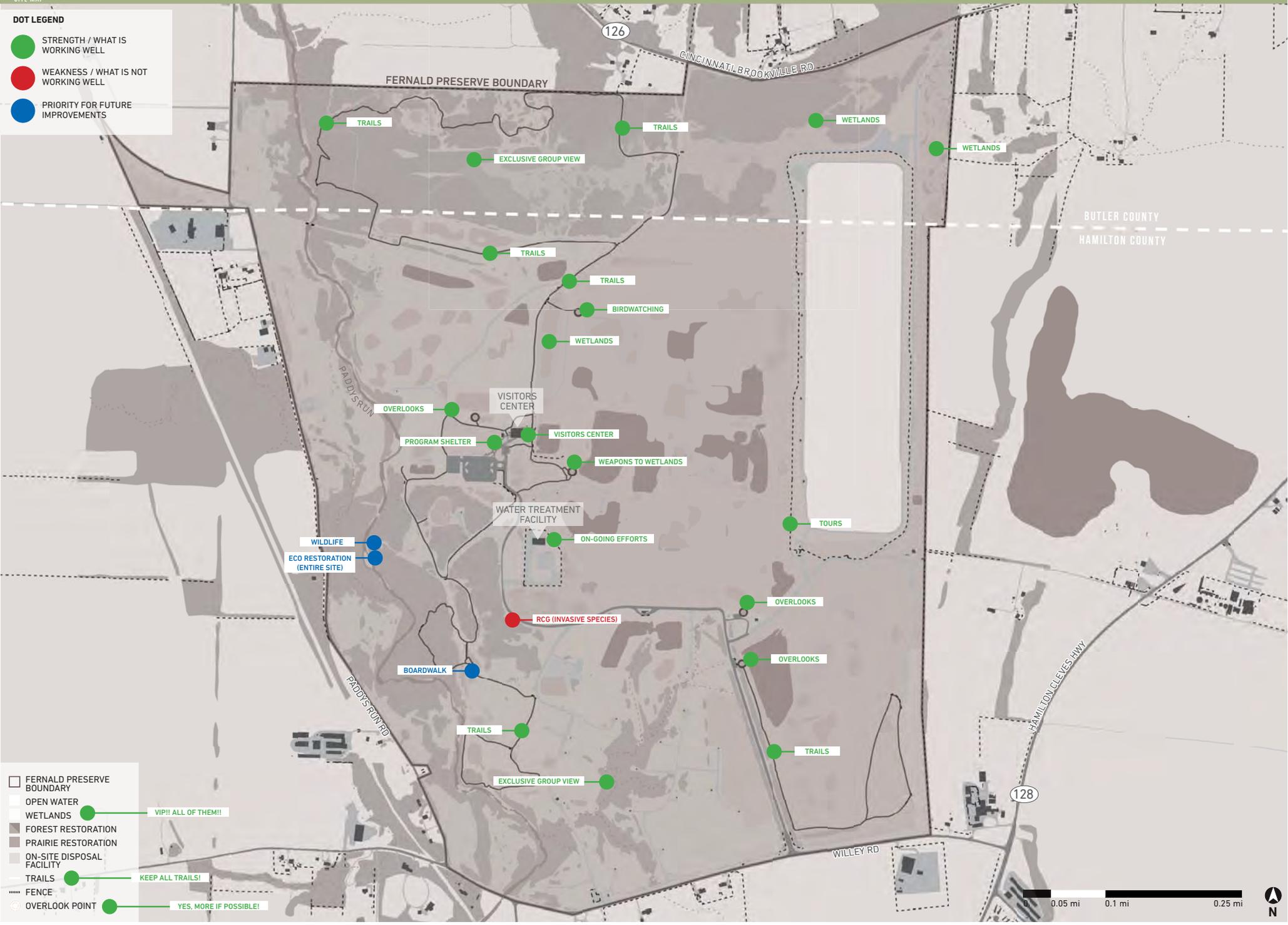
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FERNALD PRESERVE MASTER PLAN

SITE MAP

DOT LEGEND

- STRENGTH / WHAT IS WORKING WELL
- WEAKNESS / WHAT IS NOT WORKING WELL
- PRIORITY FOR FUTURE IMPROVEMENTS



- FERNALD PRESERVE BOUNDARY
- OPEN WATER
- WETLANDS
- FOREST RESTORATION
- PRAIRIE RESTORATION
- ON-SITE DISPOSAL FACILITY
- TRAILS
- FENCE
- OVERLOOK POINT

- **VIPI!! ALL OF THEM!!**
- **KEEP ALL TRAILS!**
- **YES, MORE IF POSSIBLE!**



FERNALD PRESERVE MASTER PLAN

COMMUNITY WORKSHOP #1

JUNE 13, 2018

STAFFED VISITORS CENTER, EXHIBITS & MEETING SPACES



COMMENTS: How do you attract repeat visits to the VC?
Can we use more / any social media to get info to different target audience

WALKING TRAILS



COMMENTS:

WILDLIFE OBSERVATION



COMMENTS:

OUTDOOR PROGRAM SHELTER



COMMENTS:

FERNALD PRESERVE MASTER PLAN

COMMUNITY WORKSHOP #1

JUNE 13, 2018

PRAIRIE ESTABLISHMENT



COMMENTS:
Maintain Invasive Controls

FOREST MAINTENANCE



COMMENTS:
Maintain invasive controls

INTERPRETIVE PROGRAMS/EDUCATION



COMMENTS:
More boardwalks?

INTERPRETIVE & TRAIL SIGNAGE



COMMENTS:

RESTORED WETLANDS



COMMENTS: *Maintain invasive control*

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July 19, 2018
Stakeholder Workshop Activity Results

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Community Workshop #2: Master Plan Ideas Results

MASTER PLAN IDEA	FIRST	SECOND	THIRD	SCORE
Increased paved walking trails & improve accessibility	4			12
Add seating options/benches along walking trails	1	2	1	8
Continue interpretive services and facilities; update the story to focus on wildlife/habitat management	3	1	1	12
Invest in additional wildlife viewing structures (e.g. bird blinds, boardwalks, overlooks)		2	1	5
Partner with an organization to develop an updated marketing/messaging strategy; focus on online/social media presence		1		2
Collaborate with Great Parks of Hamilton County to make physical/programmatic connections to their system; study feasibility & potential routes	1	1	2	7

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Attachment 2

MKSK Planning Analysis Report

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COMMUNITY PLANNING ANALYSIS REPORT

FERNALD PRESERVE MASTER PLAN

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1.0 Introduction

In order to best prescribe a path forward for the Fernald Preserve and how it can continue to serve as a community asset for the region, we must gain a complete understanding of the community it is presently serving and other populations or groups it intends to serve in the future. This analysis of Fernald’s immediate surrounding area, the “local area”, parts of the tri-state region, the “region”, and the nation focused on population characteristics, physical land conditions, and economic climate. Qualitative and quantitative data will be used to support and guide more specific content as it relates to this 2018 Fernald Preserve Master Plan update.

1.1 Methodology

Collection of local, regional, and national population data provides a snapshot of characteristics of the surrounding community in comparison to the tri-state region and the nation. Population data and trends were collected using U.S. Census data accessed through the Environmental Systems Research Institute (ESRI) service. The ESRI application allowed data to be collected and analyzed by defined geographic regions.

These demographic and population factors were considered at a local scale, within a 10-mile radius of Fernald (Figure 1), and at a regional scale, including the nine adjacent counties to the Preserve: Hamilton, Butler, Clermont, and Warren in Ohio; Franklin and Dearborn in Indiana; and Campbell, Kenton, and Boone in Kentucky (Figure 2). Consideration of these two scales will provide the Master Plan with insight on characteristics and trends from Fernald’s closest neighbors to a wider audience across Ohio, Kentucky, and Indiana. Where possible, local and regional data were compared to national estimates.

National trends in attitudes and resource allocation were also evaluated to provide context for DOE and stakeholders. These local and national topics provide a good characterization of the community and how it might evolve in future years.

1.2 Data Topics

Local and regional data was collected and analyzed on the following topics: Demographics, Socioeconomics, Land Use / Zoning, Parks and Recreation, Transportation, Government, and Economy

For national trends and attitudes, the following topics were evaluated: Leisure time and recreation, Conservation and land management, Education, Connection to nature, History and commemoration, Social media, and Technology

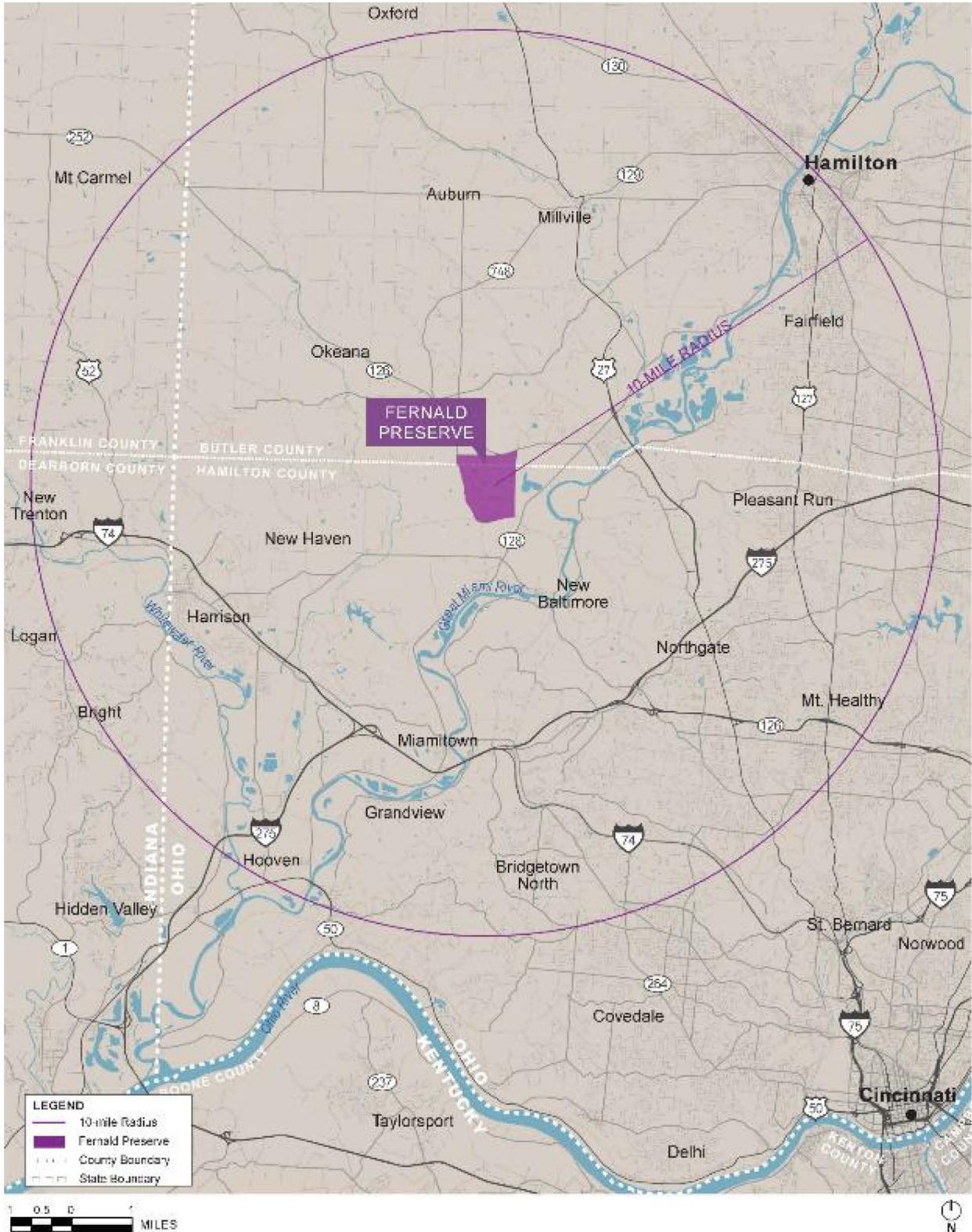


Figure 1. Local Context Map

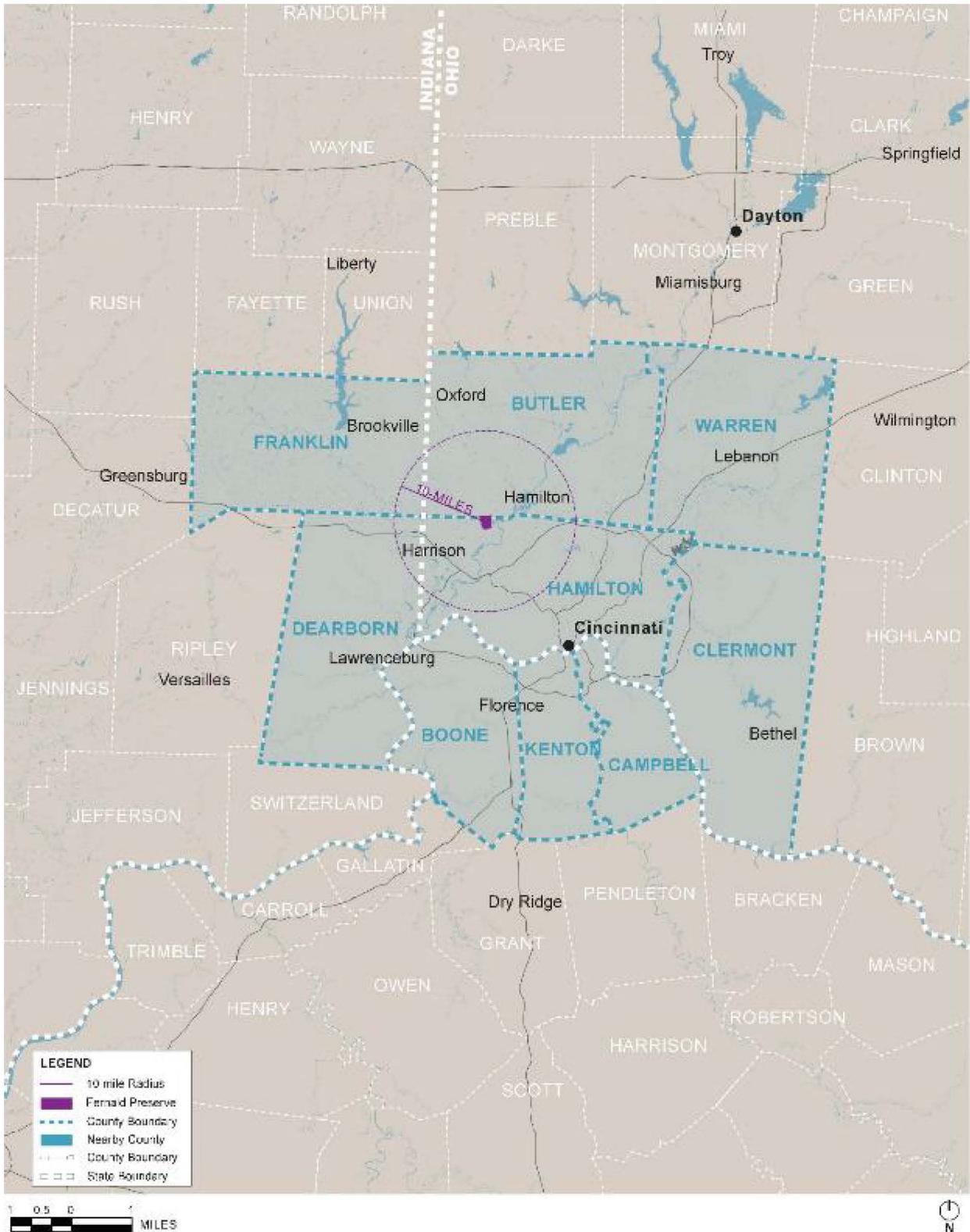


Figure 2. County Region Context Map

2.0 Demographics

2.1 Population Size

In the local area, the population is growing at a slower rate than the nation, with a projected annual growth rate of 0.31% per year into 2022. The nine-county region will experience growth as well, at a slightly faster annual rate of 0.55% but still less than the nation. Within ten miles of Fernald, 292,408 people lived in the local area in 2017, which accounts for nearly 14% of the population in the nine-county region (ESRI 2018).

Table 1. Total Population (2010-2022)

Year	Local	Regional	National
2010	285,290	2,022,561	308,745,538
2017	292,408	2,110,523	325,719,178
2022 (Expected)	296,963	2,168,941	343,633,733
Annual Rate (2017-2022)	0.31%	0.55%	5.50%

2.2 Age, Gender, and Race/Ethnicity

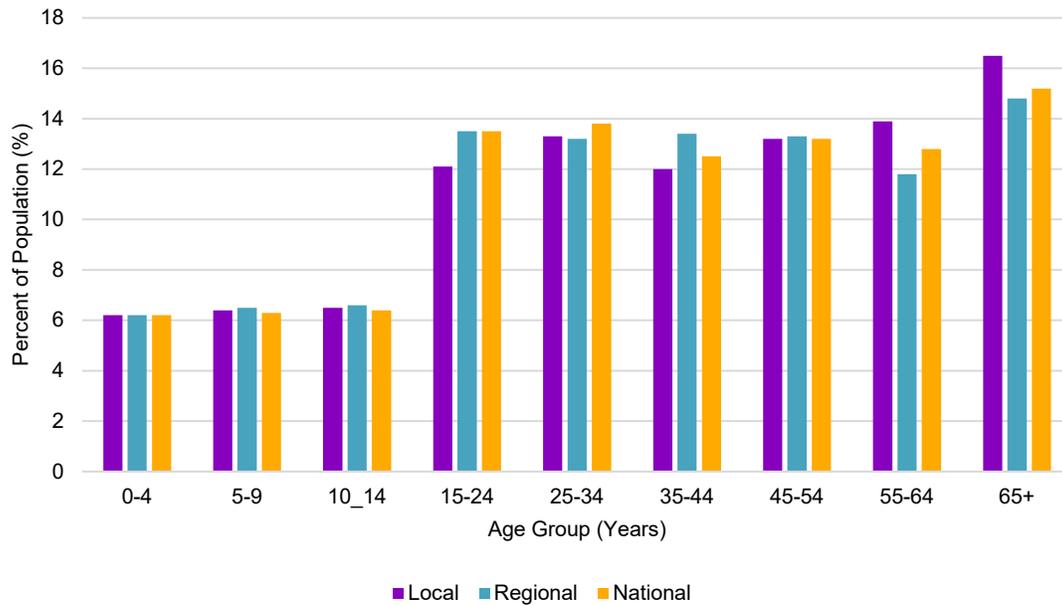
In 2017, the median age of the local area was 39.6 years, which is older than that of the nine-county region (38.1 years) and the nation (37.9 years). Median ages for all three population groups have been increasing steadily and will continue to increase (ESRI 2018).

Table 2. Median Age (2010-2022)

Year	Local	Regional	National
2010	38.5	37.0	37.2
2017	39.6	38.1	37.9
2022 (Expected)	40.1	38.8	N/A

Age distribution in the local area very closely reflects that of the nine-county region with most of the population aged 15 years or older. The local area population has a much higher concentration of adults aged 55 years or older and much less adults between the ages of 35–44 years and between the ages of 15–24 years (ESRI 2018). Both the regional and national populations have a greater proportion of their populations between 15–44 years of age.

Figure 3. Total Population by Age (2017)



The distribution of population by gender is largely similar across all three population scales in this report, with females having a slight majority of the population. The distribution of population by gender is approximately 49% males and 51% females for all three population groups (ESRI 2018).

Table 3. Population by Gender (2017)

Gender	Local	Regional	National
Male	49%	49%	49%
Female	51%	51%	51%

Note:

Percentages rounded to nearest whole number.

Population distribution by race and ethnicity follow similar patterns across the local area, regional and national populations. Most of the local area population identify as white (77%), slightly less than the 80% across the nine-county region. More residents in the local area identify as black (18%) than in the region (13%) (ESRI 2018). The nation is the most diverse of the three populations, and the local area is the least diverse.

Figure 4. Population by Race/Ethnicity (2017)



2.3 Household Size

Household sizes in the local area closely reflect those in the nine-county region and the nation, with the largest portion being 2-person households. Households in the local area and region are typically either 1-person or 2-person households (ESRI 2018). The average household size in the local area is 2.5 people, which is consistent with the region and the nation, yet households in the local area have been shrinking over the past years while households in the region have not changed. For both the local area and the region, just over one-third of the population consists of households with one or more children (ESRI 2018).

Table 4. Households by Size (2017)

Household Size	Local	Regional	National
1 Person	26%	28%	27%
2 Person	34%	33%	33%
3 Person	17%	16%	16%
4 Person	13%	14%	13%
5 Person	6%	6%	7%
6 Person	2%	2%	3%
7+ Person	1%	1%	2%
Total # of Households	111,196	790,532	116,716,292
All Households with Children	34%	34%	33%

Note:

Percentages rounded to nearest whole number.

3.0 Socioeconomics

3.1 Household Incomes

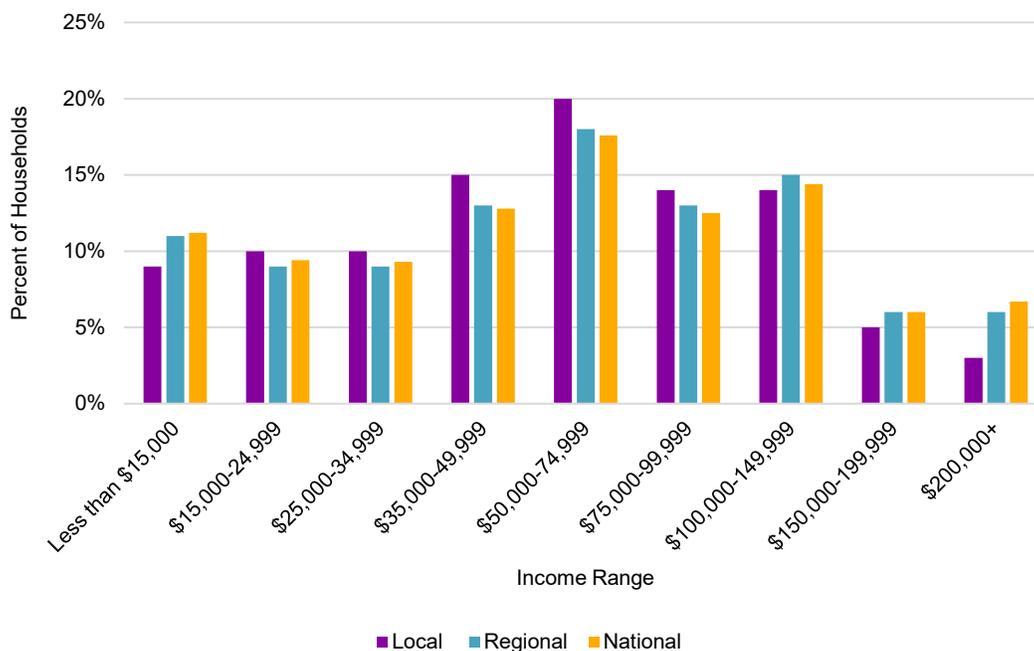
The median household income in 2017 in the local area was over \$55,000 (ESRI 2018), which is nearly \$3,000 less than the nine-county average around \$58,400, but very similar to the national median. Median household incomes in the local area are projected to increase by more than 11% over the next five years (ESRI 2018).

