Main Ditch Watershed Plan - Public Comment Opportunity

A watershed plan containing details about a proposed multi-purpose project for the Main Ditch Watershed is being prepared. An Environmental Document will determine the public benefits in comparison with environmental impacts.

This scoping meeting provides the opportunity for public input early in the project timeline. Comments may be provided:

a) in person to a USDA-NRCS representative during the open house event at the USDA Service Center, 18450 Ridgeview Lane, Dexter, MO 63841 from 6:30p.m. - 8:00p.m. on August 21, 2024.

b) or in writing by mail or email to Chris Hamilton, Assistant State Conservationist, USDA Natural Resources Conservation Service, Parkade Center Suite 250, 601 Business Loop 70 West, Columbia, Missouri 65203-2585, or Chris.Hamilton@mo.usda.gov.

Substantive comments received will be addressed and incorporated into the Environmental Document. Once completed, the document will then be provided to the public for review and comment.

Provide statement below ----------

The City of Dexter supports the investment of funds to improve drainage and stabilize the banks of DD 37.

Name: (print) DAVID WYMAN Address: 301 E Stoddard

Date: 8-21-2024 Dexter MO 63841

Signature

August 12, 2024

Steven Hefner
Butler County USDA Service Center
4327 Highway 67 North
Poplar Bluff, MO 6390
steven.hefner@usda.gov

Dear Steven Hefner;

The Missouri Department of Natural Resources appreciates the opportunity to review the materials for the Main Ditch Watershed project. The department offers the following comments for consideration.

Project Location
The project area includes the entire Main Ditch HUC 12 watershed located in Stoddard County, Missouri. The following geographic descriptions apply to the approximate location of the study area.

Geographic Coordinates:
773007 E, 4071026 N

8-Digit Hydrologic Unit Code:
Little River Ditches (08020204)

Ecological Drainage Unit:
MS Alluvial Basin/St. Francis/Little

Geology and Geospatial Data
This project is located within the New Madrid Seismic Zone. Due to the site being underlain by unconsolidated alluvial sediments, there is a higher risk of liquefaction in the event of a sizeable earthquake.

If a full Geologic Assessment is required for a project, the Missouri Geological Survey can be contacted directly at 800-361-4827. Other maps showing natural and cultural resources can be found at https://dnr.mo.gov/land-geology/maps-data-research.

Karst Topography
The project area lies in the Southeastern Lowlands Groundwater Province of Missouri. The most important groundwater zone of this province is the alluvial deposits of the Quaternary System. These deposits gradually thicken from approximately 50 feet in the north to over 125 feet in the

southern part of the project area. The lithology of the deposits in the shallow subsurface are mostly silts and fine to coarse grained sands with areas of gravels. The permeability of the alluvial materials is high; due to this characteristic they rapidly mobilize surface contaminants downward to groundwater and the underlying bedrock units.

There are 19 springs near the project area. The project area is in the Dexter and Bernie quadrangles, which have a cave density of 0. Springs, sinkholes, and caves are features on the landscape associated with karst topography that can act as direct conduits of surface water and pollutants to groundwater. As such, extra precaution should be taken to minimize disturbance of land in or around these features, and to avoid the introduction of pollutants to sensitive groundwater resources. Karst areas may also present the possibility of potential collapse.

Wells
There are 337 active wells and four public wells within the Main Ditch Watershed. Most of the wells in the project area utilize the alluvial groundwater zone with less than 5% drawing from the bedrock units in the region. This aquifer is unconfined and highly susceptible to surface contamination due to its high permeability. Current and future wells could potentially become impacted if any hazardous materials from the project migrate into the subsurface.

There are 908 abandoned, soil, and other public wells near the project area. Wells can act as conduits of pollutants to groundwater resources. Abandoned wells should be plugged prior to any land disturbance, and care should be taken to utilize appropriate best management practices to protect any currently operating wells. For more information on locating and plugging wells, or on private domestic wells, please visit the link below for the department's Wellhead Protection Section webpage or contact the department's Geological Survey Program directly. https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/wells-drilling.

Public Land
Public land, Holly Ridge Conservation Area, is located within the project area, owned by the Missouri Department of Conservation (MDC). Care should be taken to avoid impact to these public lands.

Conservation Opportunity Areas
The Holly Ridge terrestrial and aquatic Conservation Opportunity Areas (COA's) are contained within the project area. Both terrestrial and aquatic COAs are identified by the MDC and its conservation partners as priority areas that support and conserve viable populations of wildlife and the ecological systems on which they depend. Designated COAs are located statewide and may consist of a combination of public and private resources. Please contact the MDC at 573-751-4115 for more information.

Water Protection

Best Management Practices
Best management practices should be utilized during project activities to limit the amount of sediment and other pollutants entering waters of the state, and to protect the water's chemical, physical, and biological characteristics. These practices include, but are not limited to,

conducting work during low flow conditions whenever possible, keeping heavy equipment out of the water, and taking all necessary precautions to avoid the release of fuel or other waste products to streams and other waters. In addition, the department encourages the preservation of existing riparian or buffer areas around each water resource to limit the amount of sediments or other pollutants entering the water. Any stream banks, riparian corridors, lake shores, or wetlands denuded of vegetation should be stabilized and re-vegetated as soon as is practicable.

Watershed Conditions

Public Drinking Water

The project area overlaps portions of Stoddard Co. PWSD #1, Stoddard Co. PWSD #4, Stoddard Co. PWSD #6, and Stoddard Co. PWSD #7. There are nine drinking water wells and 13 tanks near the project area. Proposed project personnel should be aware of nearby Public Drinking Water Districts. Work associated with any project should take into consideration the protection of surface and groundwater public drinking water supplies, implementing appropriate best management practices as necessary. For additional information regarding source water protection, please contact Ken Tomlin of the department's Public Drinking Water Branch at 573-526-0269.

Designated Uses

Water Bodies with Specific Designated Uses

The proposed project area is in the watershed of Lateral #2 Main Ditch. Water bodies are assigned specific designated uses according to State of Missouri Water Quality regulations at 10 CSR 20-7.031(2). These waters are protected by numeric water quality criteria outlined in 10 CSR 20-7.031(5) and Table A, as well as general water quality criteria outlined at 10 CSR 20-7.031(4). Designated uses of Lateral #2 Main Ditch include the following:

- Protection and propagation of fish, shellfish, and wildlife – warm water habitat (WWH)
- Human health protection (HHP)
- Irrigation (IRR)
- Livestock and wildlife protection (LWP)
- Secondary contact recreation (SCR)
- Whole body contact recreation – Category B (WBC-B)

Water Bodies without Specific Designated Uses

Water bodies that are not assigned specific designated uses are still protected by general water quality criteria outlined at 10 CSR 20-7.031(4) and are subject to the acute toxicity criteria of Tables A and B, as well as whole effluent toxicity conditions.

According to the National Wetlands Inventory https://www.fws.gov/wetlands/, there is the likelihood of freshwater forested/shrub, pond, and emergent wetland habitat within the project area. This project has the potential to impact wetlands, ponds, and the aforementioned tributaries and headwater streams to be impacted, depending on their proximity to land disturbance activities. Project sponsors should avoid such impacts through alternatives analysis before compensatory mitigation is considered. If wetlands, ponds, headwaters, or tributaries are not directly impacted but are near any land disturbance, project sponsors should take care to protect

water quality. While these water bodies are not assigned specific designated uses, they are protected by Missouri's general water quality criteria.

Sensitive Waters

There are no known sensitive waters in the project area for the following categories: Cold Water Habitat, Outstanding National Resource Waters, Outstanding State Resource Waters, Metropolitan No-Discharge streams, biocriteria reference locations, and losing streams.

303(d) Impaired and 305(b) Threatened Waters

Lateral #2 Main Ditch is listed on the 303(d) list as impaired for low dissolved oxygen.

Waters assessed by the department as threatened or impaired could potentially be impacted by projects. Project personnel should ensure that activities related to the project do not cause an increase in the pollutants impairing these waters nor re-suspend any pollutants that might be bound to sediment. Additional information can be found by contacting the department's Water Protection Program at 573-526-1446 or by vising the link below.
https://dnr.mo.gov/water/what-were-doing/water-planning/quality-standards-impaired-waters-total-maximum-daily-loads/impaired-waters

Waters with Approved Total Maximum Daily Loads

Lateral #2 Main Ditch has an approved TMDL for sediment.

Impairments should not be made worse by this project's activities. The department staff may require extra protections when developing permits or certifications to comply with total maximum daily load and wasteload allocations. Additional information can be found by contacting the department's Water Protection Program at 573-526-1446 or by visiting the link below.
https://dnr.mo.gov/water/what-were-doing/water-planning/quality-standards-impaired-waters-total-maximum-daily-loads/tmdls

Permitting Obligations

Clean Water Act Sections 401 and 404

A Clean Water Act Section 404 Permit Authorization from the U.S. Army Corps of Engineers (USACE), and Section 401 Water Quality Certification from the department may be required for projects that have the potential to discharge fill or dredged material into a jurisdictional water of the United States. More information about these permits can be found at the following links.
https://www.epa.gov/cwa-404/section-404-permit-program
https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality

If discharge into water has occurred, or will occur, project personnel should immediately contact the appropriate USACE District (link below) and the department's Operating Permits Section at 573-522-4502 for more information.
http://www.mvr.usace.army.mil/Portals/48/docs/regulatory/MORegBound.pdf

Land Disturbance
Acquisition of a Section 401 Certification should not be interpreted to mean that the requirements for other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System Permits. Work disturbing an area of one acre or more requires issuance of a land disturbance permit prior to any earth work. Disturbance to valuable resource waters, including springs, sinkholes and losing streams, could require additional conditions or a site-specific permit.

Information and application for online land disturbance permits are located at https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/stormwater/construction-land-disturbance.

Questions regarding permit requirements may be directed to the appropriate Regional Office https://dnr.mo.gov/about-us/division-environmental-quality/regional-office.

Demolition and Construction Waste Management
Additional information on managing construction and demolition waste can be found at the following link https://dnr.mo.gov/print/document-search/pub2045.

Hazardous Waste
There are four hazardous substance cleanup sites and 22 underground storage tank facilities within the watershed that project planners should be aware of that may be impacted by the project. Two of these sites have land use limitations that restricts use of the property. A list of these sites is included in an attached, tabbed Excel file that includes site history, use limitations and locational data. Additional information on all these sites is available through ESTART at https://apps5.mo.gov/ESTARTMAP/map/init_map.action or by contacting the Environmental Remediation Program at 573-751-3176.

During the project, if any underground tanks or contaminated soil is discovered, workers should withdraw to a safe distance and notify the department's spill line at 573-634-2436.

It is the generator's responsibility to determine if materials generated during construction and demolition, are hazardous wastes. Demolition-related waste categories typically include paint residue (paint chips, paint scrapings, etc.), demolition debris (metal and boards that have been painted with lead-based or other heavy metal-based paint), and scrap metal (metal objects that contain lead or other heavy metals). A hazardous waste determination is not required for materials that will be reused or recycled without additional processing.

Asbestos
Prior to demolition activities, regulated structures must be thoroughly inspected by a Missouri-certified asbestos inspector to determine if any Asbestos Containing Materials are present, and a notification made to the department at least ten working days prior to demolition. Regulated structures include any building which has been used as a commercial, institutional, or industrial building (even if it was historic use), and projects involving two or more residential structures. In addition, this includes but is not limited to the following "non-building" structures: bridges,

pipelines, cooling towers, chimneys, dams, and tunnels. Any asbestos found must be properly managed to prevent release of asbestos fibers.

Solid Waste
Information about solid waste uncovered during construction activities can be found at the following link.
https://dnr.mo.gov/document-search/managing-solid-waste-encountered-during-excavation-activities-pub2192/pub2192.

No waste may be buried on-site or at an alternate site, except for clean fill. Clean fill is defined by the Revised Statutes of Missouri as "uncontaminated soil, rock, sand, gravel, concrete, asphaltic concrete, cinderblocks, brick, minimal amounts of wood and metal, and inert solids as approved by rule or policy of the department for fill, reclamation or other beneficial use." Clean fill must not contain protruding metals or demolition debris. Although not regulated as waste, placement of clean fill materials may be subject to requirements of the department's Water Protection Program if it is placed in contact with surface or subsurface waters of the state or would otherwise violate water quality standards.

Air Pollution
Dust
Ensure fugitive particulate matter emissions, such as dust, resulting from the project do not remain on surfaces or in the air beyond the property line of origin. 10 CSR 10-6.170 restricts the emission of particulate matter to the ambient air beyond the premises of origin. Additional information on general dust emissions may be found here https://dnr.mo.gov/print/document-search/pub2200.

Open Burning
The open burning of refuse and trade waste is restricted according to 10 CSR 10-6.045. Construction, demolition, and trade waste cannot be open burned, except for untreated wood. Brush from land clearing activities may be burned if the burning is conducted outside the city limits and greater than 200 yards from the nearest occupied structure. Additional information on open burning can be found at https://dnr.mo.gov/print/document-search/pub2047.

Historic Preservation
Project personnel should check with the department's State Historic Preservation Office to determine if a Section 106 Review is needed. Information on the Section 106 Review can be found on the department's web site at https://mostateparks.com/page/84371/state-historic-preservation-office.

Additional Considerations
Floodplain
For information concerning flood plains in Missouri, contact the Missouri State Emergency Management Agency, Floodplain Management and Mitigation Branch, at 573-526-9100 or 2302 Militia Drive, Jefferson City, MO 65101.

Endangered Species
The MDC is responsible for collecting and managing information on the location and status of endangered species in the state. Contact MDC's Endangered Species Coordinator at 573-751-4115 or P.O. Box 180, Jefferson City, MO 65102 for general information.

We appreciate the opportunity to provide comments for the proposed project. If you have any questions or need clarification, please contact me at 573-522-6221.

Sincerely,

Hannah Humphrey

Hannah Humphrey
Deputy Director

HH/man

March 27, 2025

Russell Snyder
USDA-NRCS
601 Business Loop 70 West, Suite 250
Columbia, MO 65203

Re: **SHPO Project Number: 014-SO-25** — Effects Determination Section 106 compliance notification for Main Ditch-DD37 Ditch Stabilization, Stoddard County, Missouri (NRCS)

Dear Russell Snyder:

Thank you for submitting information to the State Historic Preservation Office (SHPO) regarding the above-referenced project for review pursuant to Section 106 of the National Historic Preservation Act, P.L. 89-665, as amended (NHPA), and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of historic properties.

We have reviewed the information regarding the above-referenced project and have included our comments on the following page(s). Please retain this documentation as evidence of consultation with the Missouri SHPO under Section 106 of the NHPA. SHPO concurrence does not complete the Section 106 process as federal agencies will need to conduct consultation with all interested parties. **Please be advised that, if the current project area or scope of work changes, such as a borrow area being added, or cultural materials are encountered during construction, appropriate information must be provided to this office for further review and comment.**

If you have questions, please contact the SHPO at (573) 751-7858 or call/email Jeremy Morin, (573) 526-3761, jeremy.morin@dnr.mo.gov. If additional information is required, please submit the information via email to MOSection106@dnr.mo.gov.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Dawn Scott, Director
Deputy State Historic Preservation Officer

c: Michelle Jesse, USDA-NRCS
Rex McAliley, USDA-NRCS

SHPO Project Number: 014-SO-25 — Effects Determination Section 106 compliance notification for Main Ditch-DD37 Ditch Stabilization, Stoddard County, Missouri (NRCS)

COMMENTS:

We have reviewed the cultural resources survey report entitled *Phase I Cultural Resource Survey, Main Ditch Watershed, Stoddard County, Missouri,* by Clay Cantrell. Based on this review it is evident that an adequate survey has been conducted of the project area. SHPO concurs with your determination of **no historic properties affected** and have no objection to the initiation of project activities.

SHPO Reviewer: Jeremy Morin, (573) 526-3761, jeremy.morin@dnr.mo.gov

Scott R. Hobart

From: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Sent: Tuesday, November 12, 2024 12:24 PM
To: Scott R. Hobart
Subject: FW: [External Email]EPA Scoping Comments - Main Ditch and Ditch 27 Watershed Plan

FYI

Steve Hefner
Natural Resources Specialist
USDA-Natural Resources Conservation Service
Butler County USDA Service Center
4327 Highway 67 North
Poplar Bluff, MO 63901

From: Sedlacek, Michael <Sedlacek.Michael@epa.gov>
Sent: Tuesday, November 12, 2024 12:10 PM
To: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Subject: [External Email]EPA Scoping Comments - Main Ditch and Ditch 27 Watershed Plan

[External Email]
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Dear Mr. Hefner:

The U.S. Environmental Protection Agency (EPA) Region 7 (Iowa, Kansas, Missouri, and Nebraska) has reviewed the project scoping document for the Main Ditch and Ditch 27 Watershed Project, Dunklin County, Missouri. The following comments were prepared in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act.

NEPAssist
We recommend using NEPAssist as the first step to identify any potential environmental and human health concerns. NEPAssist may be accessed at: https://www.epa.gov/nepa/nepassist.

Water Quality
EPA recommends the forthcoming NEPA document identify any nearby impaired waterbodies and describe how the proposed actions may affect those waterbodies under Section 303(d) of the Clean Water Act. A list of impaired waterbodies and points of contact for EPA Region 7 and each state is found at: https://www.epa.gov/tmdl/impaired-waters-and-tmdls-region-7.

Wetlands and Waters of the U.S.
In the event that there are jurisdictional Waters and/or Wetlands of the United States impacted by any proposed future action, we advise avoiding and minimizing impacts to wetlands and streams as much as possible before moving towards determining the amount of compensatory mitigation that is required. Jurisdictional Waters of the United States includes navigable waters, their tributaries, interstate waters and adjacent wetlands/waters (33 CFR section 328). We recommend that any mitigation should occur in the same HUC 8 or smaller watershed as the location of the project

impacts. We urge you to contact the appropriate authorities at the US Army Corps of Engineers to determine whether a CWA Section 404 permit may be required for such action.

If changes occur in the project purpose, need, alternatives, or impacts between now and the time of issuance on Public Notice by the Corps of Engineers, EPA's 404 program reserves the ability to comment further on this project. Information may be generated through the 404 public interest review process that was not documented during the EIS process and should be considered in the final decision. This could include changes in regulation or processes, advances in the knowledge of the resources to be impacted, discovery of additional populations of threatened or endangered species, new best management practices, and/or improvement in stream or wetland restoration science. We urge you to contact the appropriate authorities at the U.S. Army Corps of Engineers (USACE) at: https://www.usace.army.mil/missions/civil-works/Regulatory-Program-and-permits/Obtain-a-Permit/ to determine if a CWA Section 404 permit may be required for the proposed project. To find the appropriate EPA Region 7 contact, see: https://www.epa.gov/wetlands/forms/contact-us-about-wetlands#r7.

Air Quality Best Management Practices at Construction Sites

Temporary fugitive dust and diesel exhaust emissions from construction activities, such as use of heavy machinery and material hauling, would occur. In 2012 the International Agency for Research on Cancer concluded that diesel exhaust is carcinogenic to humans. Diesel exhaust can also lead to other serious health conditions and can worsen heart and lung disease. We recommend implementing air quality best management practices (BMP) and mitigation measures for this project. Examples include:

- Use equipment that runs on clean, alternative fuels (e.g., ethanol or ultra-low sulfur diesel) or electric vehicles.
- Minimize engine idling (e.g., 5-10 minutes/hour) or establish an anti-idling policy.
- Use electric starting aids such as block heaters with older vehicles to warm the engine.
- Phase project construction to minimize exposed surface areas.
- Install wind fencing and phase grading operations where appropriate.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.
- Stabilize storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative, where appropriate.
- Use enclosed, climate-controlled cabs pressurized and equipped with high-efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Per Executive Order 13045 on Children's Health, EPA recommends the lead agency and project proponent pay particular attention to worksite proximity to places where children live, learn, and play, such as homes, schools, and playgrounds.
- Specify how impacts to sensitive receptors (e.g., communities living with environmental justice (EJ) concerns, children, elderly, and the infirm) will be avoided or minimized.

Erosion and Sediment Control

EPA recommends erosion and sediment control methods be implemented into the proposed project. For examples of erosion and sediment control methods, see: https://www3.epa.gov/npdes/pubs/ch4-3a.htm.

Climate Change Resiliency and Adaptation

The Fifth National Climate Assessment (https://www.globalchange.gov/our-work/fifth-national-climate-assessment) finds that in the Midwest, extreme heat, drought, severe weather, heavy downpours, and flooding will affect infrastructure, health, air, and water quality. Acute storm events are occurring with increasing frequency and intensity. EPA recommends that the forthcoming NEPA document consider adaptation and mitigation strategies, such as:

- Consider the effect of extreme heat, extreme cold, and wind resistance, on the durability and strength of the construction materials being used. For instance, consider using lighter-colored materials that will help reflect heat and avoid heat absorption on hot days.

- Consider the effect of flooding on the design of any structure(s). For instance, if a project must be located within a 100-year floodplain, consider building any structures on elevated support beams instead of on a concrete foundation.
- Install "green" stormwater management features, such as stormwater retention/detention basins, permeable pavement, rain gardens, rainwater cisterns, and/or over-sized culverts and bridges (see: https://www.epa.gov/green-infrastructure)
- Plant additional trees and vegetation to help moderate air temperature, provide shade, and trap and store carbon dioxide.
- Thoroughly insulate new structures, if applicable.

Additional climate change mitigation and adaptation strategies that may be implemented in this proposed project are available at EPA's Climate Change Resiliency and Adaptation Resource Center: https://www.epa.gov/arc-x/planning-climate-change-adaptation. Climate change summaries and adaptation and mitigation strategies are also available for individual states, regions, impact types, and sectors at: https://www.epa.gov/climateimpacts.

Environmental Justice and Children's Health

EPA recommends using EJScreen (https://www.epa.gov/ejscreen) as the first step to identify communities living with Environmental Justice (EJ) concerns near the project area. EPA recommends that any affected communities living with EJ concerns be identified and given an opportunity to provide input into the remainder of the NEPA process, including proposed mitigation.

EPA recommends the forthcoming NEPA document include information describing what was or will be done to inform these communities about the project and the potential impacts it may have on their communities, what input has been received to date from the communities, and how that input was or will be used in decision-making. Additional information may be found in: *Promising Practices for EJ Methodologies in NEPA Reviews* (https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf), and *Community Guide to Environmental Justice and NEPA Methods* (https://www.energy.gov/sites/default/files/2019/05/f63/NEPA%20Community%20Guide%202019.pdf). If you have any questions about EJ or would like EPA's help reaching out to the communities that may be affected by this project, see: https://www.epa.gov/environmentaljustice/environmental-justice-your-community#region7

Pollinators and Native Plant Species

Pollinators are critical contributors to our nation's economy, food system, and environmental health. Vegetation within the project area can provide vital habitat for pollinators, providing food, shelter, and connections to other patches of habitat. Where feasible, EPA recommends planting native species and pollinator-friendly plants within the project footprint. For more information, see: https://www.epa.gov/pollinator-protection/find-best-management-practices-protect-pollinators and https://extension.missouri.edu/publications/m405

Land Use Planning

EPA recommends collaborating with local municipalities and county governments to ensure the proposed project conforms to existing zoning and land use requirements.

Consultation Documentation

EPA recommends attaching to the forthcoming NEPA document interagency consultation documents regarding historic and cultural resources (Missouri State Historic Preservation Office), wetlands and streams (U.S. Army Corps of Engineers), Federal threatened and endangered species (U.S. Fish and Wildlife Service), and any potentially affected Tribal governments.