Table 5. Median Household Incomes (2017-2022)

Year	Local	Regional	National
2017	\$55,392	\$58,471	\$55,322
2022	\$62,622	\$66,958	\$65,727

Across the local area, the region and the nation, the largest portion of households are earning between \$50,000 and \$74,999 per year. In the local area, 44% of the population’s household incomes are less than \$50,000. In the nine-county region, this portion of households is similar at 42%. More than one-quarter (27%) of the region’s households make more than \$100,000, while closer to 22% of the local area population and 27% of the national population do (ESRI 2018).

Figure 5. Households by Income (2017)



3.2 Homeownership and Vacancy

A general trend across the nation is a shift towards renting instead of owning a home. Both the local area and regional populations reflect this shift, showing an increase in renters matched with a decrease in homeowners over the past 15 years. On trend with the nation, homeownership in the local area and the region has decreased nearly 4% percent, and this decrease is expected to continue. In 2017, the local area had a larger percentage (64%) of housing units as owner-occupied than in the region (59%). Vacancy rates are less in the local area (7% in 2017) when compared to the region at 8% and the nation at 11% (ESRI 2018).

Figure 6. Housing Unit Summary – Local Area (2000-2017)

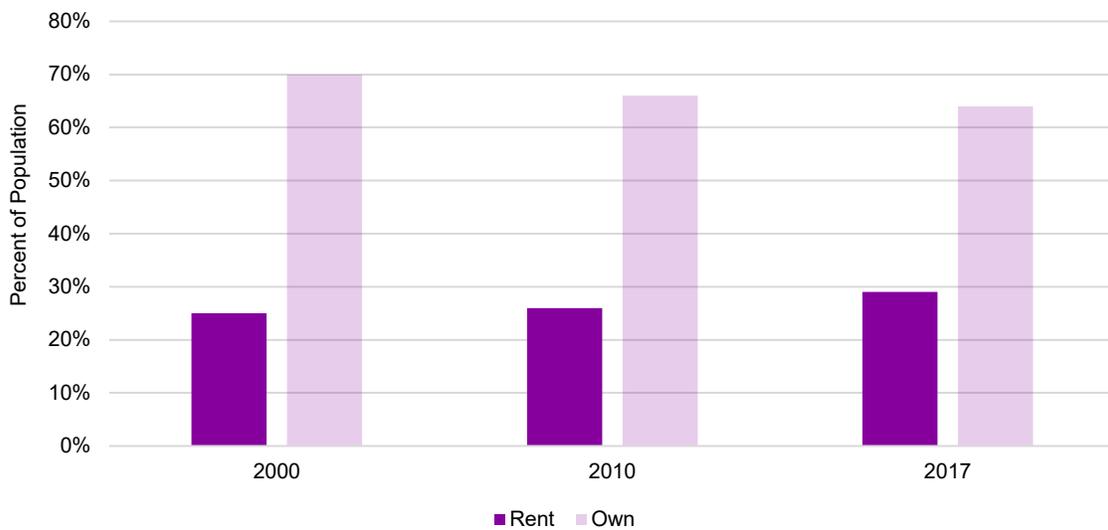


Figure 7. Housing Unit Summary – Region (2000-2017)

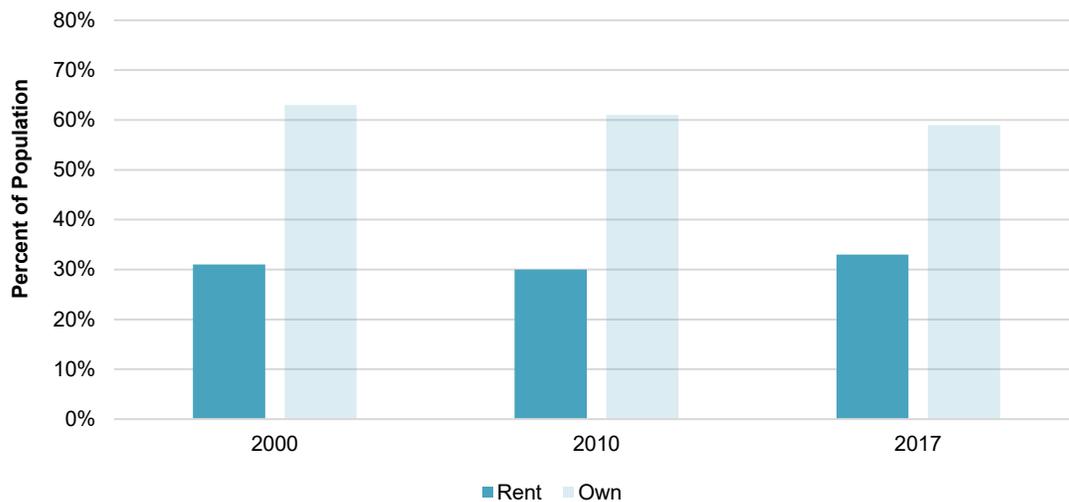
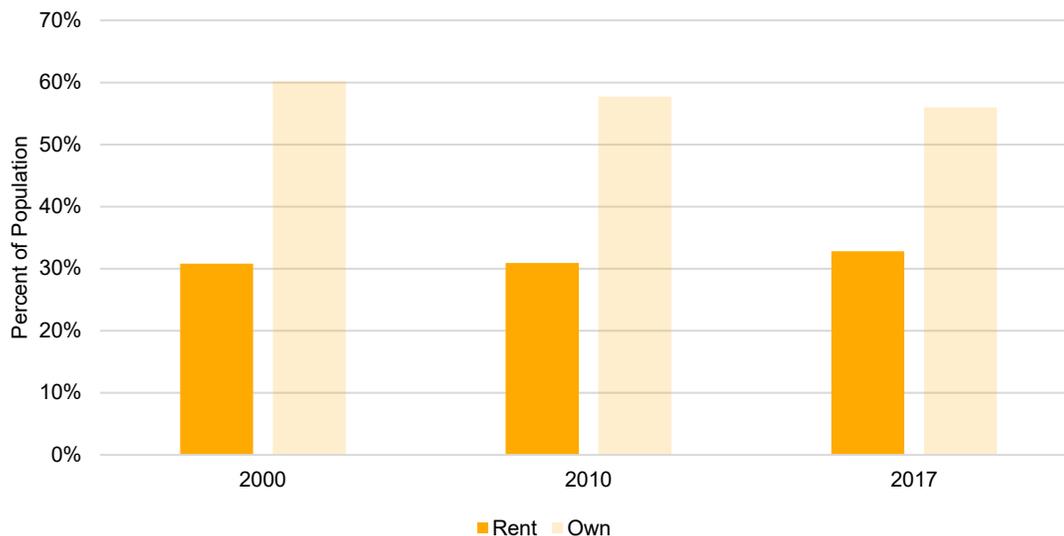


Figure 8. Housing Unit Summary – Nation (2000-2017)



3.3 Education

Education levels among the local area population follow the same patterns as the region and the nation, yet the regional and national populations have higher concentrations of more advanced degrees such as Bachelor’s or Graduate level degrees. Much of the local area population 25 years of age or older has completed high school – either a diploma, GED or equivalent alternative. This distribution is consistent with the regional population, although a larger portion of the local area (35%) has only completed high school or an equivalent than the region (29%) (ESRI 2018). Overall, the local area population has achieved less educational attainment than the regional population. These attainment levels are similar to those observed at a national scale; the nation’s population has attained less educational achievement past high school at 12% (ESRI 2018).

Table 6. Population 25+ by Educational Attainment (2017)

Educational Attainment	Local	Regional	National
Less than High School diploma	9%	9%	12%
High School Graduate/GED/Alternative	35%	29%	27%
Some college, no degree	21%	20%	20%
Associate’s degree	10%	9%	9%
Bachelor’s degree	17%	21%	20%
Graduate/Professional degree	8%	12%	12%

Note:

Percentages rounded to nearest whole number.

School systems and educational institutions can be important partners in programming and can facilitate connections with the community. Fernald is already connecting with multiple schools and institutions in the local area to conduct educational programming both on- and off-site.

Households in the 10-mile local area are served by the following public school districts:

- Fairfield School District (Butler County)
- Hamilton City School District (Butler County)
- Ross School District (Butler County)
- Talawanda School District (Butler County)
- Sunman-Dearborn Community School Corporation (Dearborn County)
- Franklin County Community School Corporation (Franklin County)
- Cincinnati Public Schools (Hamilton County)
- Finneytown Local Schools (Hamilton County)
- Mount Healthy City Schools (Hamilton County)
- North College Hill City Schools (Hamilton County)
- Northwest Local Schools (Hamilton County)
- Oak Hill Local Schools (Hamilton County)
- Princeton City Schools (Hamilton County)
- Southwest Local Schools (Hamilton County)
- Three River Local Schools (Hamilton County)
- Winton Woods Local Schools (Hamilton County)
- Wyoming City Schools (Hamilton County)

Households in the 10-mile local area are served by the following private schools:

- St. Lawrence Catholic Schools (Dearborn County)
- Mt. Hope Christian Academy (Hamilton County)
- St. John the Baptist School (Hamilton County)
- Summit Academy of Southwest Ohio (Hamilton County)
- St. Ignatius School (Hamilton County)
- St. James the Greater School (Hamilton County)
- Our Lady of Visitation School (Hamilton County)
- St. Jude Elementary School (Hamilton County)
- Heaven's Treasures Academy (Hamilton County)

The following table is a listing of public school districts and private school systems that provide education services throughout the nine-county region. Hamilton County offers the largest number of public and private school systems out of the region.

Table 7. School District & Education Systems (2017)

County, State	Public Schools	Private Schools
Hamilton County, OH	46 districts (191 schools)	85
Butler County, OH	17 districts (83 schools)	20
Clermont County, OH	11 districts (48 schools)	11
Warren County, OH	11 districts (45 schools)	20
Franklin County, IN	2 districts (7 schools)	2
Dearborn County, IN	3 districts (14 schools)	4
Campbell County, KY	8 districts (27 schools)	12
Kenton County, KY	5 districts (46 schools)	20
Boone County, KY	2 districts (28 schools)	8

Note:

Data from National Center for Education Statistics, US Department of Education.

3.4 Consumer Spending

The local area, regional and national populations’ average annual household spending follows similar consumption patterns, with the largest percentage of annual expenses going towards shelter and housing-related needs. All three populations are spending much less on other categories each year (ESRI 2018). Given the regional and national populations’ greater household incomes, these households spend more overall than the local area.

Table 8. Consumer Spending – Household Annual Averages (2017)

Spending Category	Local		Regional		National	
Shelter	\$14,110	36%	\$16,080	36%	\$16,790	36%
Dining	\$2,920	7%	\$3,330	7%	\$3,510	8%
Entertainment/Recreation	\$2,750	7%	\$3,100	7%	\$3,220	7%
Charitable Contributions/Gifts	\$2,070	5%	\$2,320	5%	\$2,490	5%
Apparel & Services	\$1,880	5%	\$2,150	5%	\$2,180	5%
Travel	\$1,710	5%	\$2,030	5%	\$2,150	5%

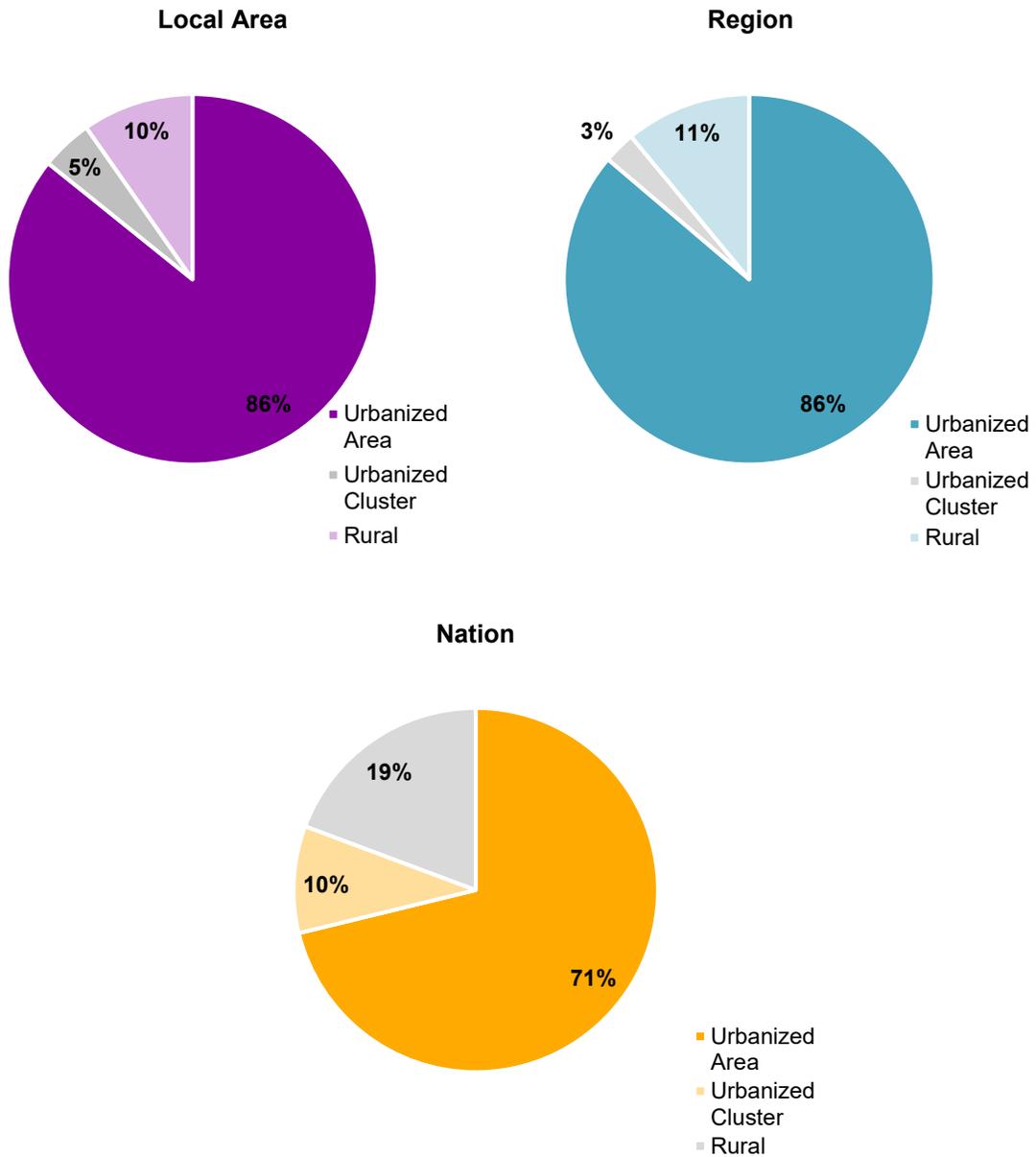
Note:

Dollar amounts rounded to the nearest 10.

3.5 Urban vs. Rural Communities

Across the region in 2010, the majority (89%) of the population lived in either *urbanized areas* or *urbanized clusters* outside of urban areas. In the local area, a larger portion lives in urbanized clusters than the region (4.5% when compared to 2.8%) (ESRI 2018).

Figure 9. Population by Urban/Rural Status (2010)



Notes:

According to the U.S. Census, an “urbanized area” is defined as a place or area of 50,000 or more people (inclusive of densely settle suburban areas in the vicinity of large cities). An “urbanized cluster” is defined as a place or area of at least 2,500 people and less than 50,000 people. “Rural” encompasses all territory and population not included within an urban area.

4.0 Land Use / Zoning

4.1 Land Use

The majority of land surrounding Fernald is used for agriculture (active or vacant) or residential purposes. Some commercial nodes are clustered along major corridors on State Routes 126 and 128 as well as State Route 27. Some public land is clustered adjacent to the Great Miami River and New London Road to the north (Figure 10).

4.2 Paddys Run Conservation Project

The Paddys Run Conservation Project (PRCP) is a multi-partner effort funded by the Fernald Natural Resource Trustee \$13.75 million settlement fund. It is managed by the Three Valley Conservation Trust and Ohio EPA. The goal of the PRCP is to preserve land, including farms, wildlife habitats and natural areas within the Paddys Run Watershed and Great Miami Aquifer footprint. This effort helps to restore and protect areas historically impacted by Fernald production and remediation activities. Through conservation easements, the project provides participating landowners with grant funding to protect their land while still maintaining ownership. Since 2012, these conservation easements have successfully permanently protected over 4,500 acres of land. This partnership and project helps to align and incorporate Fernald into the larger regional system of protected natural areas.

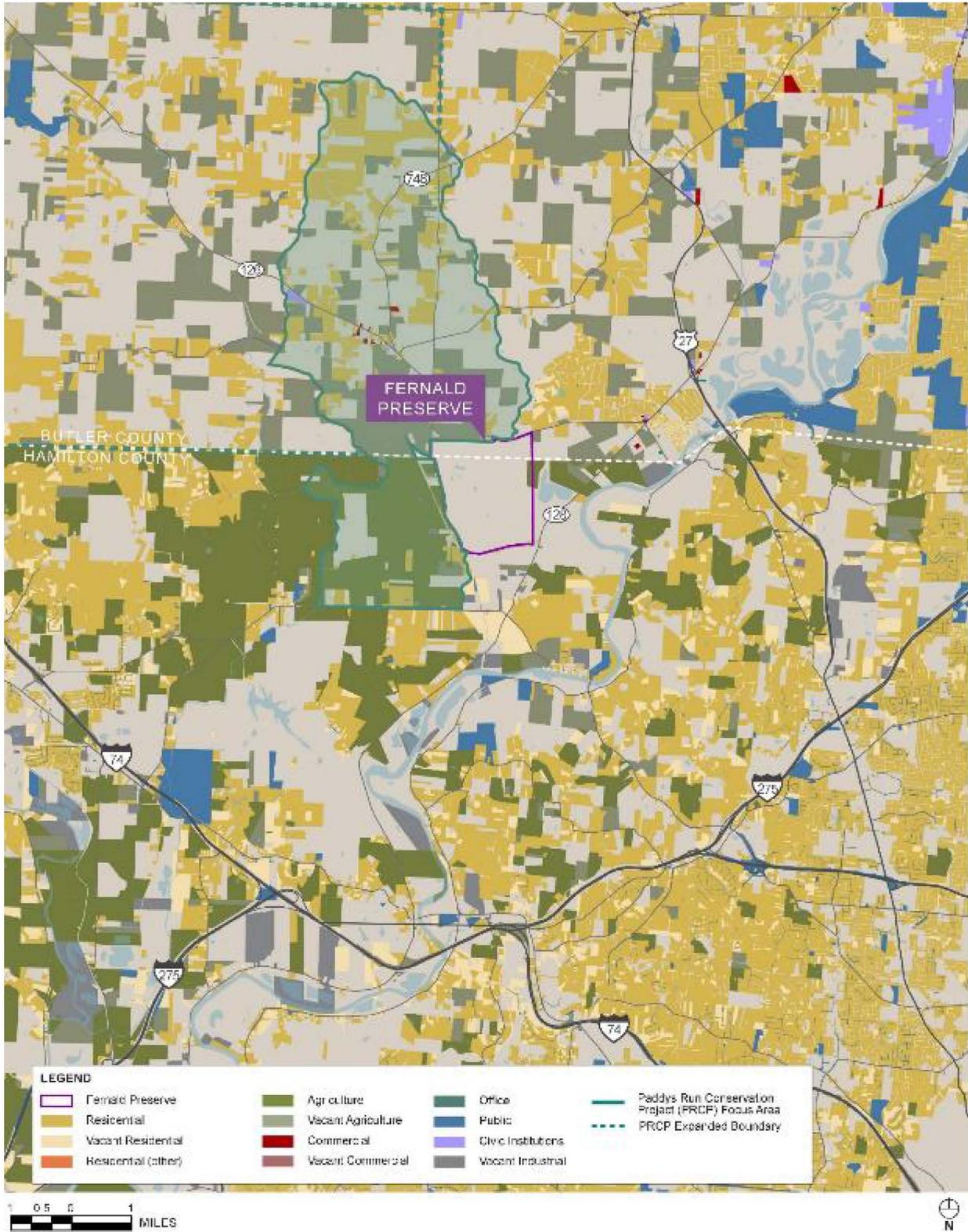


Figure 10. Land Use Map

5.0 Parks and Recreation

5.1 Introduction

The Fernald Preserve has been cleaned up and is managed as an undeveloped park with an emphasis on wildlife. Use of the site for recreation is limited to foot travel and wildlife observation. Nevertheless, the site fits into a robust regional park system, as summarized below.

5.2 Regional Parks

Fernald is in close proximity to several parks of the Great Parks of Hamilton County system. Heritage Park and Richardson Forest Preserve are located to the west of Fernald on the west side of the Great Miami River and State Route 27. Fernald's location near the Great Miami River situates it along a string of riverfront or river-near parks and natural areas that span the entire river corridor and connect to the Ohio River (Figure 11).