Noxious Weeds and Invasive Species

The spread of noxious weeds and invasive (non-indigenous) plants is a threat to biodiversity. Many noxious weeds can out-compete native plants and produce a monoculture that has little or no plant species diversity or benefit to wildlife. Noxious weeds tend to gain a foothold where there is disturbance in the ecosystem. Studies show that new roads and pipeline/utility rights-of-way can become a pathway for the spread of invasive plants. Early recognition and control of

new infestations is essential to stopping the spread of infestation and avoiding future widespread use of herbicides, which could correspondingly have more adverse impacts on biodiversity and nearby water quality. For more information on preventing or controlling noxious weeds and invasive species, see: https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/sa_weeds/sa_noxious_weeds_program.

Sincerely,

Mike Sedlacek
National Environmental Policy Act Program
Community and Environmental Review Branch
Environmental Justice, Community Engagement & Environmental Review Division
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219
(913) 551-7208
Sedlacek.michael@epa.gov

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Osage Nation Historic Preservation Office

Date: April 23, 2025 **File: 2425-4549MO-3**

Natural Resources Conservation Service
Russell Snyder
601 Business Loop 70 West, Suite 250
Columbia, MO 65203
russell.snyder@usda.gov

RE: USDA, MO NRCS, Main Ditch, Stoddard County, Missouri

SENT VIA EMAIL

Dear Mr. Snyder,

The Osage Nation Historic Preservation Office has evaluated your submission regarding the proposed USDA, MO NRCS, Main Ditch, Stoddard County, Missouri and determined that the proposed project **most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation.** For direct effect, the finding of this NHPA Section 106 review is a determination of **"No Properties"** eligible or potentially eligible for the National Register of Historic Places.

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the U.S. Department of Agriculture fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed project referenced as USDA, MO NRCS, Main Ditch, Stoddard County, Missouri.**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact Andrew Beaudoin, MA at andrew.beaudoin@osagenation-nsn.gov. Thank you for consulting with the Osage Nation on this matter.

Andrea A. Hunter, Ph.D.
Director, Tribal Historic Preservation Officer

Andrew Beaudoin, MA
Archaeologist

Osage Nation Historic Preservation Office

627 Grandview Ave. * Pawhuska, OK 74056 Telephone 918-287-5328 * Fax 918-287-5376
www.osagenation-nsn.gov/who-we-are/historic-preservation * HistoricPreservation@osagenation-nsn.gov

Scott R. Hobart

From: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Sent: Thursday, August 1, 2024 9:38 AM
To: Scott R. Hobart
Subject: FW: [External Email]Main Ditch Watershed Project

For your records.

Steve Hefner
Natural Resources Specialist
USDA-Natural Resources Conservation Service
Butler County USDA Service Center
4327 Highway 67 North
Poplar Bluff, MO 63901

From: Christina Sharp <christina.sharp@quapawnation.com>
Sent: Friday, July 26, 2024 10:26 AM
To: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Cc: section 106 <section.106@quapawnation.com>
Subject: [External Email]Main Ditch Watershed Project

You don't often get email from christina.sharp@quapawnation.com. Learn why this is important

[External Email]
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Dear **XXXX,**

The Quapaw Nation Historic Preservation Program (QNHPP) has received and reviewed the information you have provided. Based upon the information you provided we believe that the **PROPOSED PROJECT Main Ditch Watershed Project IN Stoddard County, Missouri** will have no effect on known properties of cultural or sacred significance to the Quapaw Nation.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d) (6) (A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Quapaw Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, or the Native American Graves Protection and Repatriation Act. If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and that you contact the Quapaw Nation Historic Preservation Office.

Should you have any questions or need any additional information, please feel free to contact **Christina Sharp** at **christina.sharp@quapawnation.com** please copy section106@quapawnation.com to ensure additional information requests are reviewed in a timely manner. Thank you for consulting with the Quapaw Nation on this matter.

Sincerely,
Christina Sharp

On behalf of
-Billie Burtrum
Preservation Officer/ QNHPP Director
Quapaw Nation
P.O. Box 765
Quapaw, OK 74363
(w) 918-238-3100
(f) 918-674-2456

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Scott R. Hobart

From: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>
Sent: Thursday, March 20, 2025 2:06 PM
To: Scott R. Hobart
Subject: FW: [External Email]Main Ditch-DD37 Ditch Stabilization

fyi

Thank you,

Rex

L. Rex McAliley, PhD.
Watershed Planning/EWPP Coordinator

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
601Business Loop 70 West, Suite 250
Columbia, MO 65203
Office: 573-876-9425
Email: rex.mcaliley@usda.gov

From: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Sent: Tuesday, March 18, 2025 7:38 AM
To: Jesse, Michelle - FPAC-NRCS, MO <Michelle.Jesse@usda.gov>
Cc: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>
Subject: FW: [External Email]Main Ditch-DD37 Ditch Stabilization

Same as West Ditch-Main Ditch.

From: Christina Sharp <christina.sharp@quapawnation.com>
Sent: Monday, March 17, 2025 3:58 PM
To: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Cc: section 106 <section.106@quapawnation.com>
Subject: [External Email]Main Ditch-DD37 Ditch Stabilization

[External Email]
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Dear **Mr. Snyder**,

T*he Quapaw Nation Historic Preservation Program (QNHPP) has received notification of the* **Proposed Project Main Ditch-DD37 Ditch Stabilization in Stoddard County, Missouri.**

In accordance with the National Historic Preservation Act, (NHPA)[U S C 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d)(6)(A), which clarifies that historic properties may have religious and cultural significance to Indian tribes Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U S C 4321 and 4331-35 and 40 CFR 1501 7(a) of 1969

The Quapaw Nation has a vital interest in protecting its historic and ancestral cultural resources The Quapaw Nation concurs with the agency's recommendations that a **SURVEY** should be conducted The Quapaw Nation looks forward to receiving the report for the proposed project

Should you have any questions or need any additional information, please feel free to contact **Christina Sharp** at **christina.sharp@quapawnation.com**, please copy section106@quapawnation com to ensure additional information requests are reviewed in a timely mannerThank you for consulting with the Quapaw Nation on this matter

Sincerely,
Christina Sharp

On behalf of
-Billie Burtrum
Preservation Officer/ QHPP Director
Quapaw Nation
P O Box 765
Quapaw, OK 74363
(w) 918-238-3100

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Scott R. Hobart

From: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>
Sent: Tuesday, May 6, 2025 6:37 AM
To: Scott R. Hobart
Subject: FW: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

FYI

Thank you,

Rex

L. Rex McAliley, PhD.
Watershed Planning/EWPP Coordinator

USDA U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
601Business Loop 70 West, Suite 250
Columbia, MO 65203
Office: 573-876-9425
Email: rex.mcaliley@usda.gov

From: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Sent: Monday, May 5, 2025 2:02 PM
To: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>; Jesse, Michelle - FPAC-NRCS, MO <Michelle.Jesse@usda.gov>
Subject: FW: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

---

From: Laserfiche Notification <donotreply@laserfiche.com>
Sent: Monday, May 5, 2025 12:48 PM
To: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Subject: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

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This email is in response to Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo.
The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project. However, there is still potential for the discovery of unknown resources.

We have no issues or concerns at this time. Please continue with the project as planned, but in the event archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at Section106@shawnee-tribe.com

Thank you for giving us the opportunity to comment on this project

Erin Paden
TRIBAL HISTORIC PRESERVATION SPECIALIST
Office: (918) 542-2441, x140
Email: epaden@shawnee-tribe.com
29 S Hwy 69A
Miami, OK 74354
shawnee-tribe.com

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Scott R. Hobart

From: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>
Sent: Thursday, March 20, 2025 2:07 PM
To: Scott R. Hobart
Subject: FW: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

Fyi...

Thank you,

Rex

L. Rex McAliley, PhD.
Watershed Planning/EWPP Coordinator

USDA U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
601Business Loop 70 West, Suite 250
Columbia, MO 65203
Office: 573-876-9425
Email: rex.mcaliley@usda.gov

From: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Sent: Monday, March 17, 2025 1:28 PM
To: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>; Jesse, Michelle - FPAC-NRCS, MO <Michelle.Jesse@usda.gov>
Cc: Hamilton, Chris - FPAC-NRCS, MO <chris.hamilton@usda.gov>
Subject: FW: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

---

From: Laserfiche Notification <donotreply@laserfiche.com>
Sent: Monday, March 17, 2025 1:15 PM
To: Snyder, Russell - FPAC-NRCS, MO <russell.snyder@usda.gov>
Subject: [External Email]Section 106 Consultation - Main Ditch-DD37 Ditch Stabilization Stoddard Co, Mo

[External Email]
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We have no issues or concerns at this time. Please continue with the project as planned, but in the event archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at Section106@shawnee-tribe.com

Thank you for giving us the opportunity to comment on this project

Erin Paden
TRIBAL HISTORIC PRESERVATION SPECIALIST
Office: (918) 542-2441, x140
Email: epaden@shawnee-tribe.com
29 S Hwy 69A
Miami, OK 74354
shawnee-tribe.com

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Missouri Department of Conservation

Missouri Department of Conservation's Mission is to
protect and manage the forest, fish, and
wildlife resources of the state and to
facilitate and provide opportunities for all citizens to
use, enjoy and learn about these resources.

Natural Heritage Review Level Two Report: State Listed Endangered Species and/or Missouri Species/Natural Communities of Conservation Concern

There are records of state-listed Endangered Species, or Missouri Species or Natural Communities of Conservation Concern within or near the defined Project Area. Please contact Missouri Department of Conservation for further coordination.

Foreword: Thank you for accessing the Missouri Natural Heritage Review Website developed by the Missouri Department of Conservation with assistance from the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Missouri Department of Transportation and NatureServe. The purpose of this report is to provide information to federal, state and local agencies, organizations, municipalities, corporations, and consultants regarding sensitive fish, wildlife, plants, natural communities, and habitats to assist in planning, designing, and permitting stages of projects.

PROJECT INFORMATION

Project Name and ID Number: Main Ditch Watershed - Project Area #16102
Project Description: New Madrid and Stoddard counties, Missouri
Project Type: Water Use, Transfer, and Channel Activities, Canal/irrigation construction/maintenance
Contact Person: Sylvia Harris
Contact Information: sharris@prairieengineers.com or 8037414193

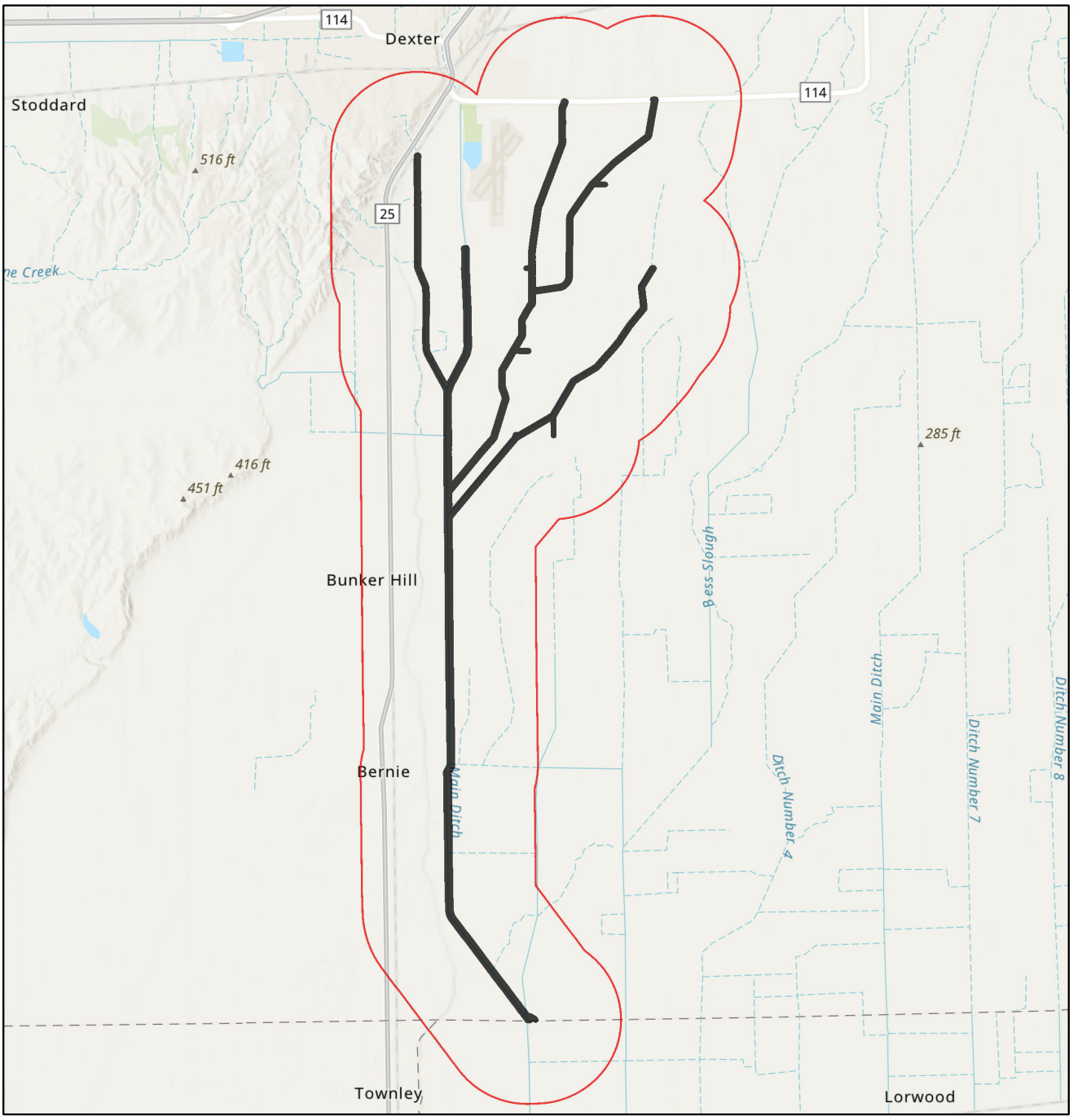
Disclaimer: This NATURAL HERITAGE REVIEW REPORT identifies if a species or natural community tracked by the Natural Heritage Program is known to occur within or near the project area submitted, and shares recommendations to avoid or minimize project impacts to sensitive species or natural habitats. Incorporating information from the Natural Heritage Program into project plans is an important step in reducing impacts to Missouri's sensitive natural resources. If an occurrence record is present, or the proposed project might affect federally listed species, the user must contact the Department of Conservation or U.S. Fish and Wildlife Service for more information.

This Natural Heritage Review Report is not a site clearance letter for the project. Rather, it identifies public lands and records of sensitive resources located close to and/or potentially affected by the proposed project. If project plans or location change, this report may no longer be valid. Because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, reports include information about records near but not necessarily on the project site. Lack of an occurrence record does not mean that a sensitive species or natural community is not present on or near the project area. On-site verification is the responsibility of the project. However, the Natural Heritage Program is only one reference that should be used to evaluate potential adverse project impacts and additional information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Reviewing current landscape and habitat information, and species' biological characteristics would additionally ensure that Missouri Species of Conservation Concern are appropriately identified and addressed in planning efforts.

U.S. Fish and Wildlife Service – Endangered Species Act (ESA) Coordination: Lack of a Natural Heritage Program occurrence record for federally listed species in your project area does not mean the species is not present, as the area may never have been surveyed. Presence of a Natural Heritage Program occurrence record does not mean the project will result in negative impacts. This report does not fulfill Endangered Species Act consultation with the U.S. Fish and Wildlife Service (USFWS) for listed species. Direct contact with the USFWS may be necessary to complete consultation and it is required for actions with a federal connection, such as federal funding or a federal permit; direct contact is also required if ESA concurrence is necessary. Visit IPaC: Home (fws.gov) to initiate USFWS Information for Planning and Conservation (IPaC) consultation. Contact the Columbia Missouri Ecological Field Services Office (573-234-2132, or by mail at 101 Park Deville Drive, Suite A, Columbia, MO 65203) for more information.

Transportation Projects: If the project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or visit Home Page | Missouri Department of Transportation (modot.org) for additional information on recommendations.

Main Ditch Watershed - Project Area



January 27, 2025

1:105,199

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Buffered Project Boundary

Project Boundary

Esri, NASA, NGA, USGS, Missouri Dept. of Conservation, Missouri DNR, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS

Species or Communities of Conservation Concern within the Area:

There are records of state-listed Endangered Species, or Missouri Species or Natural Communities of Conservation Concern within or near the defined Project Area. Please contact the Missouri Department of Conservation for further coordination.

Email (preferred): NaturalHeritageReview@mdc.mo.gov
MDC Natural Heritage Review
Science Branch
P.O. Box 180
Jefferson City, MO
65102-0180
Phone: 573-522-4115 ext. 3182

Other Special Search Results:

The project occurs on or near public land, Dexter, please contact MOARNG.

Project Type Recommendations:
Water Use, Transfer, and Channel Activities: Canal/irrigation construction/maintenance. Recommendations to help avoid and minimize impacts to fish, forest and wildlife resources are under development.

Project Location and/or Species Recommendations:

Endangered Species Act Coordination - If this project has the potential to alter habitat (e.g. tree removal, projects in karst habitat) or cause direct mortality of bats, please coordinate directly with U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 Ext. 100 for Ecological Services) for further coordination under the Endangered Species Act. Indiana bats *(Myotis sodalis*, federal- and state-listed endangered) and **Northern long-eared bats** (*Myotis septentrionalis,* federal-listed threatened) may occur near the project area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats or Northern long-eared bats, especially from September to April.

Karst: This county has known karst geologic features (e.g., caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are Species of Conservation Concern) are influenced by changes to water quality; please check your project site for any karst features and make every effort to protect groundwater in the project area. Additional information and specific recommendations are available at Management Recommendations for Construction and Development Projects Affecting Missouri Karst Habitat (mo.gov).

Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment. Please inspect and clean equipment thoroughly before moving between project sites. See Managing Invasive Species in Your Community | Missouri Department of Conservation (mo.gov) for more information.

- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that have operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
- When possible, wash and rinse equipment thoroughly with hard spray or HOT water (>140° F, typically available at do-it-yourself car wash sites), and dry in the hot sun before using again.

Streams and Wetlands – Clean Water Act Permits: Streams and wetlands in the project area should be protected from activities that degrade habitat conditions. For example, soil erosion, water pollution, placement of fill, dredging, in-stream activities, and riparian corridor removal, can modify or diminish aquatic habitats. Streams and wetlands may be protected under the Clean Water Act and require a permit for any activities that result in fill or other modifications to the site. Conditions provided within the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit (Kansas City District Regulatory Branch (army.mil)) and the Missouri Department of Natural Resources (DNR) issued Clean Water Act Section 401 Water Quality Certification (Section 401 Water Quality Certification | Missouri Department of Natural Resources (mo.gov)), if required, should help minimize impacts to the aquatic organisms and aquatic habitat within the area. Depending on your project type, additional permits may be required by the Missouri Department of Natural Resources, such as permits for stormwater, wastewater treatment facilities, and confined animal feeding operations. Visit Wastewater Permits | Missouri Department of Natural Resources (mo.gov) for more information on DNR permits. Visit both the USACE and DNR for more information on Clean Water Act permitting.

For further coordination with the Missouri Department of Conservation and the U.S. Fish and Wildlife Services, please see the contact information below:

Email (preferred): NaturalHeritageReview@mdc.mo.gov
MDC Natural Heritage Review
Science Branch
P.O. Box 180
Jefferson City, MO
65102-0180
Phone: 573-522-4115 ext. 3182

U.S. Fish and Wildlife Service
Ecological Service
101 Park Deville Drive
Suite A
Columbia, MO
65203-0007
Phone: 573-234-2132

Miscellaneous Information

FEDERAL Concerns are species/habitats protected under the Federal Endangered Species Act and that have been known near enough to the project site to warrant consideration. For these, project managers must contact the U.S. Fish and Wildlife Service Ecological Services (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132; Fax 573-234-2181) for consultation.

STATE Concerns are species/habitats known to exist near enough to the project site to warrant concern and that are protected under the Wildlife Code of Missouri (RSMo 3 CSR 1 0). "State Endangered Status" is determined by the Missouri Conservation Commission under constitutional authority, with requirements expressed in the Missouri Wildlife Code, rule 3CSR 1 0-4.111. Species tracked by the Natural Heritage Program have a "State Rank" which is a numeric rank of relative rarity. Species tracked by this program and all native Missouri wildlife are protected under rule 3CSR 10-4.110 General Provisions of the Wildlife Code.

See Missouri Species and Communities of Conservation Concern Checklist (mo.gov) for a complete list of species and communities of conservation concern. Detailed information about the animals and some plants mentioned may be accessed at Mofwis Search Results. Please contact the Missouri Department of Conservation to request printed copies of any materials linked in this document.

Missouri Department of Conservation
Science Branch
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Dillon Freiburger
NaturalHeritageReview@mdc.mo.gov
(573) 522 - 4115 ext. 3182

Natural Heritage Review Report

February 18, 2025

Sylvia Harris
Prairie Engineers
sharris@prairieengineers.com

NHR ERT ID:	16102	NHR ERT Level:	2
Project type:	Water Use, Transfer, and Channel Activities, Canal/irrigation construction/maintenance		
Location/Scope:	New Madrid and Stoddard		
County:	New Madrid and Stoddard		
Project Title:	Main Ditch Watershed - Project Area		
Query received:	1/27/2025		

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and records of sensitive resources located close to and/or potentially affected by the proposed project. If project plans or location change, this report may no longer be valid. Because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, reports include information about records near but not necessarily on the project site. Lack of an occurrence record does not mean that a sensitive species or natural community is not present on or near the project area. On-site verification is the responsibility of the project. These records serve as one reference and additional information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed to avoid or minimize impacts. More information is at Natural Areas | Missouri Department of Conservation (mo.gov) and Missouri Fish and Wildlife Information System (MOFWIS).

Level 3: Records of federal-listed (also state-listed) species or critical habitats near the project site:

Natural Heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no federal-listed species records within the project area, or in the public land survey section or sections adjacent.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. **Contact U.S. Fish & Wildlife Service** (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132) for Endangered Species Act coordination and concurrence information).

Level 2: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify Illinois Chorus Frogs within 1 mile of the project area:

- **Illinois Chorus Frog:** The area includes records and habitat for the scarce Illinois chorus frog, (*Pseudacris illinoensis*). These amphibians historically preferred flat, sand areas, but may inhabit developed land, soybean and cotton fields, too. Please see Best Management Practices for Construction and Development Projects Illinois Chorus Frog (mo.gov).