The following is a listing of notable parks within 10 miles of Fernald and main programming or amenities available at each:

- Heritage Park (Colerain Township, Ohio): Historic site, wildlife habitat, bird species, water recreation, baseball fields, golf course, picnic shelter, playground, walking trails, ecolab
- Oak Glen Nature Preserve (Great Parks of Hamilton County): Remediated pipeline site, native plant species, wildlife habitat, conservation areas
- Miami Whitewater Forest Park (Great Parks of Hamilton County, Ohio): Visitor center, nature displays, paved walking trails, nature trails, equestrian trails, golf course, soccer complex, picnic areas & shelters, youth camp area, dog park & agility course, water recreation, fishing, prairie, wetland, nursery
- Richardson Forest Preserve (Great Parks of Hamilton County, Ohio): Freshwater marsh, rare plant habitat, conservation area
- Mitchell Memorial Forest (Great Parks of Hamilton County, Ohio): Mountain bike trails, nature trails, fishing pond, playground, picnic areas, youth camp
- Winton Woods (Great Parks of Hamilton County, Ohio): GPHC headquarters, auditorium, educational exhibits, picnic areas & shelters, golf course disc golf course, paved walking trails, Parcours fitness trail, nature trails, basketball courts, equestrian trail, youth camp, fishing, water recreation, educational farm
- Joyce Park (Hamilton Parks Conservancy, Hamilton, Ohio): Sports fields (baseball, football, soccer), paved bicycle path, volleyball courts, playgrounds, picnic shelters/cabins
- Pyramid Hill Sculpture Park & Museum (Hamilton, Ohio): Outdoor art sculptures, meadows, lakes, hiking trails, Ancient Sculpture Museum
- Miami Woods Park (Hamilton Parks Conservancy, Hamilton, Ohio): Hiking trails, practice golf range

- Governor Bebb MetroPark (MetroParks of Butler County, Ohio): Wildlife habitat, forest, meadows, historic Pioneer village, picnic shelter & areas, hiking trails, playground, creeking areas, camping, cabin rental

5.2.1 MetroParks of Butler County

The MetroParks of Butler County (MetroParks) operates and manages its more than 4,000 acres of parkland with several goals and objectives that align with those at Fernald. These relevant objectives include: preserving and protecting watersheds, preserving wildlife habitat, protecting important bird areas, protecting plant and animal diversity and conducting conservation education. MetroParks intends for at least 80% of its properties to be maintained in a natural undeveloped state, and this work requires multiple management techniques, many of which are utilized at the Fernald site, such as native and invasive plant species control, prescribed grassland burns and waste and water quality control (MetroParks of Butler County 2016).

5.2.2 Great Parks of Hamilton County

The Cincinnati area's major park system, Great Parks of Hamilton County, also works toward habitat and wildlife conservation goals much like Fernald. Similar to Butler County, more than 80% of parklands maintained by Great Parks of Hamilton County are maintained as undeveloped greenspace, with 21 square miles of protected forests, prairies and wetlands. These natural areas are managed through techniques such as forest succession management, meadow mowing, prescribed fires, and wetland and stream corridor restoration (Great Parks of Hamilton County).

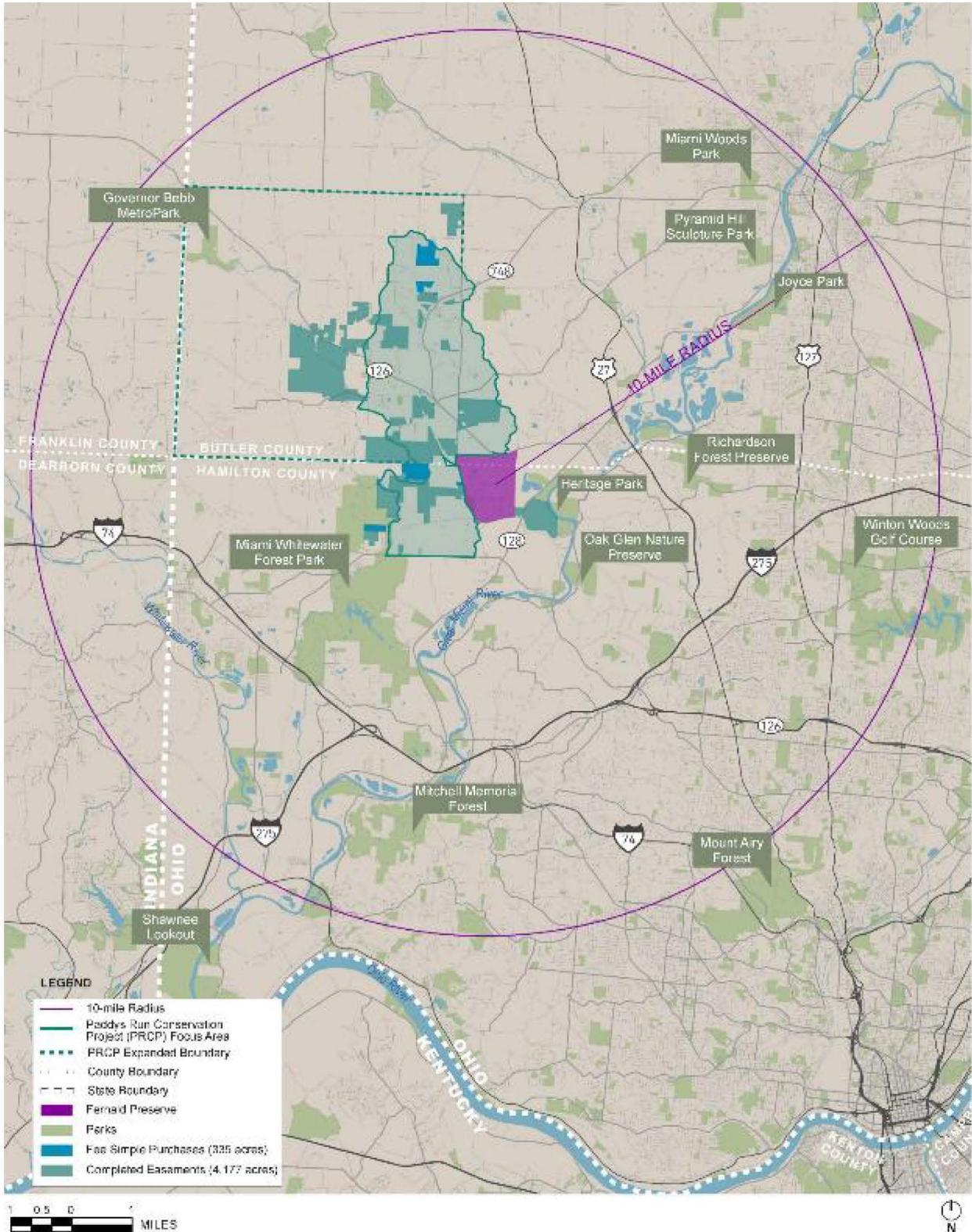


Figure 11. Parks and Recreation Map

5.3 Recreation Spending and Market

When looking at the consumer behavior in recreation activity in the local area and the region, two categories of expenditures were considered: Entertainment/Recreation Fees and Admissions and Sports, Recreation and Exercise Equipment.

On average, households spend the most money on membership fees for social, recreation or civic clubs. Households spend the least amount of money on admission to movies, museums or parks. Overall, the local area population is spending less money each year on any of these categories of fees and admissions than the region (ESRI 2018).

In terms of equipment expenditures, the local and regional populations spend the most on general exercise equipment or gear each year. Households across the region spend much more on bicycles than in the local area, as well as the entire nation, (ESRI 2018), indicating that bicycling could be a less popular activity among people living within 10 miles of Fernald. This fact could be influenced by the lack of bicycle infrastructure and connectivity to regional recreational trails within the local area. National average expenditures are generally larger in every category but show more similar amounts when it comes to spending on sports, recreation and exercise equipment, with the exception of bicycles. Local and regional are spending more money on experience-based entertainment and recreation than recreation equipment for individual activity.

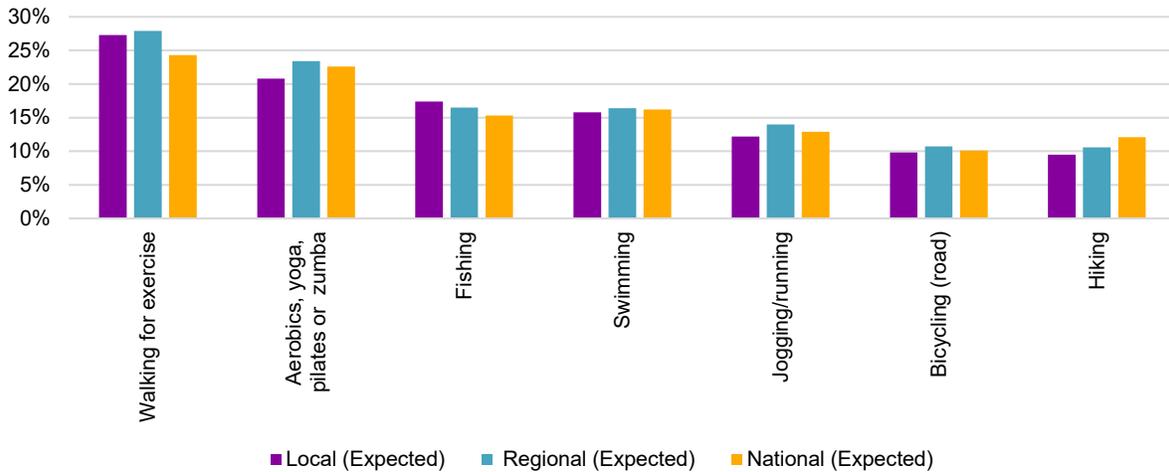
Table 9. Annual Household Recreation Expenditures (2017)

Activity	Average Expenditure		
	Local	Regional	National
Entertainment/Recreation Fees and Admissions			
Membership Fees for Social/Recreation/Civic Clubs	\$182	\$207	\$226
Fees for Recreational Lessons	\$109	\$127	\$138
Fees for Participant Sports	\$90	\$100	\$113
Tickets to Movies/Museums/Parks	\$65	\$75	\$80
Sports, Recreation and Exercise Equipment	Local	Regional	National
Exercise Equipment/Gear	\$53	\$59	\$58
Hunting & Fishing Equipment	\$37	\$42	\$54
Bicycles	\$23	\$57	\$29
Camping Equipment	\$15	\$17	\$14

Market potential for recreation activities was determined by considering how many times adults or households participated in specific recreation activities in the last 12 months. These participant behavior levels were used to project expected number and percentage of adults or households to likely participate in the activities in the future. Walking for exercise is expected continue as the most popular recreation/sport activity at 27% locally, 28% regionally and 24% nationally. Exercise activities such as aerobics, yoga, Pilates and Zumba will continue to be the second-most popular activity at 21% locally and 23% regionally (ESRI 2018). Low-impact or

more passive activities such as walking, and yoga may have the most market potential because a wider range of age and ability levels are easily able to perform these activities.

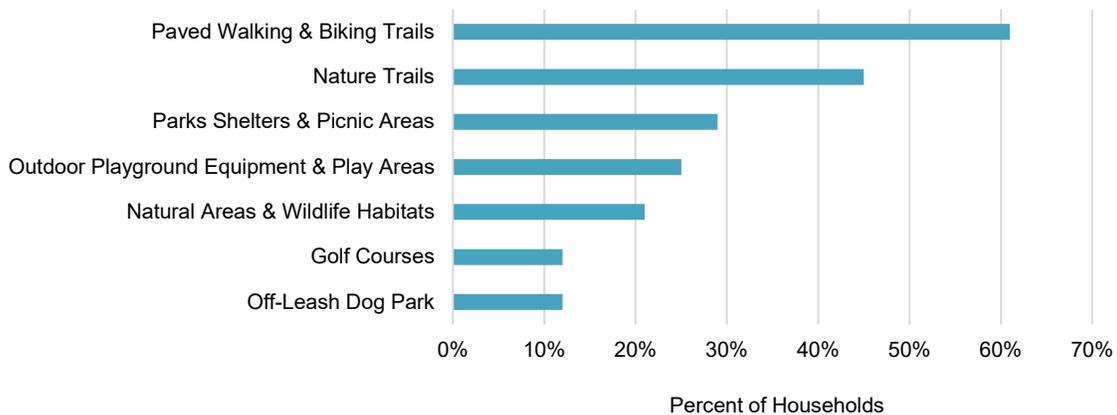
Figure 12. Sports and Leisure Market Potential (2017)



5.4 Recreation Activities and Amenities

The amount of importance that the community places on amenities can be measured and used to help guide future improvements as to how much of those amenities should exist. From a county-wide survey conducted for the Great Parks of Hamilton County Comprehensive Master Plan, households in the region indicated the greatest importance on paved walking and biking trails (61% of households) and nature trails (45%) (ETC Institute; Great Parks of Hamilton County 2017). These amenities with that are most important to households are likely to be in higher demand and used more frequently across the region. Fernald currently provides some of these important amenities, so it is already able to satisfy many households in the region.

Figure 13. Facilities/Amenities That Are Most Important to Households – Hamilton County (2017)



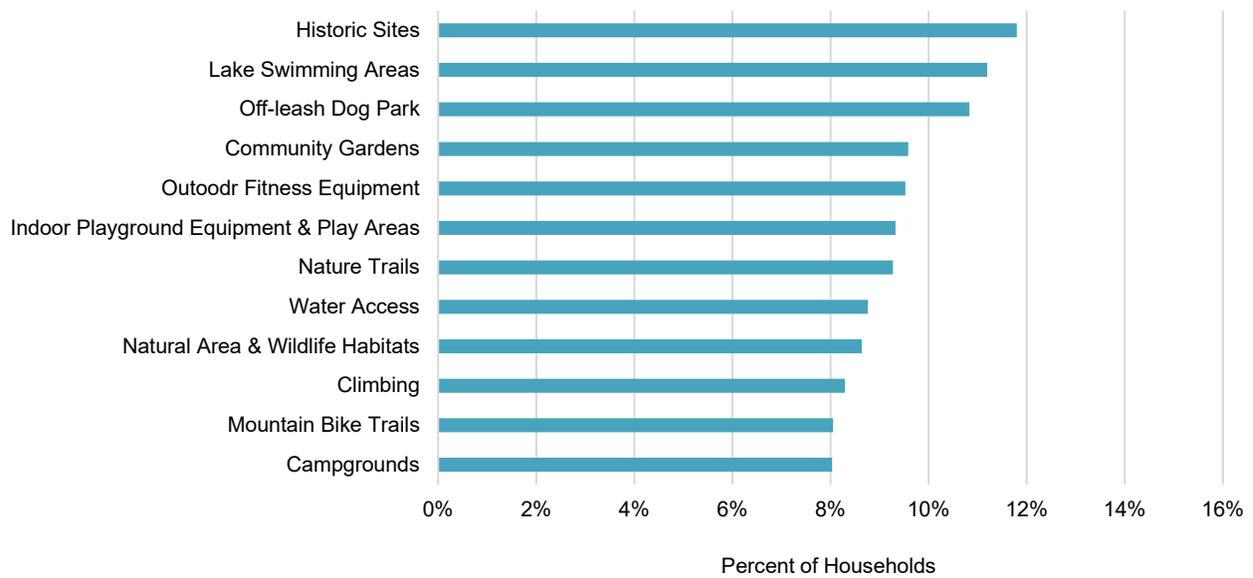
Notes:

Categories with more than 10% responses are shown.

Data from the Great Parks of Hamilton County Comprehensive Master Plan process (2018).

Another factor that influences future improvements or the development of new amenities is determining what amenities or facilities the population needs. In Hamilton County, there is a great need for historic sites that households feel is not being fully met by current available sites and facilities; nearly 12% of households feel that there are not enough historic sites in the area to meet their needs. Nature trails, natural areas, and wildlife habitats were also indicated as a greater amount of need that is not currently being met (ETC Institute; Great Parks of Hamilton County 2017). Fernald already has facilities and amenities onsite that could help to meet these needs of Hamilton County residents, especially as a historic site.

Figure 14. Estimated Number of Households Whose Needs for Facilities/Amenities Are Being Partly Met or Not Met – Hamilton County (2017)



Notes:

Categories with more than 30,000 households are shown.

Data from the Great Parks of Hamilton County Comprehensive Master Plan process (2018).

6.0 Transportation

6.1 Access

Fernald on Willey Road is directly accessible from Hamilton Cleves Pike Road/State Route 128, which runs north-south connecting State Route 50 and the Ohio River from the south with the City of Hamilton to the north. The site is less than 9 miles from Interstate 275, near where it meets Interstate 74. (Figure 15).

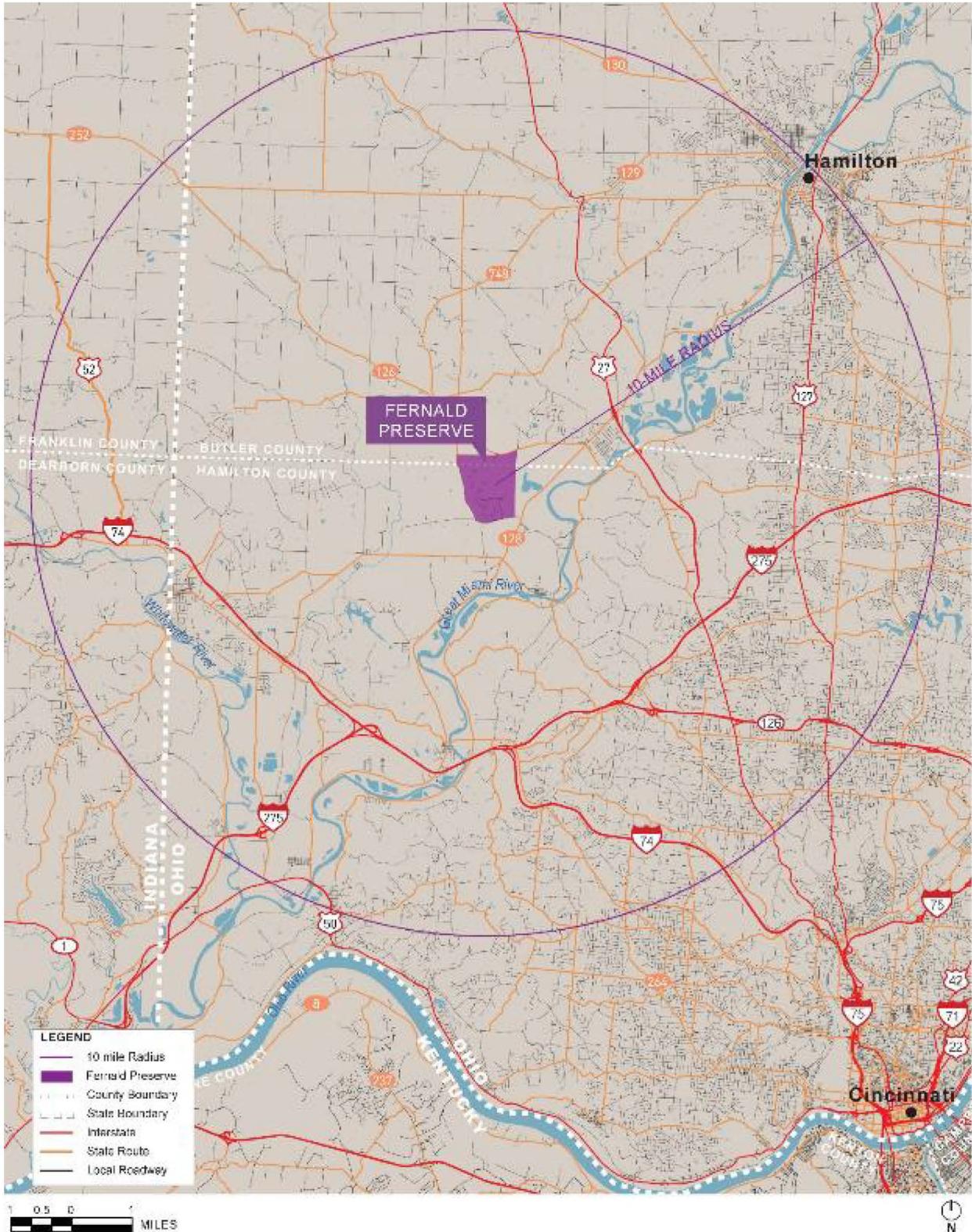


Figure 15. Transportation Map

6.2 Modes of Transportation

Despite an increase in use of alternative modes of transportation for commuting purposes across the region and the country, automobiles remain the most dominant form of transportation. Except for Hamilton County, likely due to the density and infrastructure of downtown Cincinnati, more than 83% of each county in the region commute to work by driving in a vehicle alone. On average, around 8% of the region utilizes a carpool or vanpool (US Census Bureau 2013). Across the region, public transportation is the least utilized mode of transportation. These commuting patterns may correlate with development patterns as more rural and less developed counties, such as Dearborn and Franklin in Indiana, largely depend on single-occupancy vehicles and have indicated little to no use of public transportation.

Table 10. Commuting Transportation Modes – Region (2013)

County	Drive Alone	Carpool	Public Transportation	Other
Dearborn	84%	11%	0%	5%
Franklin	84%	9%	0%	7%
Boone	86%	8%	1%	5%
Campbell	83%	8%	2%	7%
Kenton	85%	9%	2%	5%
Butler	84%	8%	1%	7%
Clermont	86%	8%	1%	6%
Hamilton	79%	9%	4%	8%
Warren	87%	6%	1%	6%

Notes:

Public Transportation includes railroad, bus, trolley or ferry

Other includes taxicab, bicycling, walking or working from home

Alternative modes of transportation, such as public transportation, bicycling or walking, become more common when considering specific special needs populations, such as racial minorities or low-income and disabled groups. Low-income individuals in the entire region are much more likely to use public transit (10% when compared to the region at 3%) and bicycling or walking (11% when compared to 3%) (OKI Regional Council of Governments 2016).