Natural Heritage records indicate the following state-ranked species near the project area:

Scientific Name	Common Name	State Rank	Proximity (miles)	Primary Habitat
Etheostoma parvipinne	Goldstripe Darter	S1	<3	River/stream, Spring/spring branch

Juncus bufonius var. bufonius	Toad Rush	S1	<4	Row/close grown crops, Wet ditches, Forest upland, Sand/gravel bars, Moist edge/mudflat
Cyperus retroflexus	Umbrella Sedge	S1	<4	Grassland native prairie, Row/close grown crops, Roadside/railroad
Cyperus croceus	Baldwin's Cyperus	S1	<4	Grassland native prairie, Forest upland
Cyperus hystricinus	Flatsedge	S2	<4	Grassland native prairie, Forest upland
Cyperus plukenetii	Plukenet's Cyperus	S2	<4	Grassland native prairie, Forest upland
Polygonum americanum	Jointweed	S2	<4	Grassland native prairie, Forest upland, Old field/shrub
Cyperus retrofractus	Teasel-like Cyperus	S1S2	<4	Grassland native prairie, Forest upland, Fen/seep, Roadside/railroad, Row/close grown crops
Aristida lanosa	Woollyleaf Three-awn	S1	<4	Grassland native prairie, Savanna, Old field/shrub
Desmodium strictum	Pineland Tick Trefoil	S2	<4	Grassland native prairie, Savanna, Woodland
Spermolepis diffusa	Rough-fruit Spermolepis	S1	<4	Grassland native prairie, Roadside/railroad
Sisyrinchium atlanticum	Eastern Blue-eyed Grass	S2	<4	Grassland native prairie, Fen/seep, Sinkhole pond, Urban low density vegetated, Roadside/railroad
Conyza canadensis var. pusilla	Fleabane	S1S2	<4	Grassland matrix, Savanna/Shrub/Woodland matrix, Forest matrix
Scaphiopus holbrookii	Eastern Spadefoot	S2	<5	Grassland matrix, Ephemeral pools, Wet ditches
Notropis chalybaeus	Ironcolor Shiner	S1	<2	River/stream
Notropis texanus	Weed Shiner	S3	<1	River/stream
Erimyzon sucetta	Lake Chubsucker	S2	<2	River/stream, Swamp, Pond/lake/deep oxbows & slough
Campylopodiella stenocarpa	A Moss	S1	<3	Spring/spring branch
Desmodium viridiflorum	Velvety Tick Trefoil	S1	<3	Savanna, Woodland, Forest upland
Carya pallida	Sand Hickory	S2S3	<4	Savanna/Shrub/Woodland matrix, Grassland native prairie
Physostegia intermedia	A False Dragonhead	S1	<5	Wet ditches, Fen/seep, Swamp, Roadside/railroad
Mecardonia acuminata	Water Hyssop	S1	<4	Shallow oxbow/slough, Moist edge/mudflat, Wet prairie/meadow
Euonymus americanus	Strawberry Bush	S2	<4	Swamp, Forest matrix
Erianthus giganteus	Plume Grass	S1	<5	Moist edge/mudflat, Roadside/railroad
Riccardia palmata	A Liverwort	S1	<3	Wetland matrix
Sphagnum fimbriatum var. fimbriatum	Sphagnum	S1	<3	Wetland matrix

Creaserinus fodiens	Digger Crayfish	S2S3	<3	Wetland matrix, River/stream
Sphagnum affine	Sphagnum	S1	<4	Undetermined

State Rank Definitions:

- S1: Critically imperiled in the state because of extreme rarity of or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically, 5 or fewer occurrences or very few remaining individuals (<1,000).
- S2: Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (6 to 20 occurrences or few remaining individuals).
- S3: Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
- S4: Uncommon but not rare, and usually widespread in the nation or state. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
- S#S#: Range Rank: A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status.
- ?: Denotes inexact or uncertain numeric rank.
- SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

There are no regulatory requirements associated with this status, however we encourage voluntary stewardship to minimize the risk of further decline that could lead to listing.

STATE ENDANGERED species are protected under the Wildlife Code of Missouri (3CSR10-4.111).
See the Missouri Species And Communities Of Conservation Concern Checklist (mo.gov) for a complete list.

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific Natural Heritage records):

- **Water Use, Transfer and Channel Activities:** Potential impacts to fish, forest and wildlife resources can be minimized or avoided by placing new lines in areas that have already been developed or disturbed, using existing utility line easements, or placing lines along existing roads. Maintenance activities that occur within the existing footprint of the water line are less likely to affect fish, forest, and wildlife resources. Following best management practices and Clean Water Act Permit conditions, if required, also help minimize potential for significant habitat effects. Stream and drainage crossings are concerns, and every effort should be made to avoid erosion, silt introduction, petroleum or chemical pollution, and disruption or realignment of stream banks and beds during maintenance activities. Please see Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams (mo.gov).
    - Revegetation is an important part of managing utility corridors and can have significant resource impacts depending on the techniques used. Revegetation of disturbed areas is recommended to minimize erosion; use native plant species compatible with the local landscape and wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive, exotic perennials such as crown vetch and *sericea lespedeza*. Maintenance of ground cover in utility corridors can have significant implications for sensitive resources. Native plant species typically require low maintenance over the long term, and provide more benefits to native wildlife. Utility corridors can provide wildlife travel corridors, food sources, and types of low-growing plant diversity sometimes

rare in adjoining land. Mowing and maintenance schedules should consider nesting seasons, and diversity in plant composition.

- **Streambank stabilization:** Channel modification, flow interruption or bank modification should occur only in compliance with conditions established in permits required under the federal Clean Water Act. Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. Best management recommendations relating to streams and rivers may be found at Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams (mo.gov).
  - Grade and seed disturbed areas as soon as possible to minimize erosion. Native grasses and wildflowers are recommended for plantings compatible with the local native landscape and wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.
  - All temporary in-channel fills that could impound water should be culverted. Culverts should (a) maintain at least six inches of water and (b) not create water velocities in excess of two feet per second during average annual discharges. A drop between the downstream end of the culverts and the downstream water surface should not occur at any time. Conditions provided within the USACE Clean Water Act Section 404 permit, if required (Kansas City District > Missions > Regulatory Branch > Nation Wide Permits (army.mil)), should help minimize impacts to the aquatic organisms within the area.

- **Indiana Bats** occur in Stoddard County and could occur in the project area. Indiana Bats *(Myotis sodalis*, federal and state-listed endangered) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats, especially from September to April. **If any trees need to be removed by your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 Ext. 100) for further coordination under the Endangered Species Act.**

- **Conservation Opportunity Areas:** The project is within Dunklin Sand Prairies Conservation Opportunity Area. COAs are key landscapes that represent the greatest opportunities for sustainable conservation of the Missouri's diverse flora and fauna and the natural communities they depend upon, including: grasslands (including prairie and savanna), glades, forests and woodlands, wetlands, caves and karst, and rivers and streams. COAs have been identified based on several factors, including the diversity and rarity of species and natural communities present, and the comparative likelihood/importance of projects to maintain them in the area over time. COAs have no regulatory role, but do reflect interest as a planning tool from multiple government agencies, non-governmental organizations and citizen groups to facilitate conservation in the area. Maintenance of high quality natural terrestrial and aquatic communities will help provide important habitat for the COA's biodiversity. Funding might be available to manage for important habitats within the COA. Please contact Missouri Department of Conservation for more information.

- **Karst:** Stoddard County has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so maintaining a buffer zone of at least 100 feet on all sides of any karst

features within the project area will mitigate impacts to these species. Please see Management Recommendations for Construction and Development Projects Affecting Missouri Karst Habitat (mo.gov)

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, larvae, and aquatic plant material may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants (or plant material) or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≥140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect sites visited by specialists in the last 30 years. Many privately owned tracts have not been surveyed and could host remnants of species once but no longer common.

MAIN DITCH PROJECT AREA

BIOLOGICAL ANALYSIS

Prepared using IPaC

Generated by Sylvia Harris (sharris@prairieengineers.com)

January 20, 2026

The purpose of this document is to assess the effects of the proposed project and determine whether the project may affect any federally threatened, endangered, proposed, or candidate species. If appropriate for the project, this document may be used as a biological assessment (BA), as it is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)).

In this document, any data provided by U.S. Fish and Wildlife Service is based on data as of October 28, 2025.

Prepared using IPaC version 6.128.20-rc0

MAIN DITCH PROJECT AREA BIOLOGICAL ASSESSMENT

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1 DESCRIPTION OF THE ACTION

1.1 PROJECT NAME

Main Ditch Project Area

1.2 EXECUTIVE SUMMARY

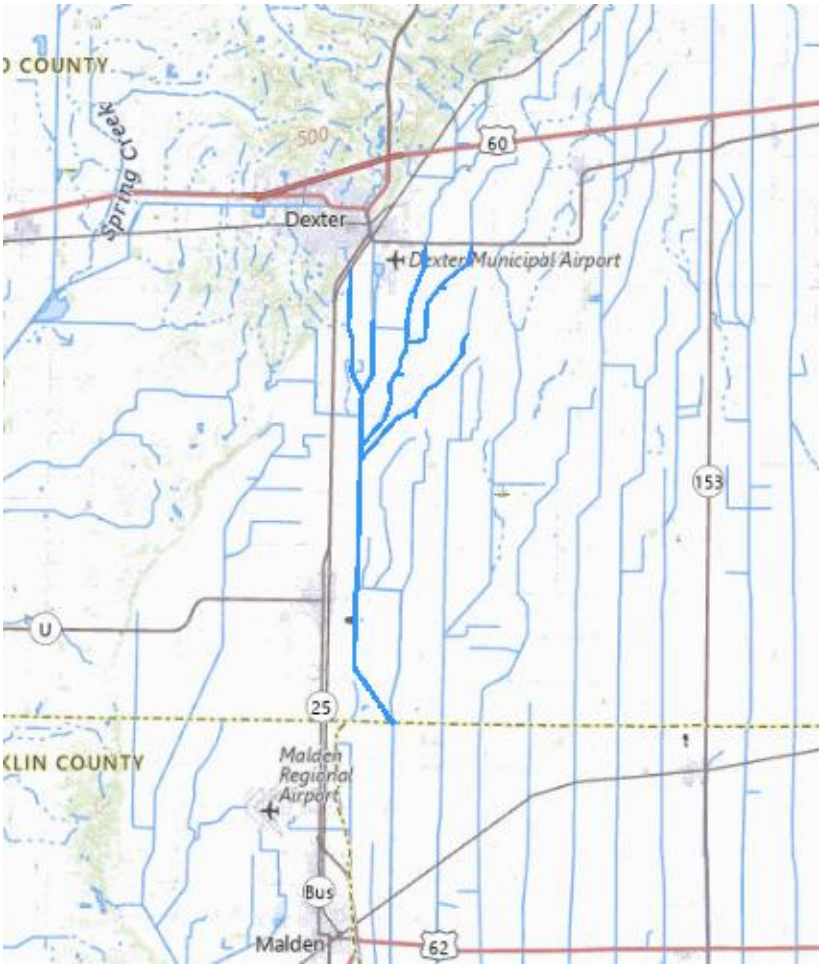
NRCS is proposing to implement measures along the drainage ditches in the Main Ditch Watershed to provide watershed protection for agricultural lands and infrastructure in the watershed and areas downstream of the watershed. The measures will address accumulated sediment in drainage ditches and eroding banks. The sediment has been accumulating in the ditches for around a century and has reduced the drainage system's capacity, diminishing its ability to reduce flooding. The action area includes drainage ditches constructed for agriculture in the early 1900s. The area surrounding the ditches is in cropland. In a few areas along the ditches, there are scattered trees. Ditch buffers are minimal and typically planted to non-native grasses. The preferred project alternative is to spread the removed sediment and seed it to native plants as well as stabilize eroding banks with riprap. No direct impacts on Indiana bats, tricolored bats, or monarchs are anticipated, because any necessary tree removal or herbaceous vegetation removal would occur during winter when bats are hibernating and monarchs have migrated. While the few existing trees do have characteristics that make them potentially suitable habitat for bats, and there are scattered nectar plants with some milkweed for monarchs along the existing ditch banks, the drainage ditch setting is likely not currently providing high quality habitat for any of the three species. Any unexpected indirect impacts that could occur due to tree or herbaceous vegetation removal would not be expected to have a meaningful adverse effect on species conservation efforts. The action area has minimal, if any, role in meeting conservation needs for any of the three species given the highly agricultural landscape, the low numbers of trees, and the predominance of non-native vegetation. One potential benefit of the proposed action would be an increase in nectar plants and milkweed by incorporating seeds of those plants into seeding mixes when seeding the ditch banks after spreading the removed sediment as well as grading and seeding the banks that will be riprapped.

1.3 EFFECT DETERMINATION SUMMARY

SPECIES (COMMON NAME)	SCIENTIFIC NAME	LISTING STATUS	PRESENT IN ACTION AREA	EFFECT DETERMINATION
Alligator Snapping Turtle	Macrochelys temminckii	Proposed Threatened	Excluded from analysis	Excluded from analysis
Indiana Bat	Myotis sodalis	Endangered	Yes	NLAA
Monarch Butterfly	Danaus plexippus	Proposed Threatened	Yes	NLAA
Tricolored Bat	Perimyotis subflavus	Proposed Endangered	Yes	NLAA

1.4 PROJECT DESCRIPTION

1.4.1 LOCATION



LOCATION
New Madrid and Stoddard counties, Missouri

1.4.2 DESCRIPTION OF PROJECT HABITAT

The action area includes drainage ditches constructed for agriculture in the early 1900's. The area surrounding the ditches is in cropland. Ditch buffers are minimal and typically planted to non-native grasses. In a few areas along the ditches, there are scattered trees.

1.4.3 PROJECT PROPONENT INFORMATION

Provide information regarding who is proposing to conduct the project, and their contact information. Please provide details on whether there is a Federal nexus.

REQUESTING AGENCY
Prairie Engineering

FULL NAME
Sylvia Harris

STREET ADDRESS
404 North Main Street

CITY
Columbia

STATE
IL

ZIP
62236

PHONE NUMBER
8037414193

E-MAIL ADDRESS
sharris@prairieengineers.com

LEAD AGENCY
Department of Agriculture

Natural Resources Conservation Service

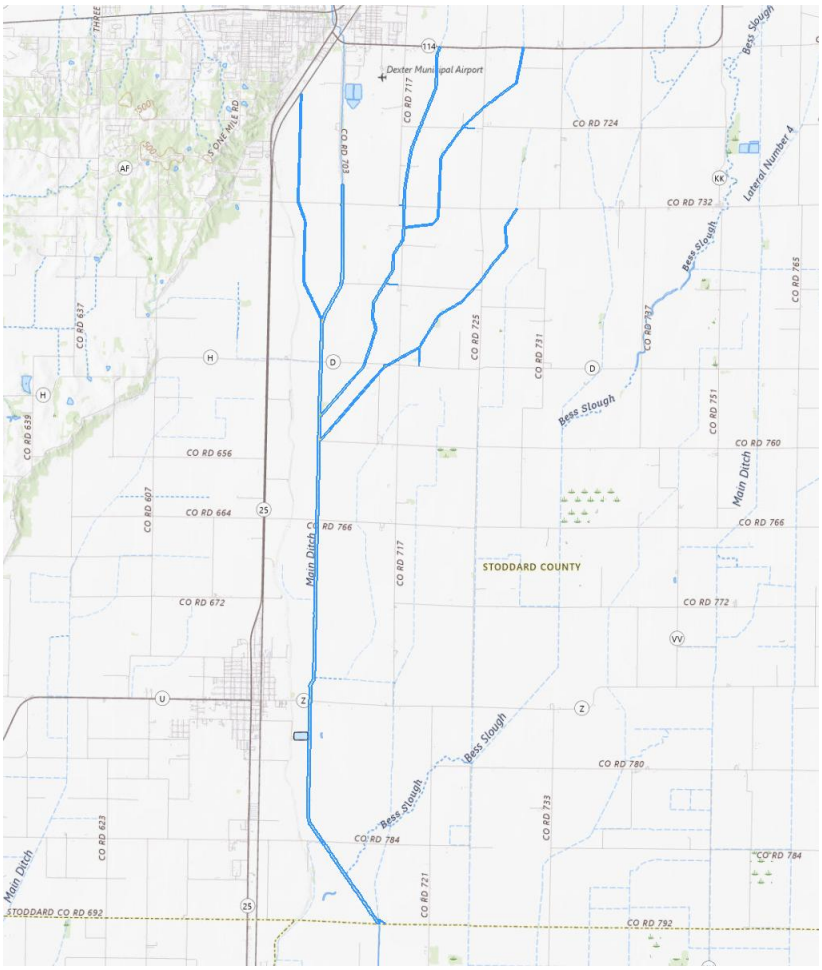
1.4.4 PROJECT PURPOSE

Drainage ditches constructed for agriculture have silted in and banks are failing, causing flooding of surrounding land and transportation routes during rain events.

1.4.5 PROJECT TYPE AND DECONSTRUCTION

This project is a drainage structure maintenance project.

1.4.5.1 PROJECT MAP



LEGEND

Project footprint

Layer 1: Drainage structure maintenance

1.4.5.2 DRAINAGE STRUCTURE MAINTENANCE

ACTIVITY START DATE
November 16, 2028

ACTIVITY END DATE
January 16, 2029

STRESSORS
- Decrease in bats

DESCRIPTION
Maintenance will be limited in duration.

1.4.6 ANTICIPATED ENVIRONMENTAL STRESSORS

Describe the anticipated effects of your proposed project on the aspects of the land, air and water that will occur due to the activities above. These should be based on the activity deconstructions done in the previous section and will be used to inform the action area.

1.4.6.1 ANIMAL FEATURES

Individuals from the Animalia kingdom, such as raptors, mollusks, and fish. This feature also includes byproducts and remains of animals (e.g., carrion, feathers, scat, etc.), and animal-related structures (e.g., dens, nests, hibernacula, etc.).

1.4.6.1.1 DECREASE IN BATS

ANTICIPATED MAGNITUDE
This stressor is not expected to occur; the following explanation has been provided:

This stressor was completely avoided by implementing a conservation measure.

CONSERVATION MEASURES
- Limit time of year of action

STRUCTURES AND ACTIVITIES
- Drainage structure maintenance

1.4.6.2 PLANT FEATURES

Individuals from the Plantae kingdom, such as trees, shrubs, herbs, grasses, ferns, and mosses. This feature also includes products of plants (e.g., nectar, flowers, seeds, etc.).

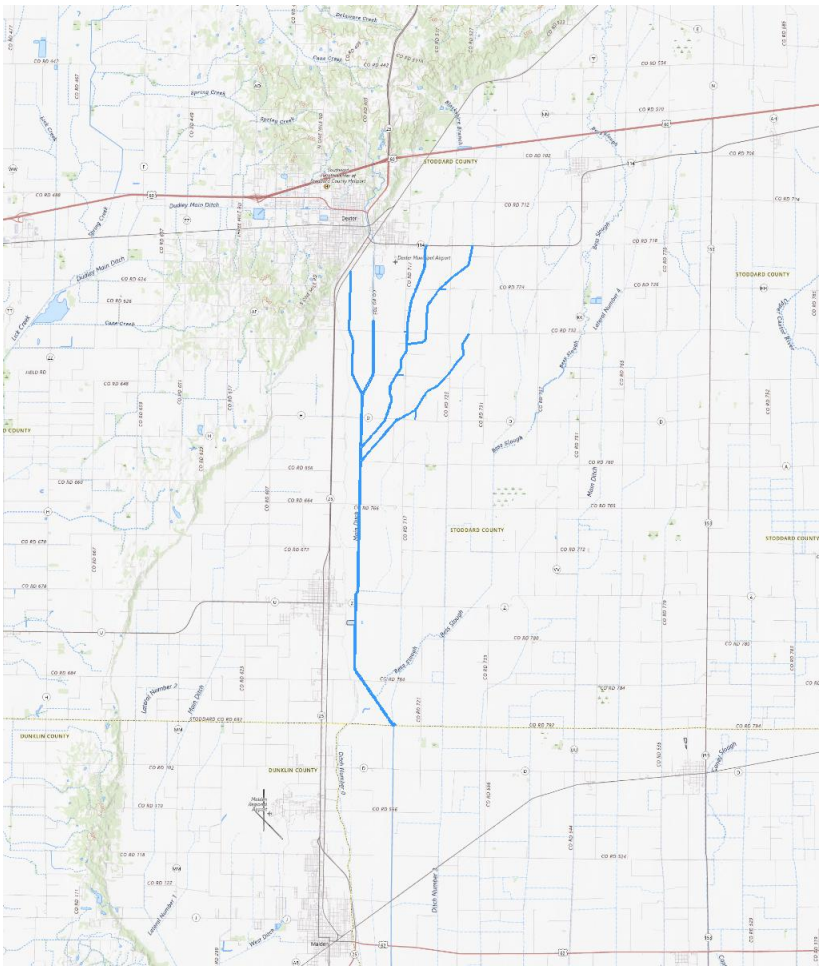
1.4.6.3 AQUATIC FEATURES
Bodies of water on the landscape, such as streams, rivers, ponds, wetlands, etc., and their physical characteristics (e.g., depth, current, etc.). This feature includes the groundwater and its characteristics. Water quality attributes (e.g., turbidity, pH, temperature, DO, nutrients, etc.) should be placed in the Environmental Quality Features.

1.4.6.4 ENVIRONMENTAL QUALITY FEATURES
Abiotic attributes of the landscape (e.g., temperature, moisture, slope, aspect, etc.).

1.4.6.5 ENVIRONMENTAL PROCESSES
Abiotic processes that occur in the natural environment (e.g., erosion, precipitation, flood frequency, photoperiod, etc.).

1.4.6.6 MISCELLANEOUS
Miscellaneous should only be used if the created feature does not fit into one of the other categories or if the creator is not sure in which category it should be placed.

1.5 ACTION AREA



LEGEND

Project footprint

Stressor location

1.6 CONSERVATION MEASURES

1.6.1 LIMIT TIME OF YEAR OF ACTION

DESCRIPTION

Any necessary tree removal (for bats) or herbaceous vegetation removal (for monarchs) will be limited to the winter months.

STRESSORS

- Decrease in bats

DIRECT INTERACTIONS

- removal

1.7 PRIOR CONSULTATION HISTORY

N/A

1.8 OTHER AGENCY PARTNERS AND INTERESTED PARTIES

The local project sponsor is Circuit Court Drainage District 37.

1.9 OTHER REPORTS AND HELPFUL INFORMATION

N/A

2 SPECIES EFFECTS ANALYSIS

This section describes, species by species, the effects of the proposed action on listed, proposed, and candidate species, and the habitat on which they depend. In this document, effects are broken down as direct interactions (something happening directly to the species) or indirect interactions (something happening to the environment on which a species depends that could then result in effects to the species).

These interactions encompass effects that occur both during project construction and those which could be ongoing after the project is finished. All effects, however, should be considered, including effects from direct and indirect interactions and cumulative effects.

2.1 ALLIGATOR SNAPPING TURTLE

This species has been excluded from analysis in this environmental review document.

JUSTIFICATION FOR EXCLUSION

Habitat is minimal in the Project Area as the drainage ditches are silted in and shallow much of the year.

2.2 INDIANA BAT

2.2.1 STATUS OF THE SPECIES

This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.2.1.1 LEGAL STATUS

The Indiana Bat is federally listed as 'Endangered' and additional information regarding its legal status can be found on the ECOS species profile.

2.2.1.2 RECOVERY PLANS

Available recovery plans for the Indiana Bat can be found on the ECOS species profile.

2.2.1.3 LIFE HISTORY INFORMATION

The Indiana bat is a medium-sized Myotis, closely resembling the little brown bat (Myotis lucifugus) but differing in coloration. Its fur is a dull grayish chestnut rather than bronze, with the basal portion of the hairs on the back a dull-lead color. This bat's underparts are pinkish to cinnamon, and its hind feet are smaller and more delicate than in M. lucifugus. The calcar (heel of the foot) is strongly keeled.

IDENTIFIED RESOURCE NEEDS

Hibernacula

Humidity: high and temperature: <10°c (50.0°f) but infrequently drops below freezing, and the temperature is relatively stable.