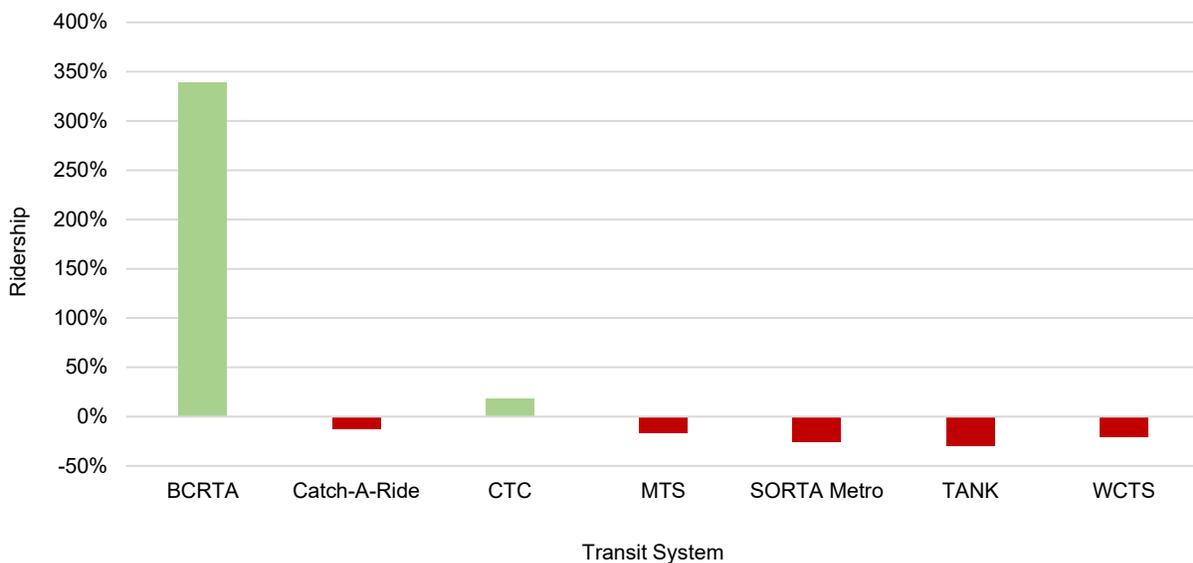
6.3 Public Transportation

Seven major public transit or bus systems operate throughout the region, with each of the eight counties defined as the Ohio-Kentucky-Indiana (OKI) region are served by at least one system. The following listing includes the public transit systems in the OKI region (OKI Regional Council of Governments 2016):

- Butler County Regional Transit Authority (BCRTA) – Butler County, OH
- Catch-A-Ride – Dearborn County, IN
- Clermont Transportation Connection (CTC) – Clermont County, OH
- Middletown Transit System (MTS) – Butler and Warren counties, OH
- Southwest Ohio Regional Transit Authority (SORTA) Metro – Hamilton, Butler, Clermont and Warren counties, OH
- Transit Authority of Northern Kentucky (TANK) – Boone, Campbell, Kenton (KY) and Hamilton (OH) counties
- Warren County Transit System (WCTS) – Warren County, OH

Since 2006, overall public transit ridership has experienced a decrease of more than 3.6 million riders (OKI Regional Council of Governments 2016). As the region has grown in a more dispersed development pattern with significant residential and employment growth occurring outside the City of Cincinnati and around the I-275 beltway, transit expansion has expanded its geographic reach. The 10-mile local area around Fernald is sparsely serviced by public transportation, causing ridership to be extremely low due to lack of service. No bus routes directly provide access to the Fernald site. Bus transit ridership directly correlates with the expansion and reduction of services, respectively, as well as fare prices. Some systems in the region, such as BCRTA, Catch-A-Ride and CTC, have seen increased ridership largely due to expansion or additions of routes. MTS, SORTA, TANK and WCTS have all seen decreased ridership due to fare increases.

Figure 16. Change in Bus Ridership – OKI Region (2006-2010)



Note:

Regional information and data from the OKI 2040 Transportation Plan (2016) does not include information for Franklin County, Indiana.

6.4 Bicycling

Bicycling, for both transportation and recreation purposes, has grown in popularity in the United States due to many factors such as education, access to facilities, sustainability, health and recreation. Cities across the country are focusing on bicycling as a major part of their transportation systems; 39 out of the 50 largest cities in the United States have a bicycle plan in place (City of Cincinnati, 2010).

6.4.1 Commuting by Bicycle

Bicycle ridership for transportation purposes in the City of Cincinnati closely reflects the United States, with an estimated bicycle commuter rate for the City of Cincinnati to be 0.60% compared to 0.55% for the nation (OKI Regional Council of Governments 2016). Considering the local area's smaller expenditures on bicycling equipment, the local population is not bicycling as much as the rest of Cincinnati or the region.

6.4.2 Bikesharing

Red Bike, Cincinnati and Northern Kentucky's public bikeshare program, first opened its stations in September of 2014. In 2015, the program had expanded into 50 stations and over 380 bicycles by 2015, making it the fourth largest bike share system in the country. After just one year of operation, the Red Bike system had totaled over 116,740 rides and over 1,515 annual members. In a user survey conducted by Red Bike, 40% of Red Bike rides replaced vehicle trips and 40% replaced walking trips (Red Bike 2015). Bikeshare programs such as Red Bike have proven to become a key factor in how people get around and have even helped change transportation habits towards more sustainable methods.

6.4.3 Existing Bicycle Facilities

The OKI region offers more than 106 miles of on-street bicycle facilities, more commonly utilized for commuting because they provide regional connectivity and access, and 95 miles of separate trails, typically used for recreation trips. Among the eight counties in the OKI region, Hamilton and Butler counties have the greatest mileage of on-street facilities, 43 and 23 miles respectively. Warren County contains the most trails, totaling 47 miles. Throughout the region, more than 287 miles of additional trails are currently, which would total an estimated \$112.5 Million investment (OKI Regional Council of Governments 2016).

Table 11. Existing On-Street Facilities (in Miles) – OKI Region

County	Striped Bike Lanes	Wide Curb Lanes	Side Paths	Signed Routes	Total On-Street Facilities
Butler	2.1	8.9	10	1.5	22.5
Clermont	0	0	2	4.5	6.5
Hamilton	8.8	5	7.8	21.8	43.4
Warren	0.8	0	14.7	0	15.5
Boone	5.9	0	4.3	0	10.2
Campbell	0	0	0.8	0	0.8
Kenton	8.2	0	0	0	8.2
Dearborn	0	0	0.4	0	0.4
OKI Region Total	25.8	13.9	39.2	27.8	106.7

Note:

Regional information and data from the OKI 2040 Transportation Plan (2016) does not include information for Franklin County, Indiana.

Table 12. Existing and Planned Regional Trail System (in Miles) – OKI Region

County	Existing	Planned	Total Future	Estimated Cost (Millions of Dollars)
Butler	16	51	67	25.3
Clermont	6	6	12	7.6
Hamilton	19	43	62	42.9
Warren	47	13	60	5.9
Boone	1	15	16	6.4
Campbell	0	26	26	12.4
Kenton	1	22	23	10.2
Dearborn	5	2	7	1.8
OKI Region Total	95	192	287	112.5

Note:

Regional information and data from the OKI 2040 Transportation Plan (2016) does not include information for Franklin County, Indiana.

7.0 Government

7.1 Surrounding Municipalities

Fernald spans two counties, Butler and Hamilton, and two townships, Ross (Butler County) and Crosby (Hamilton County); the site is also adjacent to Morgan Township (Butler County). (Figure 17). The following is a table organizing the surrounding government entities by geography: county; townships; cities, and villages or other places.

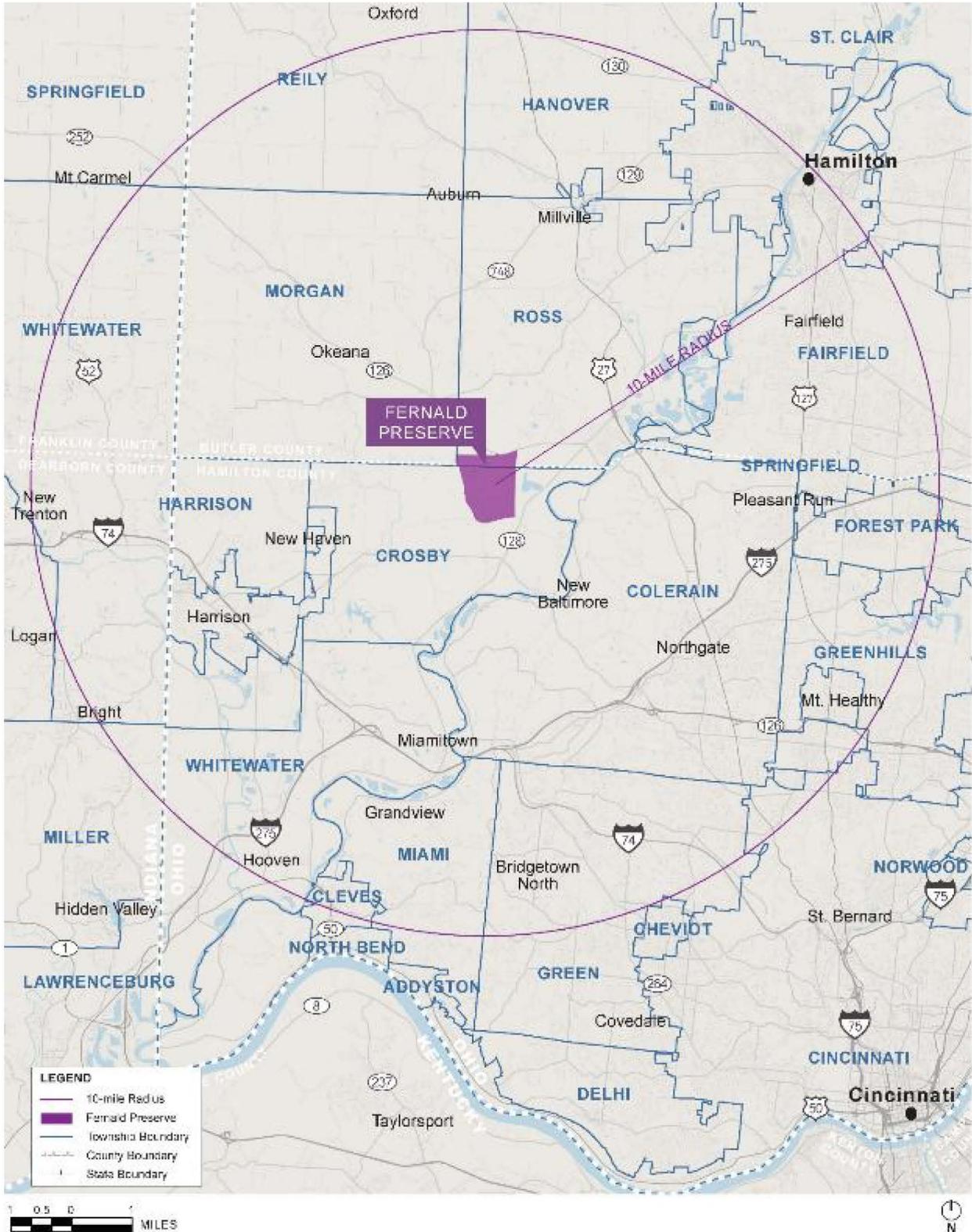


Figure 17. Government Map

Table 13. Townships, Cities and Villages by County

County	Townships	Cities	Villages or Other Places
Butler, OH	Fairfield, Hanover, Lemon, Liberty, Madison, Milford Morgan, Oxford, Reily, Ross, St. Clair, Wayne, West Chester	Fairfield, Hamilton, Middletown, Monroe, Oxford, Trenton	Jacksonburg, New Miami, Seven Mile, Somerville
Clermont, OH	Batavia, Franklin, Goshen, Jackson, Miami, Monroe, Ohio, Pierce, Stonelick, Tate, Union, Washington, Wayne, Williamsburg	Milford	Amelia, Batavia, Bethel, Chilo, Moscow, Neville, New Richmond, Newtonsville, Owensville, Williamsburg
Hamilton, OH	Anderson, Colerain, Columbia, Crosby Delhi, Green, Harrison, Miami, Springfield, Sycamore, Symmes, Whitewater	Blue Ash, Cheviot, Cincinnati, Deer Park, Forest Park, Harrison, Indian Hill, Loveland, Madeira, Montgomery, Mount Healthy, North College Hill, Norwood, Reading, Sharonville, Springdale, Indian Hill, Wyoming	Addyston, Amberley, Arlington Heights, Cleves, Elmwood Place, Evendale, Fairfax, Glendale, Golf Manor, Greenhills, Lincoln Heights, Lockland, Mariemont, Newtown, North Bend, Silverton, St. Bernard, Terrace Park, Woodlawn
Warren, OH	Clear Creek, Deerfield, Franklin, Hamilton, Harlan, Massie, Salem, Turtlecreek, Union, Washington, Wayne	Franklin, Lebanon, Mason, Springboro	Carlisle, Corwin, Harveyburg, Maineville, Morrow, Pleasant Plain, South Lebanon, Waynesville
Boone, KY	None	Florence, Union, Walton	Belleview, Big Bone, Bullittsville, Burlington, Francisville, Hamilton, Hebron, Oakbrook, Petersburg, Rabbit Hash, Richwood, Taylorsport, Verona, Union
Campbell, KY	None	Alexandria, Bellevue, California, Cold Spring, Crestview, Dayton, Fort Thomas, Highland Heights, Melbourne, Mentor, Newport, Silver Grove, Southgate, Wilder, Woodlawn	None
Kenton, KY	None	Bromley, Covington, Crescent Springs, Crestview Hills, Crittenden, Edgewood, Elsmere, Erlanger, Fairview, Fort Mitchell, Fort Wright, Independence, Kenton Vale, Lakeside Park, Ludlow, Park Hills, Ryland Heights, Taylor Mill, Villa Hills, Walton	None

Dearborn, IN	None	Aurora, Greendale, Lawrenceburg	Dillsboro, Moores Hill, St. Leon, West Harrison
Franklin, IN	None	Batesville	None

7.2 Population Growth and Density

Population growth and density can be indicators of the health of populations, the strength of economy and government, and the future of development within municipal boundaries. All counties in the nine-county region are growing except for the two Indiana counties, Dearborn and Franklin, who are shrinking at -0.1% and -0.2% respectively). Warren and Boone Counties have shown the greatest growth in total population through 2000–2010 and 2010–2018, both near 3% and 1% for the respective time frames and are anticipated to continue growing faster than the other counties in the region (ESRI 2018).

At the township level, out of the four most proximate townships to Fernald, Crosby Township has more recently shown the greatest growth, with a rate of 4.1% between 2010–2018 and an anticipated rate of 2.3% into 2023. Colerain Township and Morgan Township show little to no growth in recent years after 2010 and are expected remain that way into 2023 (ESRI 2018).

Table 14. Annual Compound Growth Rates by County (2000-2023)

County	2000-2010	2010-2018	2018-2023
Butler County, OH	1.0%	0.6%	0.7%
Clermont County, OH	1.0%	0.6%	0.6%
Hamilton County, OH	-0.5%	0.3%	0.2%
Warren County, OH	3.0%	1.2%	1.3%
Boone County, KY	3.3%	1.2%	1.4%
Campbell County, KY	0.2%	0.7%	0.6%
Kenton County, KY	0.5%	0.7%	0.6%
Dearborn County, IN	0.8%	0.0%	-0.1%
Franklin County, IN	0.4%	0.0%	-0.2%

Table 15. Annual Compound Growth Rates by Township (2000-2023)

Township	2000-2010	2010-2018	2018-2023
Colerain Township, OH	-0.3%	0.0%	0.0%
Crosby Township, OH	-0.1%	4.1%	2.3%
Morgan Township, OH	0.4%	0.0%	0.2%
Ross Township, OH	2.6%	0.5%	0.6%

When population demand is great enough to require more resources for more residents, cities or municipalities, especially those that are landlocked, may need to increase the density of development to support further growth. Densification of population may be an indicator that the area is able to adapt to increasing population needs and attract and develop the necessary resources on existing available land. In some cases, as in more rural settings for example, communities wish not to develop existing open space for development that may increase population density and may implement restrictions on development. Similar to population growth, all counties except for the two Indiana counties exhibit steady positive densification.

At the township level, both Colerain and Ross townships have remained at a steady density between 2010 and 2018 and are not expected to increase in density by 2023. Crosby Township has shown some growth, increasing in density by 72% between 2010 and 2018, and is expected to continue increasing in density by 4% through 2023. Morgan Township did not increase in density between 2010 and 2018 but is expected to nearly double in density by 2023 (ESRI 2018). This great increase may be due to multiple development projects planned for the area to be completed in the next five years.

Table 16. Population Density (Population per Square Mile) by County (2000-2023)

County	2010	2018	2023
Butler County, OH	788	831	859
Clermont County, OH	437	459	474
Hamilton County, OH	1,977	2,021	2,042
Warren County, OH	530	583	622
Boone County, KY	482	533	570
Campbell County, KY	597	630	648
Kenton County, KY	997	1,052	1,081
Dearborn County, IN	164	164	163
Franklin County, IN	60	60	60

Table 17. Population Density (Population per Square Mile) by Township (2000-2023)

Township	2010	2018	2023
Colerain Township, OH	1,366	1,365	1,364
Crosby Township, OH	140	194	218
Morgan Township, OH	150	150	297
Ross Township, OH	277	289	297

7.3 Similar Planning Initiatives or Projects

7.3.1 Tributary to O’Bannon Creek Restoration Project (Clermont County)

During the winter of 2017-2018, restoration began on an unstable portion of a tributary to O’Bannon Creek. The project was conducted by a partnership between Clermont County Water Resources Department and the Clermont Soil and Water Conservation District and was funded in part by a Section 319 grant from the Ohio EPA. The existing channel was undersized for the watershed and suffered from bank erosion, sediment loading and unstable habitat. Channel improvements included a wider channel, constructed riffles to prevent erosion, bank stabilization structures, bankfull benches, a new floodplain and native plantings (Clermont County Soil and Water Conservation District 2018).

7.3.2 Lebanon-Turtlecreek Trail Initiative (Warren County)

The Lebanon-Turtlecreek Trail Initiative was adopted in 2015 as an amendment to the Warren County Comprehensive Plan. The Initiative seeks to develop a bicycle network that connects Lebanon’s historic downtown to destinations and developing areas within Turtlecreek Township. Key destinations and recommended trailheads include existing trails, current and planned commercial or residential districts, existing parks and historic sites such as: the Little Miami Scenic Trail, the City of Lebanon, Union Village (planned), Native Ohio Center, Fort Ancient and multiple surrounding communities. The proposed system will consist of multi-purpose trails, on-street bike lanes and sections of shared road (Warren County Regional Planning Commission 2015).

7.3.3 Ohio Environmental Education Fund Grants and Mini Grants (Statewide):

Stormsewer Retrofit Project, Hamilton County Soil and Water Conservation District (2018): Educating the community about more effective and less costly implementation of stormwater technologies through a retrofitting of a stormwater outfall within the MS4 system. Instream biology, habitat and water quality will be monitored to evaluate effectiveness of the project (Ohio Environmental Protection Agency 2018).

Mill Creek Urban AgroForestry Program, Groundwork Cincinnati – Mill Creek (2017): A new Urban AgroForestry program for middle and high school students in the Healthy River/Health People school program. The program includes fieldwork activities focused on habitat restoration, reforestation, wetland restoration and invasive plant species removal as well as discussions around climate change and stormwater runoff that will improve the wildlife habitat in the Mill Creek Watershed (Ohio Environmental Protection Agency 2017).

School Yard Environmental Learning Stations, Imago and Pleasant Ridge Montessori School (2018): Design and implementation of environmental learning stations at the school’s garden and naturescape. Station examples include pollinator gardens, bird watching and arboretum (Ohio Environmental Protection Agency 2018).

Thomas C. Spellmire Water Trailer, Warren County Soil and Water Conservation District (2015): Additional interactive exhibits for a travelling water quality education trailer. The exhibit trailer includes two interactive stream tables that incorporate lessons on erosions, pollution and pollution prevention and other environmental issues (Ohio Environmental Protection Agency 2015).

7.4 Crosby Township

Review of the Crosby Township 2009 Land Use Plan began in 2015 (adopted in 2016) by Township leadership, property owners and residents to ensure continuity and necessary adjustments for proper future development of the Township. Goals of the plan included the following:

- Allocation of township's resources;
- Maintain the open space such as farmland, undeveloped land and parks;
- Promote low-density housing and limited retail;
- Preserve the township's history;
- Keep agriculture viable;
- Ensure suitable industry and tax support; and,
- Protect the aquifer and floodplain from contamination.

These goals of the township align with many goals of Fernald and its partners in terms of the protection of natural resources and local history as well as the preservation of undeveloped land by restricting the density of development.

8.0 Economy

8.1 Home Values

Median home values across the nine-county region were more than \$176,000 in 2017, while the local area median is less at nearly \$143,600 and the national median is higher at \$184,700. Home values in both the local area and region are expected to increase by at least \$15,000 over the next five years (ESRI 2018).

Table 18. Median Home Value (2017, 2022)

Year	Local	Regional	National
2017	\$143,600	\$176,200	\$184,700
2022 (Expected)	\$159,500	\$198,300	N/A

Note:

Numbers rounded to the nearest hundred.