Insects

Type: flying

Open water

Type: streams, rivers, ponds, wetlands, lakes, road ruts

Travel corridors

Location: between two whole patches of forests. and type: hedgerow, riparian corridor, forest edge

Trees

Size: > or = 5 inches dbh, spatial arrangement: within 1000 feet of forest, structure: cracks, crevices, loose bark, type: dead, nearly dead, and living with dead parts

2.2.1.4 CONSERVATION NEEDS

From the 2007 Recovery Plan:

Actions Needed: 1. Conserve and manage hibernacula and their winter populations. 2. Conserve and manage summer habitat to maximize survival and fecundity. 3. Plan and conduct research essential for recovery. 4. Develop and implement public information and outreach program.

2.2.2 ENVIRONMENTAL BASELINE

*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.*

2.2.2.1 SPECIES PRESENCE AND USE

There are very few trees in the Project Area, but use by these bats cannot be ruled out.

2.2.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA

The action area has minimal, if any, role in meeting conservation needs given the highly agricultural landscape and the low numbers of trees.

2.2.2.3 HABITAT CONDITION (GENERAL)

Scattered trees exhibiting characteristics of potentially suitable habitat for the Indiana bat were observed in and adjacent to the project area during a field assessment in November 2024.

2.2.2.4 INFLUENCES

Habitat loss and degradation, disturbance, disease, environmental contaminants (from 2007 Recovery Plan)

2.2.2.5 ADDITIONAL BASELINE INFORMATION

N/A

2.2.3 EFFECTS OF THE ACTION

This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.2.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.2.3.2 DIRECT INTERACTIONS

No direct interactions leading to effects on species are expected to occur from the proposed project.

Justification:

Any necessary tree removal will be limited to the winter months.

2.2.4 CUMULATIVE EFFECTS

There are no reasonably foreseeable activities that would affect the site after the Proposed Action is implemented.

2.2.5 DISCUSSION AND CONCLUSION

DETERMINATION: NLAA

COMPENSATION MEASURES
No direct impacts on Indiana bats are anticipated, because tree removal would occur outside of summer. While the few existing trees do have characteristics that make them potentially suitable habitat, the drainage ditch setting is likely not currently providing high quality habitat. Thus, any indirect impacts that may occur due to tree removal would not be expected to have a meaningful adverse effect on species conservation efforts.

2.3 MONARCH BUTTERFLY

2.3.1 STATUS OF THE SPECIES
This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.3.1.1 LEGAL STATUS
The Monarch Butterfly is federally listed as 'Proposed Threatened' and additional information regarding its legal status can be found on the ECOS species profile.

2.3.1.2 RECOVERY PLANS
Available recovery plans for the Monarch Butterfly can be found on the ECOS species profile.

2.3.1.3 LIFE HISTORY INFORMATION

For information on monarch conservation, visit https://www.fws.gov/initiative/pollinators/monarchs, http://www.mafwa.org/?page_id=2347, and, for the West, https://wafwa.org/committees-working-groups/monarch-working-group/.

Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. The black border has a double row of white spots, present on the upper side of the wings. Adult monarchs are sexually dimorphic, with males having narrower wing venation and scent patches. The bright coloring of a monarch serves as a warning to predators that eating them can be toxic.

During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.), and larvae emerge after two to five days. Larvae develop through five larval instars (intervals between molts) over a period of 9 to 18 days, feeding on milkweed and sequestering toxic chemicals (cardenolides) as a defense against predators. The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly. There are multiple generations of monarchs produced during the breeding season, with most adult butterflies living approximately two to five weeks; overwintering adults enter into reproductive diapause (suspended reproduction) and live six to nine months.

In many regions where monarchs are present, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America, undergo long-distance migration, and live for an extended period of time. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites. This migration can take monarchs distances of over 3,000 km and last for over two months. In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing. The same individuals that undertook the initial southward migration begin flying back through the breeding grounds and their offspring start the cycle of generational migration over again.

IDENTIFIED RESOURCE NEEDS

Habitat connectivity

The size and spatial arrangement of habitat patches for nectar and milkweed resources is important during the breeding season and along the migration route.

Larval host plant

Healthy and abundant milkweed needed for oviposition and larval consumption.

Microclimate

Monarchs at all life stages need specific temperature ranges, precipitation levels, and other climatic conditions that are supportive of life processes (breeding, migrating, and overwintering).

Nectar

Sufficient quality and quantity of nectar from flowers is needed for adult feeding throughout the breeding and migration seasons.

2.3.1.4 CONSERVATION NEEDS

The loss of milkweed and nectar resources (i.e., breeding and migratory habitat) has been targeted as the threat that can be most easily addressed through conservation efforts. Protection, restoration, enhancement and creation of habitat is a central aspect of recent monarch conservation strategies. The 2023 Mid-America Monarch Conservation Strategy, developed by the Midwest Association of Fish and Wildlife Agencies, established a goal of adding 1.3 billion stems of milkweed on the landscape by 2038. Missouri is among the states that have agreed to participate in the effort to reach the 1.3 billion stem goal, which will require contributions from multiple sectors of society, including private landowners, agricultural producers, non-governmental organizations, rights-of-way organizations, and federal, state and local governments. (Monarch Butterfly Species Status Assessment Report, version 2.3, December 2024)

2.3.2 ENVIRONMENTAL BASELINE

*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.*

2.3.2.1 SPECIES PRESENCE AND USE

Along a few of the ditches in the Project Area, there are small stands of milkweed. Other than these few sites, most ditch buffers are planted to non-native grasses.

2.3.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA

Nectar plant and milkweed seeds will be incorporated into native species seeding plans for the ditch buffers.

2.3.2.3 HABITAT CONDITION (GENERAL)

Very few nectar or larval plant sources are in the Project Area; most ditch buffers are planted to non-native grasses.

2.3.2.4 INFLUENCES

Besides loss of milkweed and nectar resources during breeding and migration, influences on monarchs include availability and quality of overwintering habitat; climate (storms, drought, temperatures); disease and natural enemies; insecticides; and road mortality and pollutants. (Monarch Butterfly Species Status Assessment Report, version 2.3, December 2024)

2.3.2.5 ADDITIONAL BASELINE INFORMATION

The landscape in the action area is overwhelmingly dominated by agricultural production. Buffers between agricultural fields and the ditch are minimal in size and/or consist mostly of non-native species.

2.3.3 EFFECTS OF THE ACTION

This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.3.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.3.3.2 DIRECT INTERACTIONS

DIRECT INTERACTION	CONSERVATION MEASURES	INDIVIDUALS IMPACTED	IMPACT EXPLANATION
Removal	Limit time of year of action	No	Any milkweed plants that may be present during spring, summer, and fall could be host to monarch eggs, larvae, and/or pupae. If such milkweed plants were destroyed by maintenance equipment, monarchs in those life stages would be destroyed. To avoid this possibility, herbaceous vegetation will be cleared in the winter when there would not be eggs, larvae, or pupae on the milkweed plants.

2.3.4 CUMULATIVE EFFECTS

There are no reasonably foreseeable activities that would affect the site after the Proposed Action is implemented.

2.3.5 DISCUSSION AND CONCLUSION

DETERMINATION: NLAA

COMPENSATION MEASURES
Because milkweed plants could be destroyed by maintenance equipment, herbaceous vegetation will be cleared in the winter when there would not be eggs, larvae, or pupae on the milkweed plants.

2.4 TRICOLORED BAT

2.4.1 STATUS OF THE SPECIES
This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.4.1.1 LEGAL STATUS
The Tricolored Bat is federally listed as 'Proposed Endangered' and additional information regarding its legal status can be found on the ECOS species profile.

2.4.1.2 RECOVERY PLANS
Available recovery plans for the Tricolored Bat can be found on the ECOS species profile.

2.4.1.3 LIFE HISTORY INFORMATION

The tricolored bat is a small insectivorous bat that is distinguished by its unique tricolored fur and often appears yellowish to nearly orange. The once common species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico and Central America. During the winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures. Tricolored bats face extinction due primarily to the rangewide impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent. White-nose syndrome has caused estimated declines of more than 90 percent in affected tricolored bat colonies across the majority of the species range. To address the growing threat of white-nose syndrome to the tricolored bat and other bats across North America, the U.S. Fish and Wildlife Service is leading the White-nose Syndrome National Response Team, a coordinated effort of more than 150 non-governmental organizations, institutions, Tribes, and state and federal agencies. Together we are conducting critical white-nose syndrome research and developing management strategies to minimize impacts of the disease and recover affected bat populations. For more information on white-nose syndrome, please see: https://www.whitenosesyndrome.org/ For more information on tricolored bats, please see: https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus

IDENTIFIED RESOURCE NEEDS

Hibernacula

Tricolored bats hibernate in caves, mines, road-associated culverts, tree cavities, and abandoned water wells. (2021 species status assessment report for the tricolored bat, version 1.1)

Insects

Tricolored bats are opportunistic feeders and consume small insects including caddisflies (trichoptera), flying moths (lepidoptera), small beetles (coleoptera), small wasps and flying ants (hymenoptera), true bugs (homoptera), and flies (diptera). (2021 species status assessment report for the tricolored bat, version 1.1)

Open water

Wetlands and waterways (2021 species status assessment report for the tricolored bat, version 1.1)

Trees

Tricolored bats primarily roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees. in the southern and northern portions of their range, they will also roost in spanish moss and lichen, respectively. they have also been observed roosting during summer among pine needles, eastern red cedar, and within artificial roosts (e.g., barns, beneath porch roofs, bridges, concrete bunkers). trees need to be near suitable food and water resources. (2021 species status assessment report for the tricolored bat, version 1.1)

2.4.1.4 CONSERVATION NEEDS
Reducing the effects of white-nose syndrome, mortality related to wind energy generation, and habitat loss. (2021 Species Status Assessment Report for the tricolored bat, Version 1.1)

2.4.2 ENVIRONMENTAL BASELINE
*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.*

2.4.2.1 SPECIES PRESENCE AND USE
There are very few trees in the Project Area, but use by these bats cannot be ruled out.

2.4.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA
The action area has minimal, if any, role in meeting conservation needs given the highly agricultural landscape, the low numbers of trees, the absence of hibernacula where white-nose syndrome spreads, and the absence of wind energy generation facilities.

2.4.2.3 HABITAT CONDITION (GENERAL)
Scattered trees exhibiting characteristics of potentially suitable habitat for the tricolored bat were observed in and adjacent to the project area during a field assessment in November 2024.

2.4.2.4 INFLUENCES
White-nose syndrome, mortality related to wind energy generation, habitat loss (2021 Species Status Assessment Report for the tricolored bat, Version 1.1)

2.4.2.5 ADDITIONAL BASELINE INFORMATION
N/A

2.4.3 EFFECTS OF THE ACTION
This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.4.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.4.3.2 DIRECT INTERACTIONS

No direct interactions leading to effects on species are expected to occur from the proposed project.

Justification:

Any necessary tree removal will be limited to the winter months.

2.4.4 CUMULATIVE EFFECTS

There are no reasonably foreseeable activities that would affect the site after the Proposed Action is implemented.

2.4.5 DISCUSSION AND CONCLUSION

DETERMINATION: NLAA

COMPENSATION MEASURES

Any necessary tree removal will be limited to the winter months.

3 CRITICAL HABITAT EFFECTS ANALYSIS

No critical habitats intersect with the project action area.