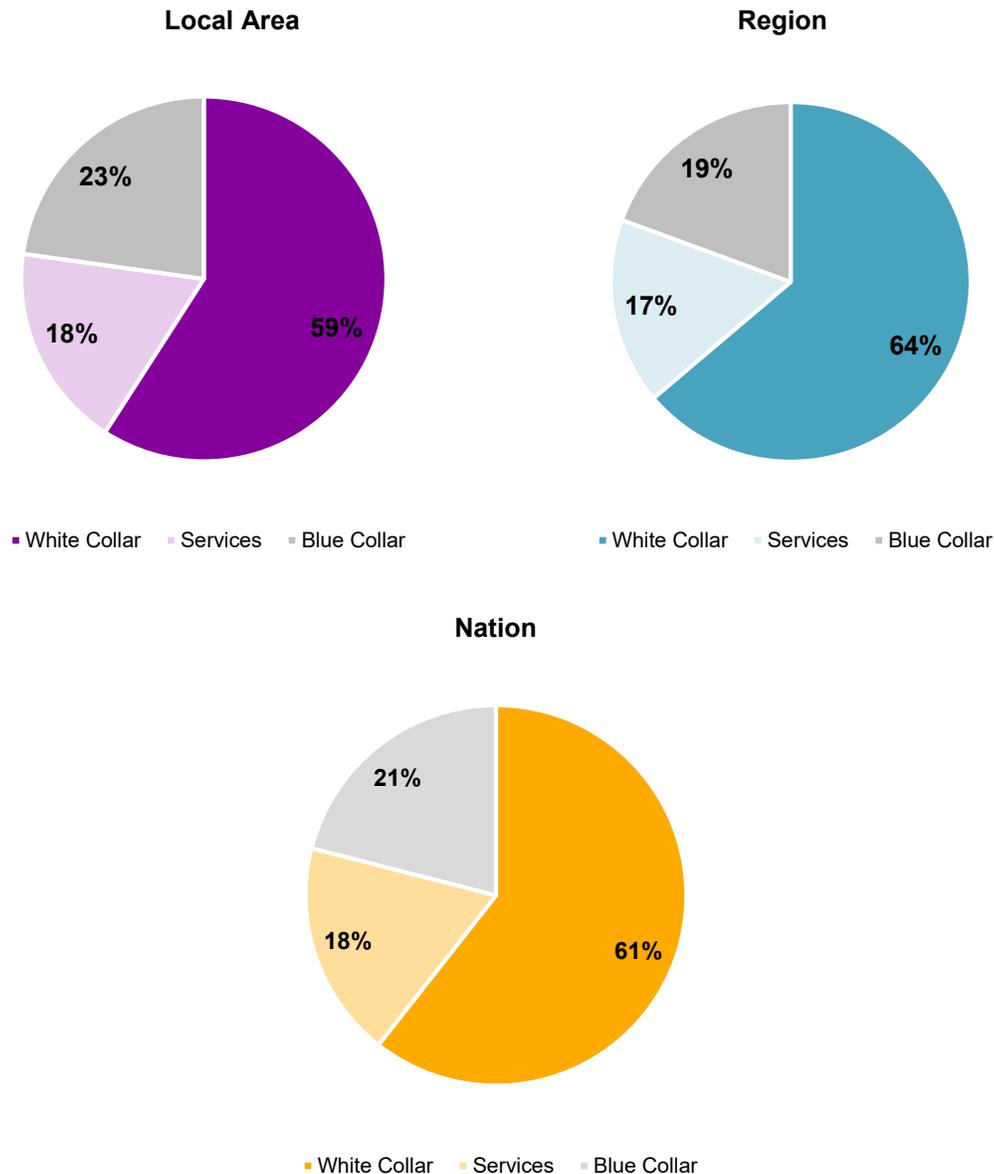
8.2 Employment

The unemployment rate of the local area is 6%, which is slightly less than the region at 5.3%. Both the local area and region are enjoying an unemployment rate significantly lower than the nation at 37%. On average, the daytime population of the local area consists of more than one-third (39%) workers and two-thirds (61%) residents (ESRI 2018).

8.2.1 Employment by Occupation Type

Of the employed individuals aged 16 years or older, the majority of the population at the local and regional scales is currently working in white collar occupations (59% and 64% respectively) (ESRI 2018). The distribution of occupation types in the local area more closely reflects that of the nation than the region. More workers in the local area are in blue collar and service positions than the in the region.

Figure 18. Employed Population 16+ by Occupation Type (2017)



8.2.2 Employment by Industry

When broken down by industry, the local area, regional and national employment sector distribution follow very similar distributions. Around half of the employed population at all scales work in the Services industry (48%, 49% and 50% respectively). Manufacturing and Retail Trade are the second and third largest sectors for each population, both between 10% and 14% of the employed population (ESRI 2018).

Figure 19. Employed Population by Industry – Local Area (2017)

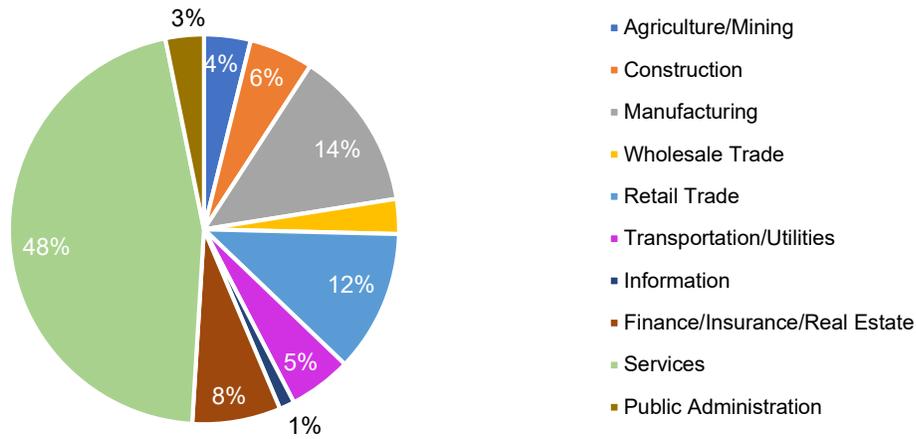


Figure 20. Employed Population by Industry – Region (2017)

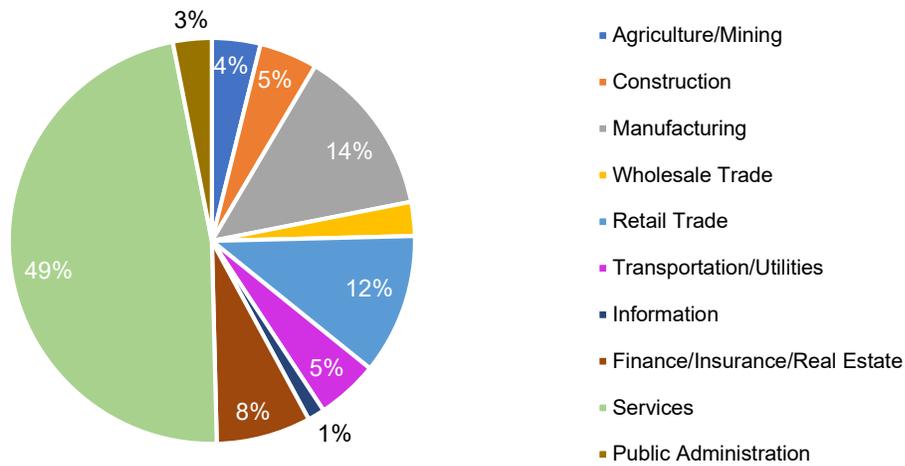
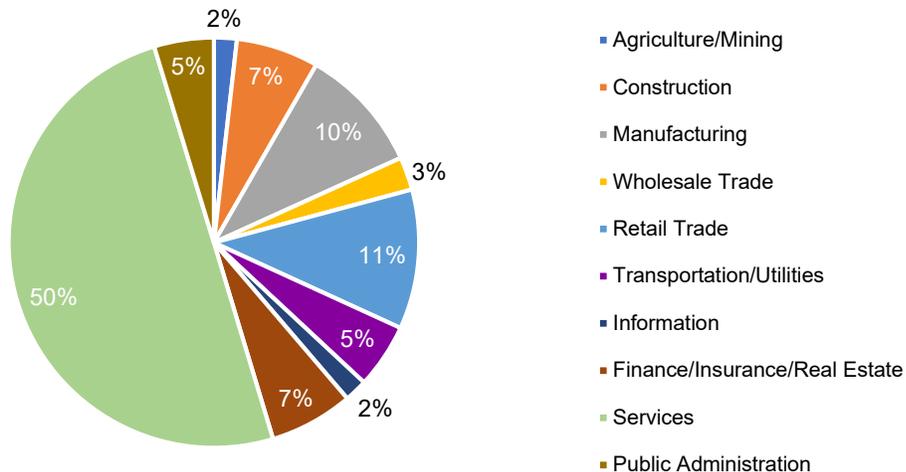


Figure 21. Employed Population by Industry – Nation (2017)



8.3 Business and Retail

Industry distribution, in terms quantity, of businesses and services in the local area region very closely reflect that of the rest of the nation. The dominant industries of retail businesses in the local area are restaurants or food and beverage retail, which make up more than one-quarter (28% combined) of the businesses within the 10-mile radius. The same holds true for the nine-county region, but at a higher percentage of 41%. The second largest industry at more than 20% both locally and regionally and 25% nationally is focused on soft goods or material goods such as clothing, accessories, and merchandise (ESRI 2018).

Table 19. Retail Marketplace Profile by Industry (2017)

Industry Group	Local	Regional	National
Restaurants & Food Services	29%	32%	30%
Soft Goods & Retail (Clothing, Accessories, other Merchandise)	21%	24%	25%
Motor Vehicles, Parts, Gasoline	16%	12%	13%
Home Goods, Appliances, Etc.	14%	13%	13%
Food & Beverage Retail	9%	9%	9%
Other Services (Health, Personal Care)	6%	5%	6%
Sports & Hobbies Retail	5%	5%	4%

9.0 National Trends and Attitudes

9.1 Purpose

In addition to analyzing local and regional information, responding to national trends and attitudes will allow Fernald to stay relevant in the services it provides to the community and continue to align itself with changing needs and preferences. National trends are powerful enough to impact changes in behaviors at all scales of the country's population. Awareness and understanding of these trends can influence how people, institutions, organizations, agencies, and other entities adapt and plan for the future. Looking broadly at trends and attitudes toward nature connection and conservation, education, recreation, connection to history, social media use, and technology will provide insight on changing behaviors and preferences throughout the nation and how to both reactively and proactively approach these changes.

9.2 Conservation Management

9.2.1 Land Conservation

As of 2016, there are 32 states across the country that have dedicated funding sources for land conservation. These funding sources vary in form such as legislative bonds, voter approved bonds, taxes, oil and gas royalties, lottery, and other fees (Conservation Almanac 2016). Land conservation and remediation in the region remain important to cities across the state of Ohio, as well as other Rust Belt cities, who are addressing their post-industrial landscapes. In 2000, the Clean Ohio Fund, an \$800 million bond for land conservation, brownfield cleanup, farmland preservation and recreational trails, was approved by voters and re-authorized in 2008 (Conservation Almanac 2018).

Conservation Easement agreements, as a tool for protecting and conserving important private land, have grown and evolved in the United States as these agreements adapt to shifts in land use, purposes and policies since 2000. The growth of Conservation Easements across the country can be attributed to the growth of land trusts and public funding. The number of land trusts has increased from 53 in 1950 to more than 1700 by 2011. In 2010, the hectares of conservation easements held by these land trusts totaled over 19 million, more than doubling the 9.3 million ten years earlier (Owley and Rissman 2016). Two trends since 2000 in private land conservation agreements have been observed: increasing complexities in these agreements due to contingencies, experience-based learning and diversified properties; and lessening restrictions on development and landowner uses due to larger properties and multiple contexts and changing priorities (Owley and Rissman 2016).

9.2.2 Wildlife Species Protection

National wildlife conservation efforts have been active since the Endangered Species Act, yet nearly one-third of America's plant and animal species are still vulnerable. Many populations are still declining with more than 1,600 species currently receiving protection under the federal act. In 2000, Congress mandated that state fish and wildlife agencies develop State Wildlife Action Plans to guide implementation of grant funding. The first of these plans were completed in 2005 and all updated in 2015. These action plans coupled with multi-agency partnerships have proven effective through the deployment techniques such as reintroducing native species, habitat restoration and enhancement, and research and inventory. Success stories of recovering species include the Canada lynx, the New England cottontail rabbit, and Alaska's Wood Bison (Stein, Edelson, Anderson, Kanter and Stemler 2018). These on-going efforts by state governments and other public and private partners display to growing concern for endangered and at-risk species across the country, the multiple factors that threaten them, and the appropriate actions that conserve, restore and protect these species and their habitats.

Honey bees and pollinator species populations have been declining; in fact, 30% of operating beehives have collapsed each year since 2006 (National Resources Conservation Service [NRCS] 2016). Many plants, as well as almost 35% agricultural crops, in the United States depend on these pollinators to reproduce, and without them, could cease to exist. Beginning in 2014, the Natural Resources Conservation Service (NRCS) launched several conservation initiatives to support the protection of honey bees, including technical and financial assistance to help producers implement conservation practices, incentives programs, and conservation easement programs. NRCS has been working with private landowners, farmers and ranchers in geographically-targeted efforts to improve their lands that have enhanced 35,000 acres of land for honey bees since 2014. The NRCS also provides information and resources to other individual landowners who are interested in implementing some of these practices in their own backyards (NRCS 2016).

Migratory birds across North America, including the United States and Canada, have been in decline over the past 40 years, falling from 11.5 billion in 1970 to around 10 billion in 2016. Many species populations, such as chimney swifts and field sparrows, have decreased by more than half in that time, and nearly 20% of breeding species are listed as vulnerable. (Andrew-Gee 2018). Studies point to loss of habitat due to development, farming and forestry as one of the main causes of bird population declines, which makes conservation and protection of natural land and habitat crucial to the longevity of migratory birds across the country. In response, conservation efforts are taking place on national, state and local levels of wildlife organizations through land conservation, habitat protection and restoration, advocacy and education. For example, the Audubon Society provides recommendations on how urban and rural areas can create bird-friendly communities through plantings and architectural design and collaborates with landowners, agencies and industry to increase quality of habitat and apply birdy-friendly practices on working lands. Through its land management programs, the Audubon Society has assisted with over 67 million acres of land, an impact which increases by 500,000 acres per year (Audubon Society 2018).

9.2.3 Sustainable and Biophilic Cities

How cities and developments are planned can have a massive impact on the environment but can also be designed perform efficiently and benefit the environment. The definition “sustainable city” is being expanded to not only address energy efficiency and carbon footprint through means of LEED-Certified buildings or transportation, but to also focus on functionality and quality of life in the city. The 100 Resilient Cities initiative launched by the Rockefeller Foundation selected 100 cities around the world, including 23 cities across the United States, aims to help cities become resilient to physical, social and economic challenges. The initiative combats shocks (e.g. natural disasters) and stresses (e.g. day-to-day or cyclical challenges that weaken cities).

The “Biophilic Cities” movement incorporates nature into the urban environment for purposes beyond infrastructure, such as biodiversity, health and aesthetics. For example, urban trees and vegetation capture carbon dioxide, offer shade and reduce heat island effects, mitigate air pollutants, control erosion and make people feel more connected to nature (American Public Health Association 2013). Washington D.C., as well as several other cities in the United States, have committed to a tree canopy goal of 40% coverage and reported planting 12,000 trees in the last year (Kolczak 2017). Sustainable practices are being explored and implemented as a way for cities and developers to reduce or reverse their negative impacts on land, the atmosphere, and climate.

9.2.4 Investing in Natural Infrastructure

Cities are incorporating nature and nature-mimicking systems into infrastructure planning as a cost-effective and sustainable method to manage stormwater, recharge groundwater, reduce flooding, and mitigate pollution. These sustainable or “green infrastructure” solutions include bioswales, rain gardens, wetlands and urban green spaces. Usage of green infrastructure in place of traditional “grey” systems can reduce infrastructure costs. For example, The Metropolitan Sewer District of Greater Cincinnati incorporated green infrastructure into its stormwater approach and is anticipated to save \$150 million compared to the original “grey” approach (Environmental Protection Agency 2014).

Not only are these “green” techniques being implemented by the public sector investing in green infrastructure in cities and towns, but these same efforts made by private property owner are also proving to be just as beneficial. For example, Washington D.C. has recently created a program that provides financial incentives and rebates to homeowners, schools, and communities to install green infrastructure techniques on their properties. 8% of the city’s newly planted trees in the past year result from private property owners participating in this program (Kolczak 2017). The success of these programs not only contribute to overall stormwater management and resiliency for entire communities and cities, but they involve individual residents in city-wide efforts towards a sustainable future.

9.2.5 Big Data Solutions

Data capture and analysis has been a major influencer across many sectors, but technological innovations and big data have contributed and will continue to contribute significantly to environmental research. In 2016, the United State Environmental Protection Agency (US EPA) became a member of the National Consortium for Data Science, and since then has launched a project mapping all watershed and streams across the country and the Environmental Quality Index, which may be able to forecast public health issues based on environment conditions (Sutter 2018).

Geospatial Information System (GIS) mapping and data collection has become more widely used, and increasingly accessible on multiple platforms, and it enables users to access, intersect and compile an almost endless pool of quality geospatial data and information (Dangermond 2016). For example, the Conservation Almanac provides interactive mapping and data collecting tools that are publicly available on its website. The more that this type comprehensive data is created and shared, the more that scientists and organizations can expand research and spread information across the country and the world.

Technology such as drones and genetic mapping have allowed scientists to gather more information, and smartphones and mobile applications have allowed this information to be accessed and applied in previously inaccessible settings (The Nature Conservancy 2018). Drone technology, utilized in commercial, personal and military settings, has innovated how the world is able to be seen and documented. Drones equipped with mapping software has captured information on an estimated nearly 10 million acres of land across 160 countries (Leopold 2017). 60% of commercial drone are used mapping. (Leopold 2017). Using drones in this capacity has made mapping large areas more efficient and accurate, with the ability to create detailed maps within hours, thus enabling quicker creation and updating of maps with the most recent data possible.

9.2.6 Energy Sprawl

As the United States shifts toward renewable energy resources for power production, the country is faced with the implications of developing the land required for production. Due to the amount of space required, wind and solar power is making energy production the largest driver of land-use change in the country. (The Nature Conservancy 2018). It has been estimated by The Nature Conservancy's Global Lands Program that by 2030 an area approximately the size of the state of Minnesota could be converted to meet the country's expected energy needs, and wind and solar energy sources will increase by 10 to 30 times by 2040 (Kiesecker 2017). Developing wind and solar farms could potentially destroy natural habitats and disrupt the ecosystem. Large-scale planning efforts in many regions are changing the site and grid development practices for energy production to avoid habitat loss (The Nature Conservancy 2018). To prevent development on natural areas and habitats, development is being encouraged on agricultural lands, industrial areas and former or converted production sites and regional energy plans are being created in collaboration with energy companies to avoid natural lands (Kiesecker 2017). Advancements in technology and resources must be coupled with environmental considerations to maintain and protect crucial areas and habitats.

9.3 Education

9.3.1 Environmental Education and Programming

Recreational and educational programming is an effective way to tailor outdoor and recreation opportunities to cater toward different age groups, demographics, ability levels and interests to maximize the benefits of parks for the surrounding community. New education and recreation programs are being created and expanded by government entities, local parks and recreation departments, health care systems, national organizations, universities and primary school systems to encourage participation from particular groups like young girls, urban youth, or children on the autism spectrum or with physical disabilities.

Environmental education has become increasingly important as the planet faces complex environmental challenges and needs knowledgeable and dedicated leadership to advocate for the future. Studies, such as a series conducted by Stanford University from 1994-2013, show that environmental education could not only contribute to the addressing environmental challenges in the future, but that it has an undeniable impact on learning, skill-building and empowerment in all facets of a child's life (North American Association for Environmental Education 2013), including:

- 90% reported increased skills
- 86% reported positive changes
- 83% reported enhanced environment-related behaviors

Results from these studies reinforce the notion of integrating environmental education into early childhood and everyday experiences, whether it is through extra-curricular programming offered by schools, community-wide programs or park-specific events and activities. In 2015, the federal government and the National Park Foundation launched the “Every Kid in a Park” campaign, that seeks to provide park experiences to fourth-graders and their families across the country, with emphasis on schools in areas with high percentages of low-income families. The campaign offers students with free passes to national parks and coordinates grants toward transportation funding for field trips, especially in underserved and urban communities. Diversity groups and organizations are also collaborating with national organizations to provide more outdoor recreation and education opportunities to the minority groups they serve. Program offerings through colleges and universities have increased whether through course curriculums or extra-curricular trips and study abroad opportunities. (Association of Outdoor Recreation 2016). In addition, universities are often well-positioned to expand these opportunities and partner with other institutions and communities around them. In recognition of today's disconnection with nature resulting from urbanization and technology, among many other factors, schools and other organizations are incorporating environmental education aspects into child education and communities to build environmental awareness, advocacy and leadership.

9.3.2 Higher Education

In higher education, generational shifts are apparent through selection of majors and field of focus in their studies. More scientific fields have seen significant increases in number of degrees conferred, such as Health-Related Programs (60%); Computer Science and Information (50%); Parks, Recreation, Leisure & Sports Fitness (42%); and Engineering (40%). Additional growing fields include Agriculture & Natural Resources (29%) and Biological & Biomedical Sciences (26%). Conversely, many liberal arts degrees have been on the decline since 2010, including English Language & Literature (-19%), Education (-16%), and Social Sciences & History (-9%) (US Department of Education 2018). A growing interest in scientific fields reflects this generation’s concern with health issues, technological innovation, the benefits of nature connection, and environmental changes and resource protection. This growing thought-leadership in these fields could affect the landscape of the country’s economy, land, and the people’s well-being.

Table 20. Bachelor’s Degrees Conferred by Post-Secondary Institutions, by Field of Study (2010-2016)

Field of Study	2010-11	2015-16	Change (2010-2016)	Percent Change (2010-2016)
Agriculture & Natural Resources	28,600	37,000	8,400	29%
Biological & Biomedical Sciences	90,000	113,700	23,700	26%
Computer & Information Sciences	43,000	64,400	21,300	50%
Education	104,000	87,200	-16,800	-16%
Engineering	76,400	106,900	30,500	40%
English Language & Literature/Letters	52,800	42,800	-10,000	-19%
Health Professions & Related Programs	143,500	228,900	85,400	60%
Liberal Arts and Sciences, General Studies & Humanities	46,700	43,700	-3,000	-7%
Parks, Recreation, Leisure & Fitness Studies	35,900	50,900	15,000	42%
Psychology	100,900	117,400	16,500	16%
Social Sciences & History	177,200	161,200	-15,900	-9%

Note:

Numbers rounded to the nearest hundred.

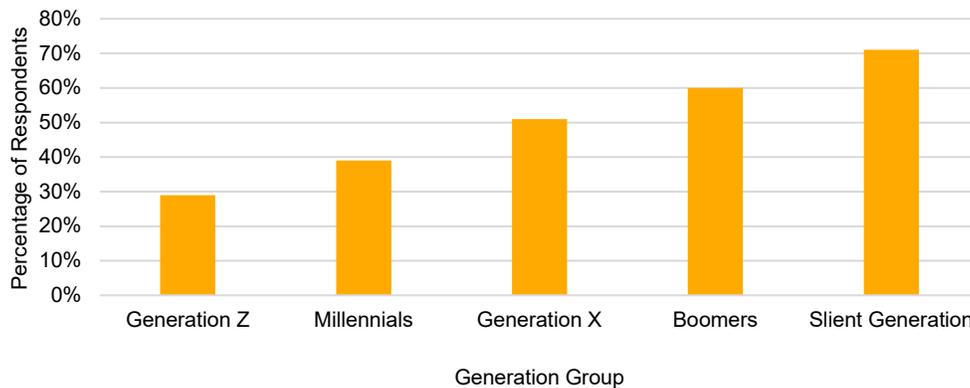
9.4 Leisure/Recreation

9.4.1 General Leisure Time and Primary Activities

How Americans prioritize and use their time each day changes throughout their lives as they age. Older generations, such as Silent Generation (ages 65+) and Baby Boomers (ages 50-64) tend to prioritize health and fitness more, but value money and career less when compared their younger counterparts, such as Generation Z (ages 15-20) and Millennials (ages 21-34). In a lifestyle survey conducted by Nielsen, 71% of respondents in the Silent Generation group indicated being fit and healthy as a top priority. This percentage decreases with each younger generation with

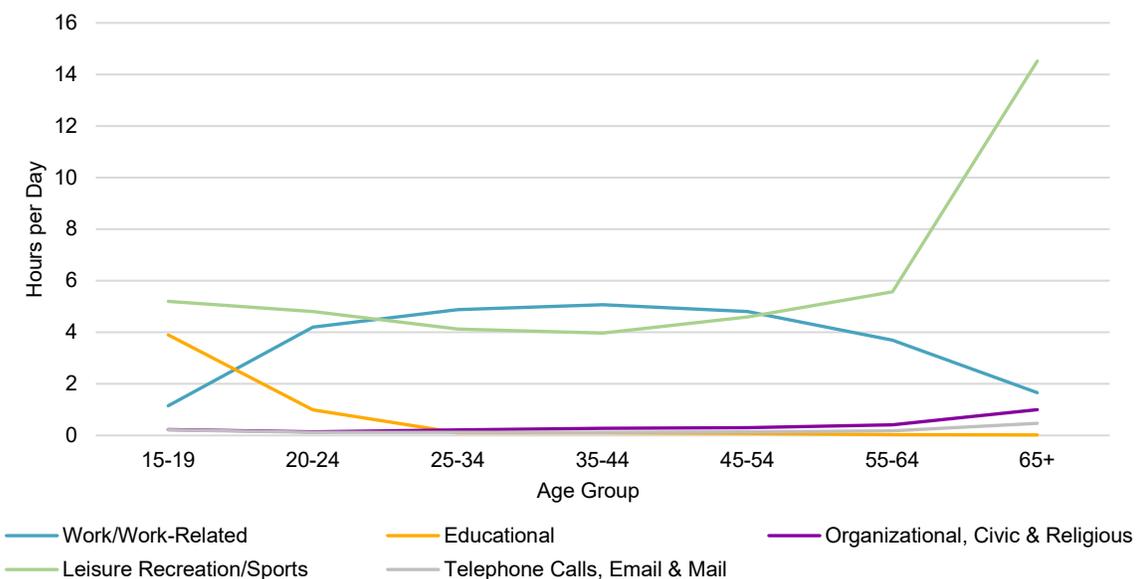
Generation Z at only 29% (Nielsen 2015). In addition to older generations wanting to be active and healthy, they also require accessibility and assistance in outdoor and recreation activities.

Figure 22. Being Fit and Healthy as a Top Priority, by Generation (2015)



Not only do older generations value recreation and leisure time more as they age; they also have more time available to participate in these activities. Time spent in voluntary activities such as leisure recreation or sports and participating in organizational or civic activities is inversely correlated with work; as the 25 to 54-year olds are spending much of their time in their careers, they in turn dedicate less time to these activities. As Americans age and work less, they spend more of their time in leisure recreation or sports or civically-minded activities. At 14.5 hours per day, seniors aged 65 years or older are the most involved in these activities than any other age group (Jones & Bartlett Learning, LLC 2014). Also, as Americans age, they are faced with less educational opportunities and spend less time engaged in educational activities.

Figure 23. Time Spent (Hours per Day) in Primary Activities by Age – Annual Averages (2014)



Note:

Data from Jones & Bartlett Learning, LLC, 2014. "Future Perspectives on Leisure and Recreation."

9.4.2 Leisure and Outdoor Activity Spending

Recreation, entertainment, and leisure are major spending categories in the United States economy. Outdoor recreation spending, including equipment and travel-related costs, alone accounts for \$887 in annual consumer spending (2017), which outranks household utilities, motor vehicles and parts and pharmaceuticals. In 2017, Americans generally spent more on outdoor recreation than entertainment activities (e.g. home entertainment, video games and movie tickets). Total spending on trail sports (\$201.5 billion) exceeded spending on movie tickets (\$11 billion) by more than eighteen times and more than tripled spending on video games (\$61 billion) (Outdoor Industry Association 2017). Despite the rise in technology and prevalence of digital leisure time in the United States, these spending patterns indicate that outdoor recreation continues to be a dominating industry.

Figure 24. Annual Spending of Americans Participating in Outdoor Recreation in Billions of Dollars (2017)

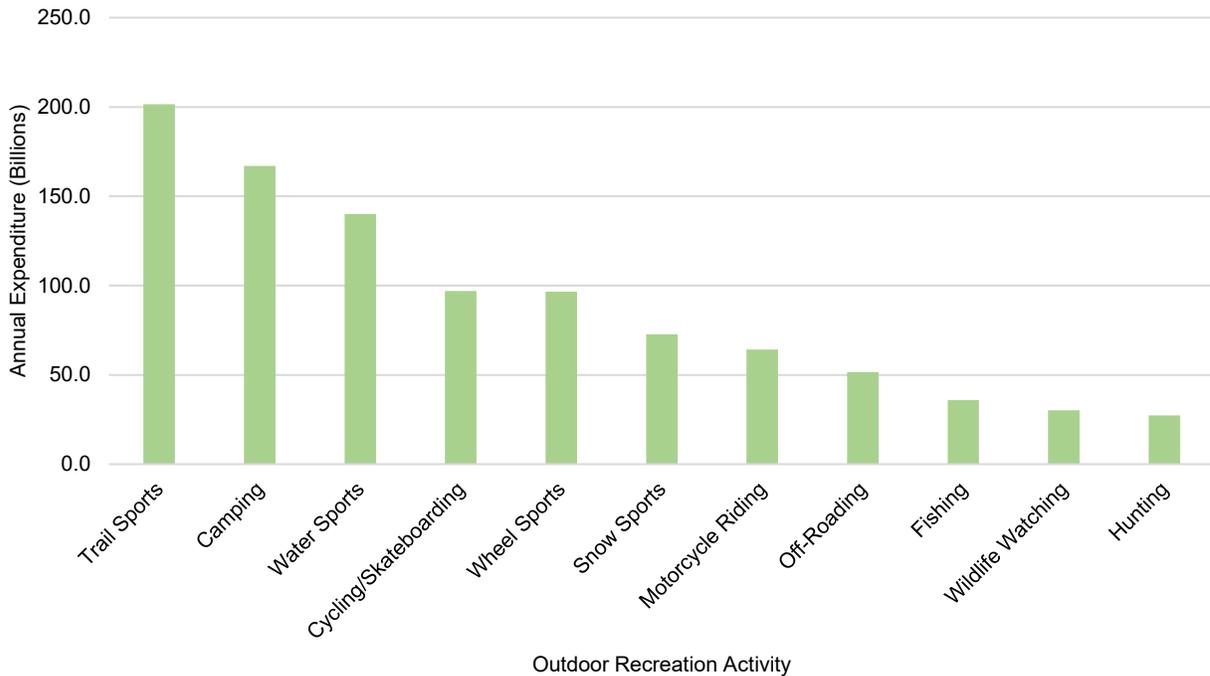


Table 21. Annual Spending of Americans Participating in Outdoor Recreation in Billions of Dollars (2017)

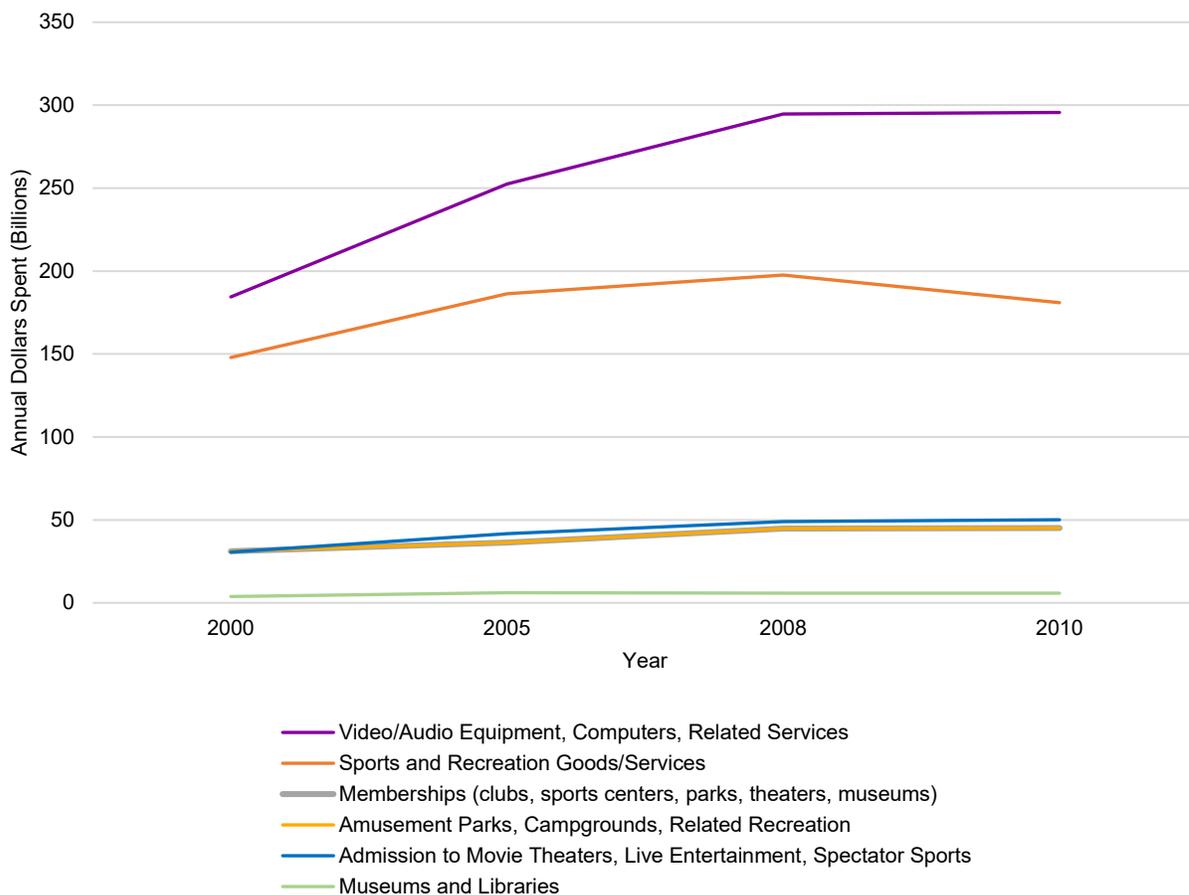
Activity	Annual Expenditure (Billions)
Trail Sports	\$201.5
Camping	\$166.9
Water Sports	\$140.0
Cycling/Skateboarding	\$97.0
Wheel Sports	\$96.7
Snow Sports	\$72.7
Motorcycle Riding	\$64.2
Off-Roading	\$51.6
Fishing	\$35.8
Wildlife Watching	\$30.2
Hunting	\$27.4

Table 22. Annual Spending of Americans on Entertainment in Billions of Dollars (2017)

Activity	Annual Expenditure (Billions)
Video Games	\$61.0
Home Entertainment	\$18.0
Movie Tickets	\$11.0

The annual expenditures on recreation has almost tripled in the last 20 years. The most significant increase of these categories is video and audio equipment, computers and related services, which has seen an increase of \$214.5 Billion from 2000 to 2010 and continues to be the country’s largest activity expenditure. Sports and Recreation Goods or Services is also a major expense category but has started to see some decline starting in 2008 (ProQuest 2013). All other categories have significantly less spending per person but have remained steady over time with very gradual increases.

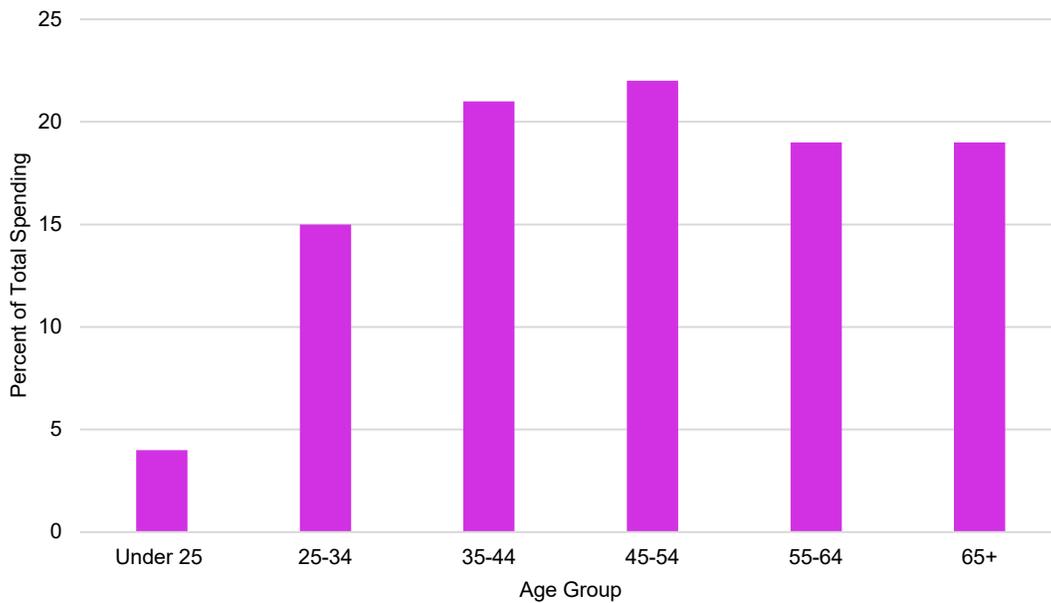
Figure 25. Annual Personal Spending (in Billions of dollars) on Recreation or Leisure (2000-2010)



As lifestyles, time commitments, and priorities change with age, so do leisure activities and monetary spending on these activities. Americans aged 35-44 and 45-54 years old (Generation X and Baby Boomers) tend to spend the most on leisure (21% and 22% respectively), which may be primarily due to spending on leisure travel and family activities. As individuals age into their senior years, leisure spending decreases as they are more likely to participate in activities close to home. Millennials (individuals between the ages of 18–24 years or “Under 25” in Figure 17) are spending significantly less on leisure activities (only 4%) than older age groups (Fung Global Retail & Technology 2018).

Millennials, currently the largest generation in the United States, are choosing to spend their time and money on experiences or events rather than material goods. Three out of four Millennials choose to spend on desirable experiences rather than purchasing something. 69% believe that attending events or participating in experiences makes them more connected to other people, community, and the world (Eventbrite 2017). Millennial spending habits on leisure does not necessarily indicate they are less active or participate less in outdoor or recreation activities, but they may indicate that they are participating less in leisure activities such as museum visits, movies or libraries that individuals in Baby Boomers or Silent Generations would.

Figure 26. US Total Spending on Leisure (in Billions of dollars) (2014)



Note:

Data from Fung Global Retail & Technology, 2018. “Deep Dive: Millennials and Leisure”

9.4.3 Fitness and Outdoor Recreation Activities

National trends in fitness have accelerated and shifted over recent years due to an increased interest in active lifestyles that improve personal health and quality of life. The most popular type of fitness activity continues to be fitness walking or walking for exercise at 107,895,000 participants reported in 2016, yet that number has decreased by 4% since 2011. Fitness activities seeing the greatest increase between 2011 and 2016 are more adventure-type activities such as off-road triathlon (+108%), trail running (+60%), and Road/Traditional Triathlon (+41%) (PROS Consulting; Great Parks of Hamilton County 2017). Nationally, more extreme outdoor activities have caught the attention of Americans, but with many of these sports just emerging or gaining awareness, more passive traditional fitness activities remain the most popular.

Table 23. National Participatory Trends – General Fitness (Ages 6+, 2011-2016)

Fitness Activity	Participation Levels (Thousands)			Percent Change
	2011	2015	2016	2011-2016
Fitness Walking	112,700	109,800	107,900	-4%
Running/Jogging	50,000	48,500	47,400	-5%
Aerobics (High impact)	15,800	20,500	21,400	36%
Trail Running	5,400	8,100	8,600	60%
Triathlon (Traditional/Road)	1,700	2,500	2,400	41%
Triathlon (Non-Traditional/Off Road)	800	1,800	1,700	108%

Notes:

Numbers rounded to the nearest hundred.

Excerpt from PROS Consulting, 2017 “Demographic Trends & Analysis”

Outdoor and adventure recreation activities, in general, have seen increases in participation levels from 2011–2016. The three most popular activities in the country continue to be hiking, road bicycling, and freshwater fishing. The most significant decrease in participant levels over these five years were in-line roller-skating (-28%) and birdwatching (-11%). More extreme activities, such as BMX bicycling, adventure racing and mountain/ice climbing, have each seen an increase in popularity of more than 45% from 2011 to 2016 (PROS Consulting; Great Parks of Hamilton County 2017). Similar to fitness activities, the more extreme adventure activities are growing rapidly in popularity, but passive and more common or traditional activities are still the most popular among Americans.

Table 24. National Participatory Trends – Outdoor/Adventure Recreation (Ages 6+, 2011-2016)

Outdoor/Adventure Activity	Participation Levels (Thousands)			Percent Change
	2011	2015	2016	2011-2016
Hiking (Day)	33,500	37,200	42,100	26%
Bicycling (Road)	39,800	38,300	38,400	-4%
Wildlife Viewing	21,500	20,700	20,800	-4%
Birdwatching	13,000	13,000	11,600	-11%
In-Line Rollerskating	7,500	6,000	5,400	-28%
Bicycling (BMX)	2,000	2,700	3,100	59%
Climbing (Traditional)	1,900	2,600	2,800	47%
Adventure Racing	1,200	2,900	3,000	150%

Notes:

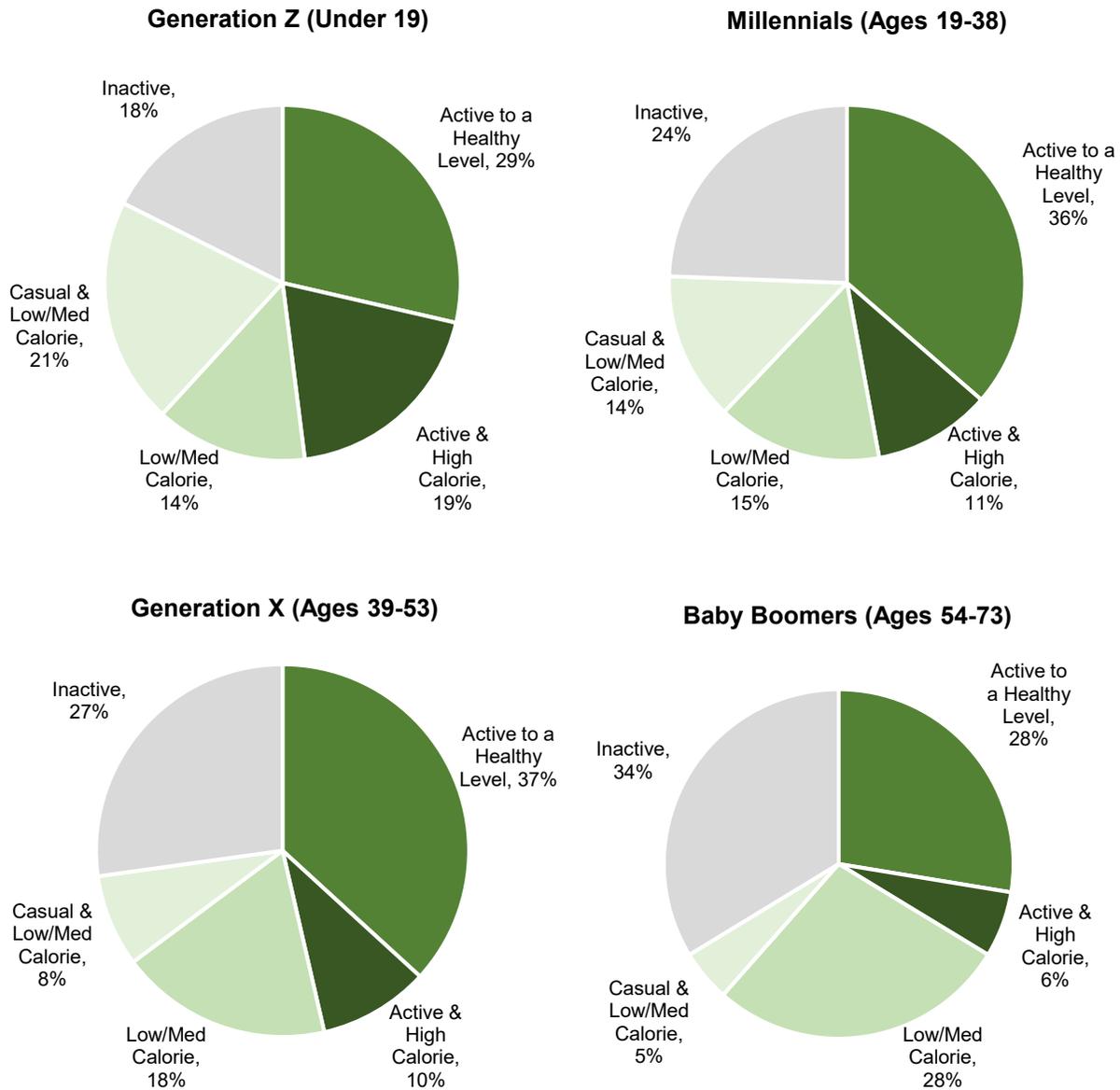
Numbers rounded to the nearest hundred.

Excerpt from PROS Consulting, 2017 “Demographic Trends & Analysis”

Fitness and activity levels have been observed in correlation with age or generation groups. Younger generations, Generation Z (ages 18 or younger) and Millennials (ages 19-38) are less inactive (18% and 24% respectively). These generations also tend to participate in more active, physically-demanding activities than their older counterparts; 19% of Generation Z individuals are participating in active and high-calorie burning activities, and 11% of Millennials are doing

so. More than one-third (34%) of Baby Boomers are inactive, but most are participating in enough regular low-impact activity to be healthy (28% Active to a Healthy Level and 28% Low/Med Calorie-Burning activities) (PROS Consulting; Great Parks of Hamilton County 2017). From Baby Boomers to Generation Z, inactivity levels are greatly decreasing.

Figure 27. Participation Rates by Generation, (Ages 6+)

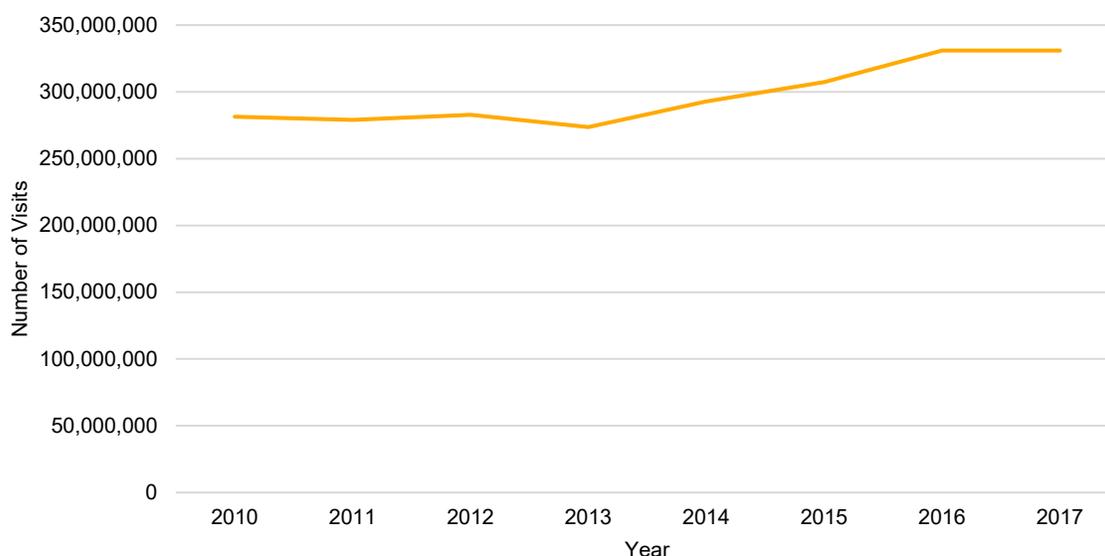


9.5 Nature Connection

9.5.1 State and National Parks

Records of state and national park attendance show variation in attendance throughout the last two decades, but in more recent years, attendance for both state and national parks has been steadily increasing. The park system hosted a record-setting number of visitors in 2016 and almost as much in 2017, with 16% of parks in the system setting new visitation records. Despite a very slight decrease in national park attendance between 2016 and 2017, visitors are spending more time in the parks in 2017 than the last year. In 2017, Americans spent 1.44 billion hours in national parks, more than 19 million more hours than in 2016 (National Park System 2018). State parks across the country are seeing steady increases in attendance, and states across the country are reporting record-breaking visitation numbers, including New York, Virginia and Utah.

Figure 28. National Park System Recreation Visits by Year (2010-2017)



9.5.2 Benefits of Parks and Open Space

Social concerns of the 21st century are now being considered and incorporated into open space and recreation services as research is increasingly pointing to multiple benefits of urban green space preservation to surrounding community members. Urbanization of the country has removed much of the country’s population from natural and traditional environmental ethics, but the country is beginning to reconnect with the values and benefits of nature once again. 83% of Americans believe that they personally benefit from their local parks, and even more (92%) believe that their entire communities benefit from local parks. Even non-parks users hold this same belief for their local parks (80%) (National Recreation and Park Association 2016). With a rising awareness of obesity and personal health, racial and economic disparities, and mental

health, access to open space and recreation is becoming a useful tool with which cities and communities can improve the quality of life for all people.

Most Americans agree that conservation of open space, public and personal health and wellness, and social equity are the top priorities when it comes to access to nature and outdoor activities.

- 86% of Americans believe that conserving the natural environment is important.
- More than 80% believe that outdoor recreation facilities and services offered by parks reduce stress and improve both physical and mental health.
- 77% believe that parks and open space should focus on addressing the needs of disadvantaged populations (National Recreation and Park Association 2016).

Even the smallest of parks and natural spaces have been observed to improve mental health and well-being. The act of casual walking in a natural environment lowers frustration, increases happiness and ultimately leads to positive psychological effects. Repeated interaction with nature can reduce stress, provide restorative effects from mental fatigue, enhance creativity and increases brain activity, all benefits which can lead to increased productivity in the workplace and increased performance in other areas of life. Parks and natural spaces in community settings often provide volunteering and opportunities to be involved that build social capital and empower individuals and neighborhoods (Wolfe 2017). These direct experiences, whether passive recreation or active volunteering, foster a sense of ownership and stewardship for the environment that could lead to better protection of the environment in the future (American Public Health Association 2013). Much like early-childhood environmental education can encourage young minds to grow into advocates for the planet, exposure to natural areas throughout life can encourage people to think about the future of the planet and act more sustainably.

9.5.3 Shift in Public Health Focus

Increased research activity and available information on the health benefits of access to nature and green space have shifted the focus of public health toward connections between humans and nature. This rediscovered importance of nature and green space, especially in urban environments, has encouraged healthcare and insurance providers to become advocates for more green space in our cities and better access to natural areas (The Nature Conservancy 2018). These entities are investing in parks, gardens, and recreational areas or opportunities; working with cities and developers; launching wellness and recreation programs; and partnering with civic and community organizations and academic institutions with the intentions to increase and improve nature connections for even the most urbanized areas.

Building upon the relationship between parks and health, partnerships have been occurring across many sectors and levels of government to incorporate health-related programming into parks and green space. For example, the National Recreation and Parks Association sponsors programs conducted by local parks and recreation agencies, including weekly walking programs

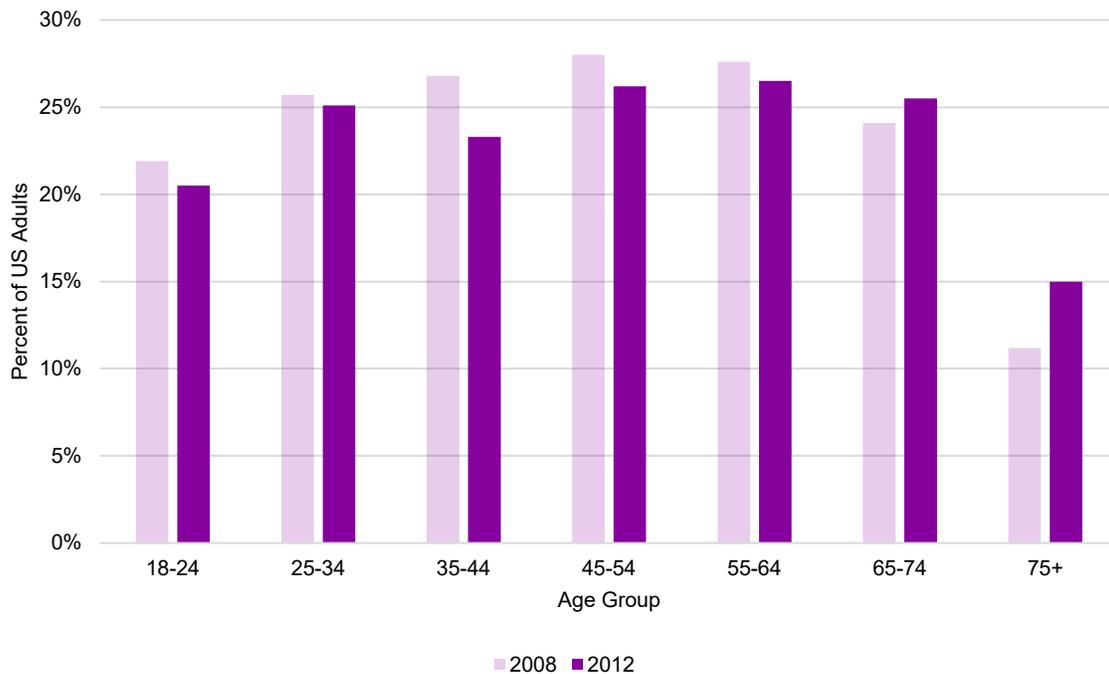
and active living days. 155 agencies in 45 states have made similar commitments to hosting the type of programming in the parks (National Recreation and Parks Association, 2018).

9.6 History/Commemoration

9.6.1 Visits to Cultural or Historical Sites

Overall interest in culture and history has been observed as declining and largely influenced by age and generational shifts. When looking at humanities organizations and sites holistically, the percentage of people visiting places such as libraries, museums or historic sites has decreased by more than one-third in twenty years (from 1982-2012). In 2012, only 24% of Americans had visited a historical site in the previous year, which is 13% less than two decades prior (American Academy of Arts and Sciences, 2016). Each generation is less likely to visit a historic site than generation before them; adults aged 18-24 years are the least likely of all age groups, whereas older adults 55 years or older are the most likely (National Endowment for the Arts 2013).

Figure 29. US Adults Who Tour a Park, Monument, Building or Neighborhood for Historic/Design Value (2008-2012)



Notes:

Data from National Endowment for the Arts, 2013. "How A Nation Engages with Art."

9.7 Social Media

9.7.1 Receiving News and Information

The rise of technology and social media has greatly influenced the way the world receives information and connects to one another. In 2017, more than two-thirds (67%) of Americans reported receiving their news and updates from social media – a 5% increase from 2016 – and 85% of Americans accessed this information on a mobile device – a 13% increase from 2016. These positive trends include older generations as well, with more than half (55%) of Americans aged 50 years and older receiving their news on social media. In addition, minority groups tend to receive their news on social media more; 74% of non-whites use social media news outlets, compared to 64% of whites. 69% of less educated individuals, those with less than a Bachelor’s degree, use social media news outlets, compared to 63% of those with at least a Bachelor’s degree (Pew Research Center 2018). Overall, regardless of age or other demographic, many Americans are turning to social media for their information about the world more and more each year.

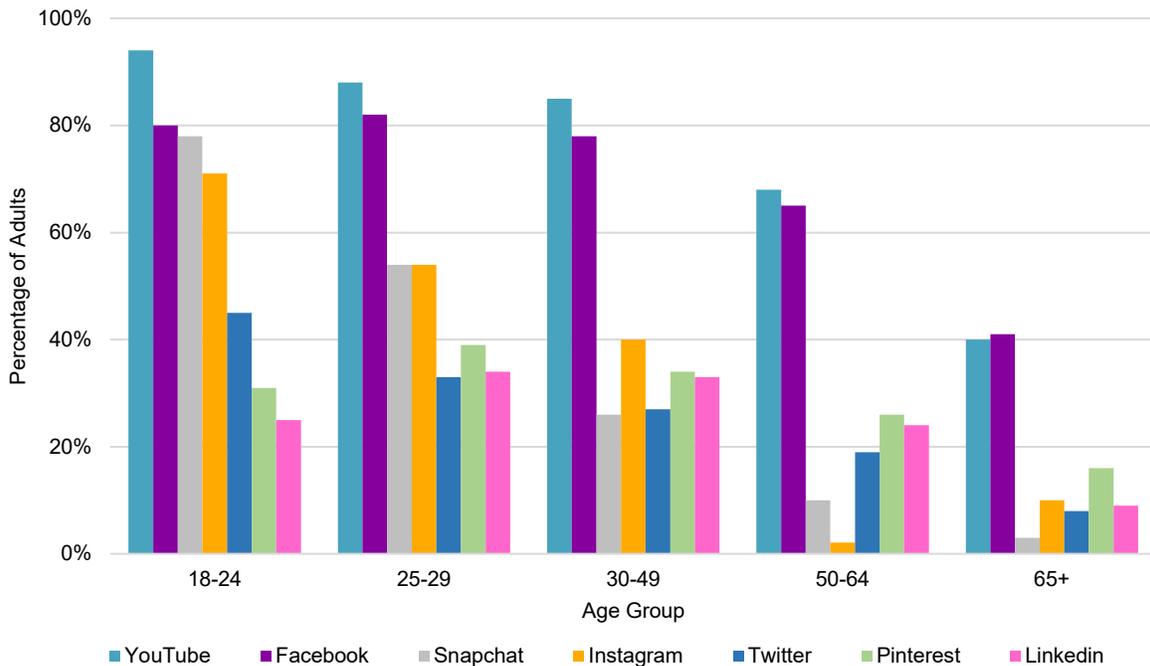
9.7.2 Sharing Experiences

Not only is news more accessible via social media platforms, Americans and the entire world are connecting with each other more on these platforms. Four years ago, in 2014, nearly 60% of Millennials shared their experiences with one another each year (Eventbrite 2017). Yet these younger generations are not the only ones. More than two-thirds (67%) of all Americans are on Facebook and almost three-quarters of those Facebook users are on the site daily (Pew Research Center 2018). This rise of multiple platforms coupled with advancements in technology has transformed into social media into a hyper-accessible collection of information and connections at the world’s fingertips.

9.7.3 Platforms

While the use of social media is on the rise for nearly all Americans, younger generations (ages 18-24) utilize a wider variety of social media platforms, typically at least three at a time, than their older counterparts who mostly use Facebook as their primary platform. 94% of 18 to 24-year olds use YouTube daily; 80% use Facebook; and 78% use Snapchat (Pew Research Center 2018). Even age groups 25-29 and 30-49 have indicated heavy use of all platforms, meaning social media use begins to noticeably decline as Americans enter their fifties.

Figure 30. Percentage of Adult in Each Group Who Say They Use Each Platform (2018)



Note:

Data from Pew Research Center, 2018. “Social Media Use in 2018.”

9.8 Technology

Technology has not only become a major focus in today’s global market and economy, but it is also changing the way people live each day. Advancements and innovations facilitate daily tasks with increased efficiency, improved health, greater safety and increased accessibility.

9.8.1 Fitness and Health Tracking

Wearable fitness trackers, such as Fitbits or integrated mobile applications, are part of a movement coined the “Quantified Self”, in which people are increasingly interested in self-tracking. These types of devices can track exercise, calorie intake, location and sleep patterns. On average, Fitbit users take 43% more steps per day, solely by the fact that they are wearing the device and can measure their actions. In 2011, the number of wearable devices with these types of applications was at 16.2 million (Entrepreneur 2012), and by 2016, that number increased to 102.4 million devices (Wade 2017). By monitoring these factors of daily life, users can learn about their health habits, make healthy lifestyle changes, and measure their progress. These tracking methods have not only encouraged users to become more active and health-conscious, but they have also facilitated education and research surrounding the health community, making it easier for medical and health professionals to access health information.

9.8.2 Equipment and Gear

Innovations in sports and recreation clothing, equipment and accessories have also contributed to an increase in activity levels. Recent technologies in materials and designs have made recreation clothing and equipment stronger and lighter, more comfortable and stylish, and versatile – all of which make wearing and using those accessories more appealing (Outdoor Adventure Education 2018). Advancements in equipment have also made certain activities safer and more accessible to wider age ranges and ability levels that may not have been able to participate before.

9.8.3 Interactive Maps and Exhibits

Interactive technology is an effective and engaging tool that is being used across institutions, including cultural, corporate, education, healthcare and government facilities, to quickly and conveniently convey information to staff and visitors alike. In response to the wave of technology in the world, institutions and companies are capitalizing on these innovations and the nearly-universal usage of smartphones to better communicate with the public and allow the public to actively participate in exhibits. Museums across the world are encouraging visitors to explore exhibits through responsive touchscreens as opposed to traditional plaques. Mobile programs are flexible in design; the institution may provide smartphones or devices for visitors to loan during their stay or allow visitors to use their own smartphones via a customized downloadable app. These innovative technologies, both stationary and mobile, enhance user experiences through geo-located information, responsive interfaces, and rich multimedia.

The Cincinnati Museum Center incorporated interactive touchscreens throughout its *Chocolate: The Exhibition* experience. In addition to traditional plaques and displays, the exhibit encouraged visitors to engage with and explore concepts through responsive touchscreen stories, prompts, tutorials and games. The Louvre in France launched a mobile device, in this case Nintendo 3DS XL, program that allows visitors to purchase and download the software and experience the museum exhibits through their personal video game players. The program includes audio and self-guided tours, art information, museum navigation, and a virtual tour (Gedert 2017).

Figure 31. Digital kiosks at the Cincinnati Museum Center (left) and the Louvre’s Nintendo tour (right).



Notes: Images from McCosham, 2018. “The Exhibition at the Cincinnati Museum Center.” (left) and Louvre Museum, 2013. “The Louvre Guide for Nintendo 3DS.” (right)

Although many digital exhibits and interactive technology can be found indoors, kiosk stations can be outfitted to be placed in parks, public squares, zoos and other outdoor environments. The National Park Service launched a traveling outdoor interactive exhibit in 2015, as part of its “Find Your Park” marketing campaign to promote its parks and sites across the country, that was moved to several cities. This digital kiosk, called “Find Your Park Virtual Tour,” provides users with information on the 407 parks, landmarks and monuments in the NPS system. Through audio, visual, and geo-located elements, the kiosk displays informative brief clips promoting each site, and real-time virtual reality experiences are available for some sites. The exhibit also enables users to interact directly with NPS staff, influencers and park-goers who share their stories with the program (Shu 2015). By sharing information and stories about parks across the country, NPS hoped to educate the public about their parks and inspire more park visitors. The Virtual Tour digital kiosk successfully connected visitors in a single park location to the entire National Parks system and allowed them to explore parks that they might not otherwise been able to visit or that they want to visit in the future.

Figure 32. Find Your Park Virtual Tour traveling interactive kiosk



Notes: Images from Shu, 2015. “National Park Service launches digital kiosk to promote 407 parks, landmarks.” (left) and “Find your Park Virtual View Tour – Los Angeles Stock Photos and Images.” (right)

Geographic Information System (GIS) software developer, Esri, created its “Story Maps” series that tell stories about places through interactive maps layered with information such as narratives, images, videos or 3-Dimensional visualizations (ESRI 2018). Data and multimedia layers and graphic maps are linked together so that they communicate together to present a compelling geographic-based story. Categorized layers such as themes, timelines, or activities organize places and prompt users to navigate the story or place in a variety of ways. The user may curate a unique story based on these categories and how they overlap with each other and the map features. For example, clicking a place on a map will display an image or description of that place; conversely scrolling through a narrative could project a new data visualization on a map with each chapter. These maps can work for places of different scales, from world-wide phenomena to the plant species in a single public garden. Whether a story is being told about multiple related sites or one site, maps and stories can be tailored appropriately. By organizing

geographies and information geographically, chronologically and categorically, Story Maps provide a data- and graphic-rich format to explore places and share their stories.

Figure 33. Story Map JournalSM example, “Welcome to the Anthropocene”

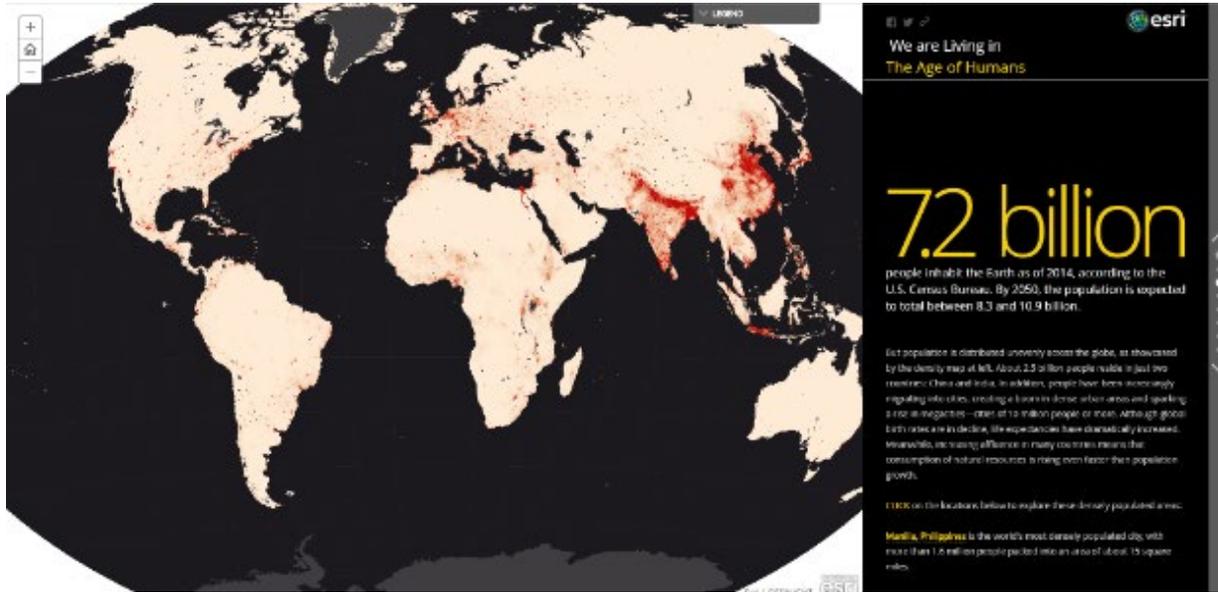


Figure 34. Story Map ShortlistSM example, “A selection of Frank Lloyd Wright buildings”

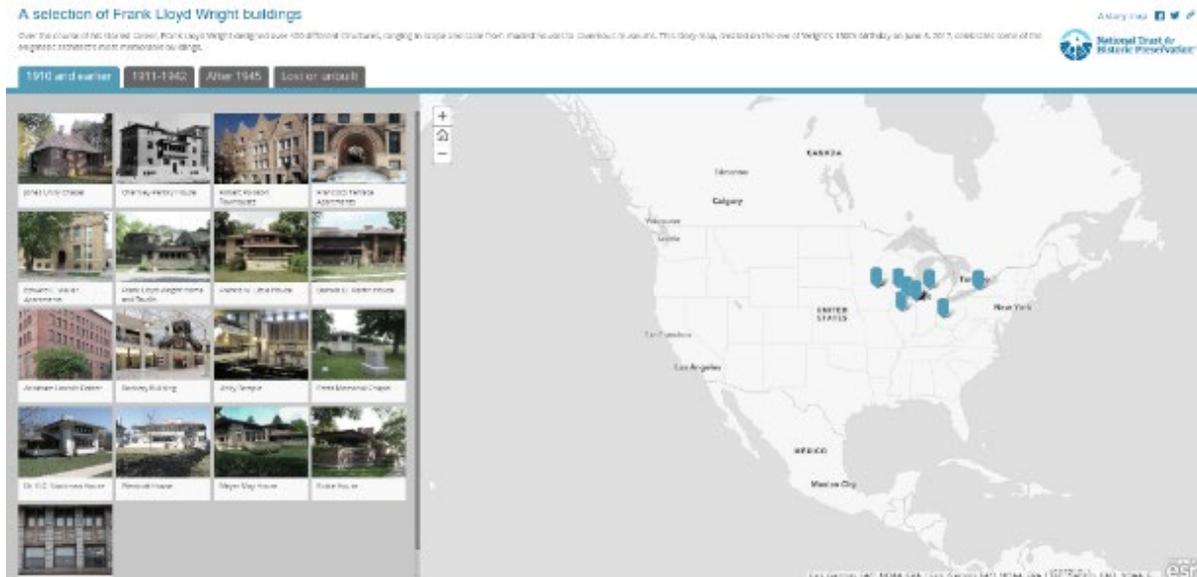
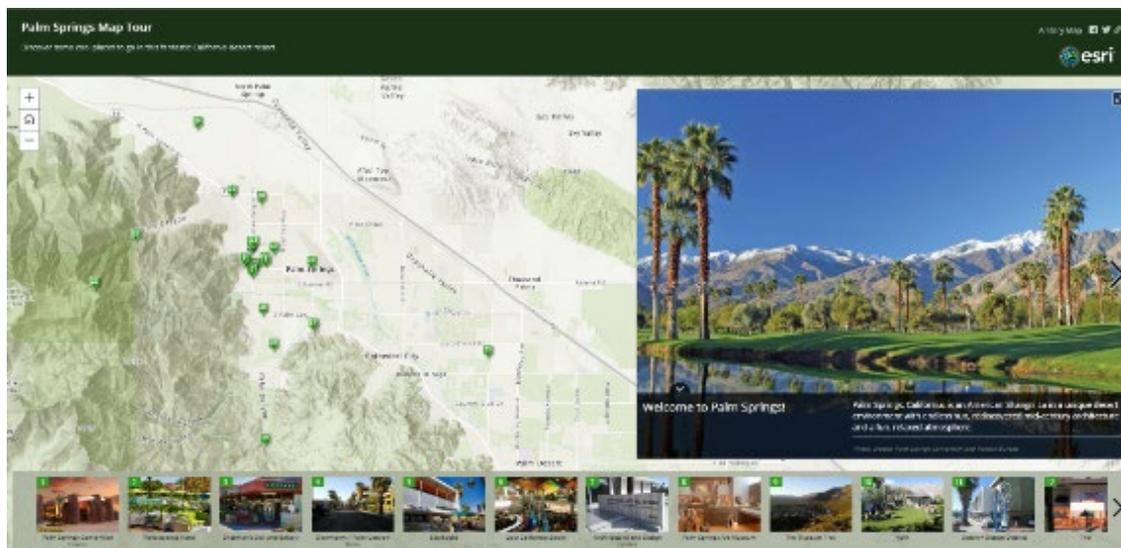


Figure 35. Story Map Swipe™ example, “Devastation in Nepal: Before and After the April 2015 Earthquake”



Figure 36. Story Map Tour™ example, “Welcome to Palm Springs”



Note: Images for Figures 31-36 from ESRI, 2018. “What Kind of Story Do You Want to Tell?”

These dynamic maps and exhibits reveal layers of related information with the user’s touch and allow the user to tailor the experience of the exhibit to his own curiosity and interests. Museums and educational centers have incorporated these types of experiences to diversify their exhibits, attract the attention of visitors, and present information in a more digestible format. The Fernald Preserve Visitors’ Center and Museum has successfully curated an interactive and responsive exhibit to tell its story. These exhibits created immersive experiences that activate and react to multiple human senses, which together more effectively convey information and tell the story.

Museums and other institutions are exploring digital and technological programs and exhibits that connect with these younger generations who are growing up with technology as part of daily life. By adapting to today’s tech-based human behavior, the fact that people now gravitate towards technology, museums and other educational and cultural institutions remain relevant in attracting, interacting with, and teaching visitors.

9.8.4 Digital Wayfinding

Cultural destinations, educational campuses and institutions, healthcare facilities, amusement parks, zoos, and even shopping malls are utilizing interactive maps and geo-location to assist visitors in curating their experiences to suit their needs and expectations. Digital wayfinding can be designed into two forms: place-based or mobile. Place-based wayfinding are usually kiosks or wall-mounted screens with interactive touchscreen capabilities. Mobile wayfinding is accessible via smartphone devices through a downloadable wayfinding application. Transitioning from traditional wayfinding signage to digital interactive wayfinding has become crucial to complement modern human behavior and retaining the attention of a tech-savvy and tech-obsessed world. The intersection of personalization, context, and location make these location-based and interactive technologies desirable, and when implemented, these technologies create impactful and memorable user experiences (Kosir 2016). With 30% of United States cellphone users carrying smartphones and a prediction that 100% will within the next five years, adapting accessibility of information accordingly will be crucial for institutions and destinations to interact with their visitors (Wolke 2010).

Place-based wayfinding is particularly useful in helping a visitor understand a place before or upon arrival. These kiosks greet visitors with information that will help them navigate and experience a place, such as information on key destinations or features, important news or upcoming events, and directions to selected points of interest. Interactive screens are typically placed at entrances as well as other accessible locations to help guide visitors at various points.

Figure 37. Interactive digital wayfinding and information kiosk examples: Johns Hopkins University interactive digital wayfinding kiosk (left) and York City visitor (right)



Notes: Images from Cloud Gehshan. “Work by Capability.” (left) and “Multi-Touch Technology with Object Recognition Give New York City Visitors an Unforgettable Interactive Experience.” (right)

9.8.5 Mobile Applications

Mobile wayfinding provides the same type of information as place-based wayfinding – often these tools are used in conjunction with each other – but with a more personalized user experience. Once users download the appropriate wayfinding application or app, they have been granted access to the same information at their fingertips, and they can carry this information with them throughout their entire journey. These apps are especially convenient for visitors because it connects to technology that they already have in their pockets. Mobile apps are often used in conjunction with place-based wayfinding kiosks to create ease of access for all users and provide a seamless visitor experience. Geo-location makes mobile app wayfinding particularly useful to provide users with turn-by-turn directions as they navigate their trip. At each decision point, the mobile app user locates the user and provides the next step, removing the necessity for the user to memorize his entire route. Mobile app navigation may also show the user a snapshot of their next decision point or destination to further facilitate the trip. Geo-location can be accomplished through either Bluetooth Low Energy (BLE) and Beacons, Wi-Fi, GPS or geofencing, or a combination of these (Kosir 2016). These three technologies work best at various scales and are best suited for various uses. For example, GPS is ideal for outdoor environments where activities require a wider range (Kosir 2016).

Stuyvesant Town-Peter Cooper Village in New York City, a large-scale residential neighborhood has created its own free mobile application to assist with navigating through the complex’s monotonous architecture and repetitive blocks. The app provides a customized base map that is optimized for pedestrians, highlighting walking routes or paths and amenities. Users can browse a directory or search for destinations and set app navigation to direct them to a chosen place. Navigation uses step-by-step directions and augmented reality to project imagery of the user’s destination over the smartphone’s camera view (Wolke 2010).

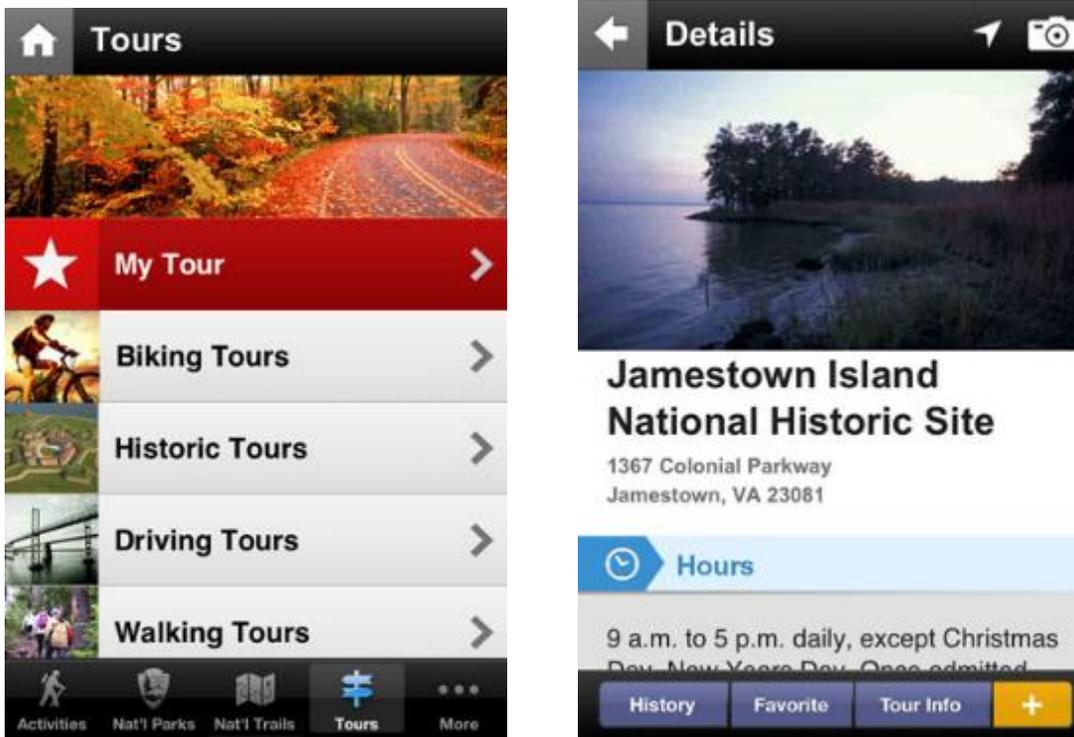
The National Parks Service (NPS) began exploring alternatives for in-park interpretation (the translation of natural, scientific or cultural subject matter into readily accessible content for the lay person) that adapt to modern technology and replicate educational or informational interactions with park rangers. When a rise in park visitation coupled with a decrease in staffed park rangers, the NPS sought to accommodate the needs and expectations of visitor experiences and to achieve goals of educating the public by complementing park ranger interpretive services with mobile applications (Blaser 2015). The following is a selection of National Parks with dedicated mobile application and features:

- Oregon National Historic Trail: maps and directions; exploring information and location of points of interest; audio-described sites; state-by-state self-guided tours; creating collages of user images taken along the trail and ability to share via social media; downloadable content to be viewed offline (National Park Service).
- Chesapeake Explorer: General park and site visitor information; maps and wayfinding; geo-located driving directions; guided tours; searches by activity, site type, and name; locating nearby activities, parks, trails and sites based on user location; creating and sending digital postcards through social media; build personalized tours based on user preferences (Blaser 2015).
- National Mall and Memorial Parks: Navigation to and through 70 cultural and historical sites; interpretive information; maps; tours; site information; walking directions and

estimated travel times; creating and sending digital postcards through social media; Park Lens augmented reality overlay labeling and information of site using the smartphone’s camera (Blaser 2015).

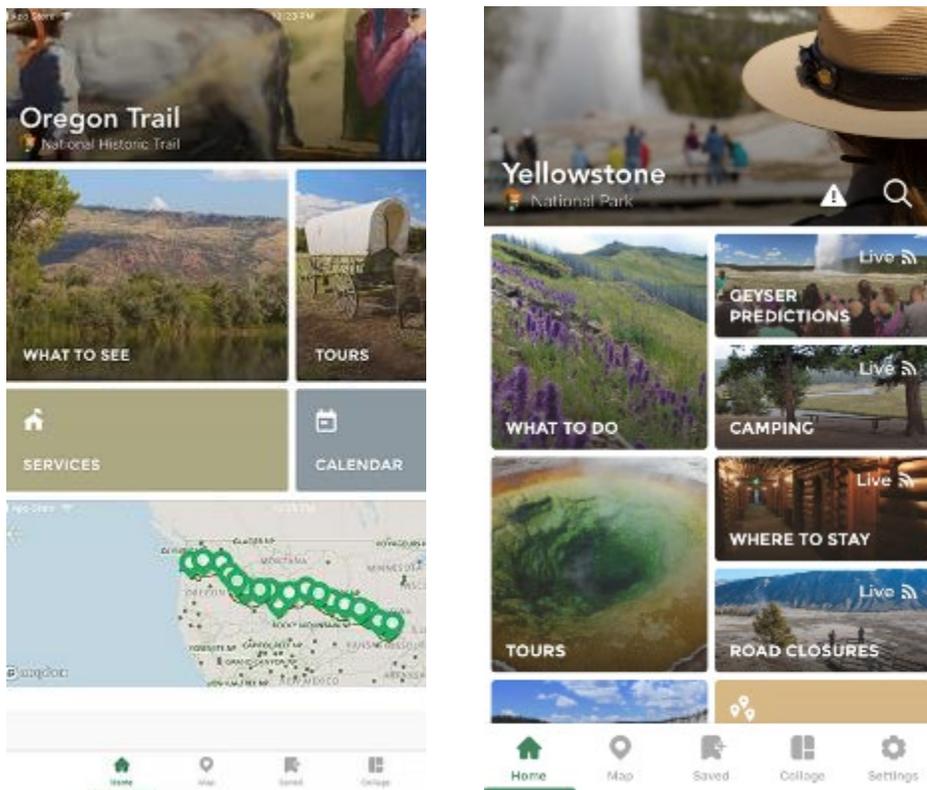
- Mount Rushmore Virtual Tour: interpretive services; educational narrated guided tour; virtual tour of the monument; 360° views; 3-Dimensional scans of the mountain (Blaser 2015).
- Chimani Yellowstone National Park: hiking trails; park amenities; audio and auto tours; prime wildlife viewing locations; geo-located maps and directions; park event schedules; Leave No Trace guidelines; sunrise and sunset times; editable maps based on user preferences; downloadable maps to be viewed offline (Blaser 2015).

Figure 38. Interface of the NPS Chesapeake Explorer mobile app



Note: Images from National Park Service “Chesapeake Explorer”.

Figure 39. Interfaces of NPS mobile apps: Oregon National Historic Trail (left) and Yellowstone National Park (right)



Note: Images from National Park Service, 2016. National Park Service Apps.”

9.8.6 Augmented Reality and Virtual Reality Technology

The development of augmented reality and virtual reality have enabled the average modern person to travel the world or explore exotic concepts without moving an inch. These two innovations display digital information and 3-Dimensional and/or animated life-like imagery for users to navigate and explore through a computer screen or smartphone.

Augmented reality is often used in GPS navigation systems and mobile wayfinding applications to provide actual imagery of a user’s destination or upcoming decision point. This feature can operate over real-time camera view and overlay directional arrows on the device’s viewfinder screen (Wolke 2010). The addition of real-world imagery in mobile navigation enhances the user experience by providing visual recognition and confirmation of place.

Augmented reality can transform a smartphone’s camera into a historic viewfinder through mobile applications, allowing the user to see a place as it was decades ago. The Museum of London developed its Streetmuseum app as part of a program to take its art collections outside the museum and onto the city streets. The app uses augmented reality to highlight the city’s history at 250 locations, found through an interactive Google Map. When users arrive at a chosen

site, they then select the pin on the map and point their device’s camera toward the appropriate viewpoint. The app then translucently and in real-time overlays a historical scene atop the street scene (Wolke 2010). This overlay feature provides a snapshot of history of a place while a person stands in it, prompting the user to imagine himself in that historical scene.

Last year, the Detroit Institute of Art launched an augmented reality program that invites visitors to further explore select exhibits through smartphones made available to loan from the museum during their visits. This program reveals additional layers of information from these exhibits than can only be discovered through augmented reality; visitors can scan an ancient Egyptian mummy with these smartphones to examine the mummy’s skeleton (Gedert 2017).

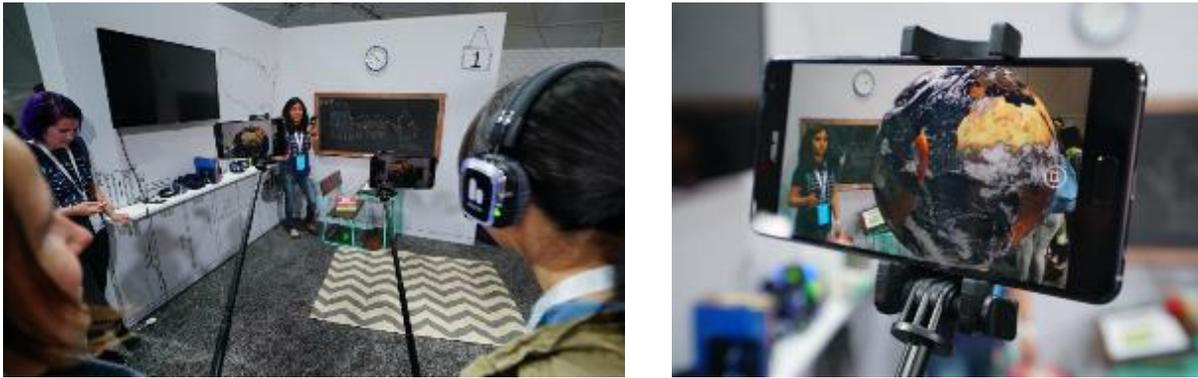
Figure 40. Augmented Reality programs through smartphones: London Museum of Art’s Streetmuseum app (left) and Detroit Institute of Art’s smartphone program (right).



Notes: Images from Wolke, 2010. “Wayfinding in Your Pocket.” (left) and Zlatopolsky, 2017. “Like Pokemon Go for art lovers, Lumin brings augmented reality to DIA.” (right)

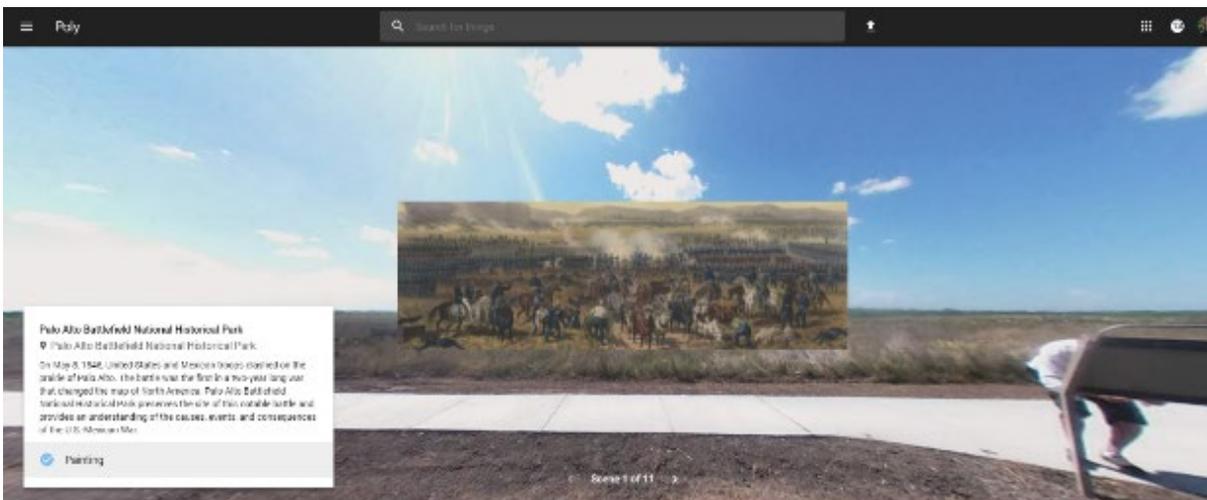
In 2017, Google introduced virtual reality (VR) and augmented reality (AR) technology into its Expeditions app through its Google Expeditions AR Pioneer Program. This program brought the app to classrooms across the United State to be used as an advanced educational tool. Through smartphones outfitted with the AR app, students have been exploring the world in their classrooms through virtual field trips and examining 3-Dimensional objects that seem to appear on their desks. Over 900 VR expeditions already developed and available take students to historic fishing villages in Connecticut, battlefields in England, America’s National Parks, or a surgeon’s room in a hospital. Over 100 AR expeditions bring concepts to life right before students’ eyes, such as the human muscular system, castles around the world, historic printing presses, or sharks. Teachers and students can also create their own virtual field trips with 360° or 180° photos and images from Google Streetview (Matney 2018). As a visual aid, this program helps make learning about exotic place and abstract concepts feel more realistic and understandable as it enables students to see and explore more fully than what just an image would offer.

Figure 41. Google Expeditions AR Pioneer Program in a classroom.



Note: Images from Melnick, 2017. “Google Brings AR Into The Classroom With ‘Expeditions AR’ Program.”

Figure 42. Google Expeditions VR Program in Palo Alto Battlefield National Historic Park with historic painting overlay.



Note: Image from Google Tour Creator, 2018. “1066 Battle of Hastings, Abbey and Battlefield.”

10.0 Conclusion

The characteristics of the community surrounding the Fernald Preserve closely resemble the region as a whole. Recognizing the similarities and differences among the surrounding community and other communities will allow insight on how to best continue serving the needs of current users as well as other groups that Fernald intends to serve. National attitudes and resource allocation show that there is a growing focus on sustainable living, environmentally-sensitive development, access to and connection with nature, and conservation of natural land and wildlife. Furthermore, the nation is expressing more interest in and emphasizing the importance of environmental education in multiple ways, such as early childhood education, youth outdoor programs, community recreation and outdoor activity opportunities, especially in urban and marginalized populations. Technology has been increasingly influencing the way people work, live and spend their leisure time. In response to an increasingly tech-savvy world, institutions and organizations are integrating interactive and geo-located technologies to keep visitors interested and engaged and to enhance their experiences. Particularly the rise of social media has changed how people interact with each other and their communities and how people receive and exchange information. This information will help DOE and its stakeholders gain an understanding of the surrounding community and awareness of current national trends and help make informed decisions regarding future use of the site.

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