4 SUMMARY DISCUSSION AND CONCLUSION

4.1 SUMMARY DISCUSSION

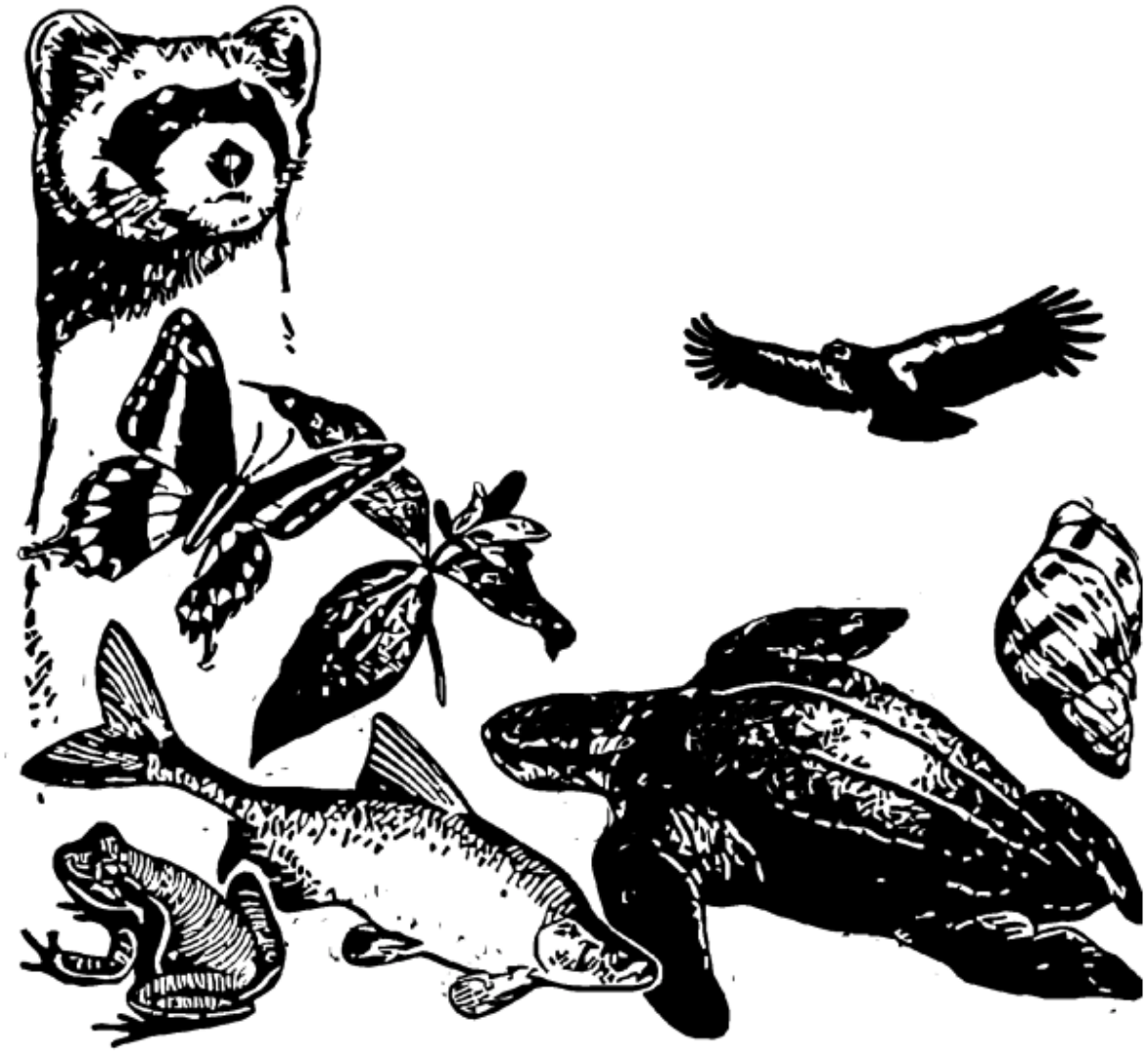
No direct impacts on bats or monarchs are anticipated, because tree removal or herbaceous vegetation removal would occur during winter when bats are hibernating and monarchs have migrated. While the few existing trees do have characteristics that make them potentially suitable habitat for bats, and there may be scattered nectar plants and milkweed for monarchs, the drainage ditch setting is likely not currently providing high quality habitat for any of the four species. Any unexpected indirect impacts that could occur due to tree or herbaceous vegetation removal would not be expected to have a meaningful adverse effect on species conservation efforts. The action area has minimal, if any, role in meeting conservation needs for any of the three species given the highly agricultural landscape, the low numbers of trees, and the predominance of non-native vegetation. One potential benefit of the proposed action would be an increase in nectar plants and milkweed by incorporating seeds of those plants into seeding mixes when seeding the ditch banks after spreading the previously removed sediment.

4.2 CONCLUSION

The proposed action may affect, but is not likely to adversely affect, the Indiana bat, monarch butterfly, and tricolored bat. Any effects on the four species would be insignificant (because the potential for direct effects should be avoided by doing any necessary tree or herbaceous vegetation removal in winter) or discountable (because the potential for indirect effects, given the paucity of suitable habitat that exists to begin with, is minimal if not absent). There may be beneficial effects for monarchs by increasing availability of nectar plants and milkweed.

General Project Design Guidelines (4 Species)

Generated October 28, 2025 04:44 PM UTC, IPaC v6.128.17-rc2



IPaC - Information for Planning and Consultation (https://ipac.ecosphere.fws.gov/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

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Species Document Availability 1
Alligator Snapping Turtle and 3 more species - Missouri Ecological Services Field Office 2

Species Document Availability

Species with general design guidelines

Alligator Snapping Turtle *Macrochelys temminckii*

Gray Bat *Myotis grisescens*

Indiana Bat *Myotis sodalis*

Tricolored Bat *Perimyotis subflavus*

Species without general design guidelines available

Monarch Butterfly *Danaus plexippus*

General Project Design Guidelines - Indiana Bat and 4 more species

Published by Missouri Ecological Services Field Office - Publication Date: July 9, 2025 for the following species included in your project

- Indiana Bat *Myotis sodalis*
- Tricolored Bat *Perimyotis subflavus*
- Alligator Snapping Turtle *Macrochelys temminckii*
- Gray Bat *Myotis grisescens*
- Monarch Butterfly *Danaus plexippus*

Avoidance and Minimization Measures for Listed Species in Missouri

The U.S. Fish and Wildlife Service's Missouri Ecological Services Field Office is currently developing recommendations to help avoid or minimize adverse effects to listed species and designated critical habitat. Until measures are developed, we recommend coordinating directly with our office to discuss ways to avoid or minimize adverse effects. Federal Agencies may find their contact at the Missouri Ecological Services Field Office at https://www.fws.gov/service/missouri-esa-consultation-and-technical-assistance.

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

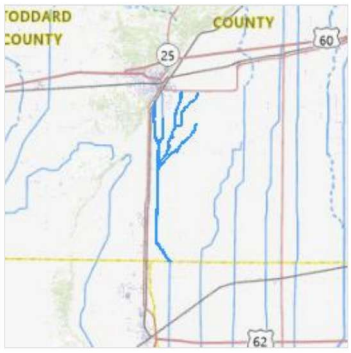
Project information

NAME

Main Ditch Project Area

LOCATION

New Madrid and Stoddard counties, Missouri



DESCRIPTION

Some(Maintenance of 100-year-old agricultural canals.)

Local office

Missouri Ecological Services Field Office

(573) 234-2132
(573) 234-2181

MAILING ADDRESS
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057

PHYSICAL ADDRESS
101 Park Deville Drive
Suite A}
Columbia, MO 65203-0057

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Indiana Bat Myotis sodalis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Reptiles

NAME	STATUS
Alligator Snapping Turtle Macrochelys temminckii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

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Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

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NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

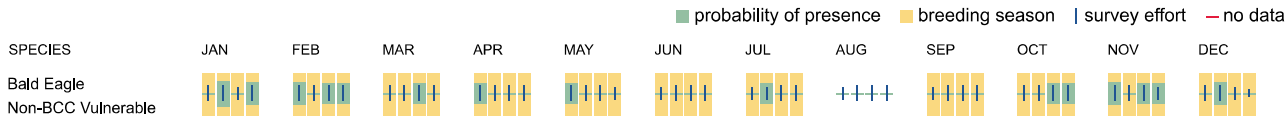
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there,

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and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Kentucky Warbler Geothlypis formosa This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Little Blue Heron Egretta caerulea This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 10 to Oct 15
Pectoral Sandpiper Calidris melanotos This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Prairie Warbler Setophaga discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere

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Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
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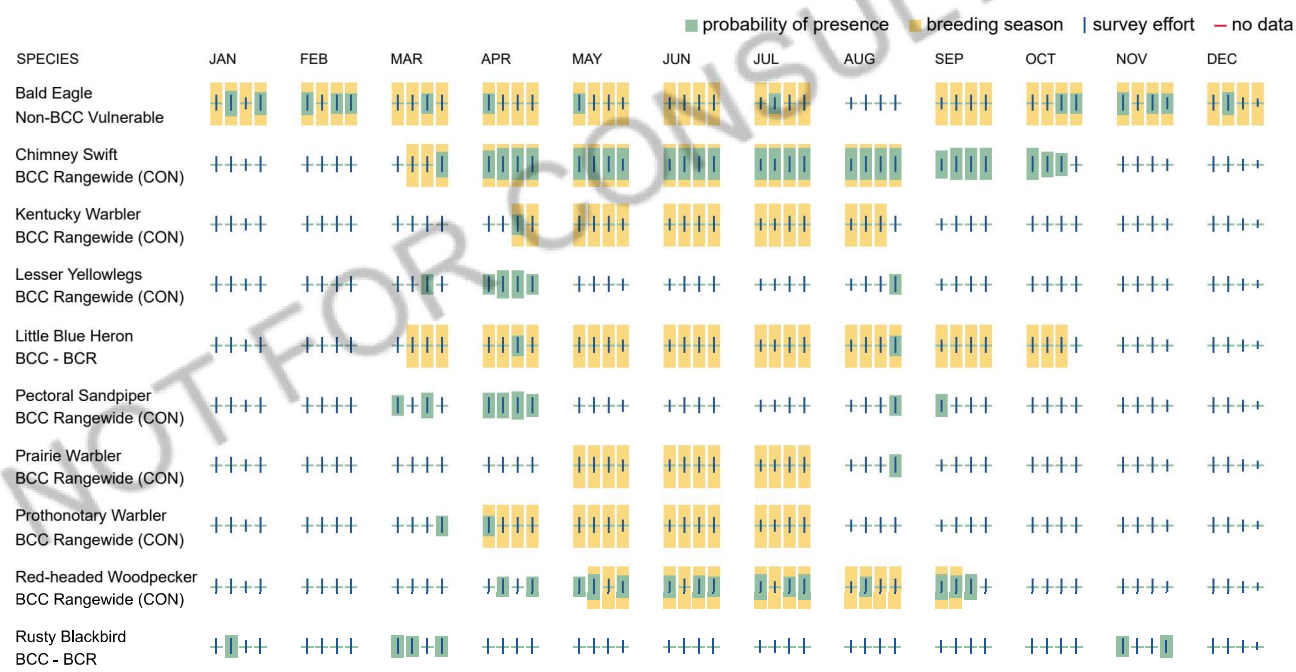
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

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To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER
FORESTED/SHRUB WETLAND
- PFO1Cx
- PSS1Cx
- PFO1A
- PFO1C
- PSS1Fx
- PSS1A

RIVERINE
- R2UBHx
- R4SBCx
- R4SBC
- R5UBFx

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A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: 01/20/2026 16:06:00 UTC
Project Code: 2025-0047330
Project Name: Main Ditch Project Area

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).
New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. **Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests

for a Conditional Letter of Map Revision (CLOMR) from FEMA. Please contact the appropriate POC at Missouri Ecological Services for any additional consultation needs.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features – particularly within stream corridors, riparian areas, or associated upland woodlots –gray bats could be affected.
Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the inactive season is considered to be October 15 to March 31 unless the project is located within a 1/2 mile of a hibernacula. During the active season in Missouri they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches diameter at breast height (dbh) for Indiana bat, and ≥3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.
Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the Species website.
3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:
    a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
    b. Any activity in or near the entrance to a cave or mine;
    c. Mining, deep excavation, or underground work within 0.5 miles of a cave or mine;
    d. Construction of one or more wind turbines; or
    e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.
If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA

to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.
We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

John Weber

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

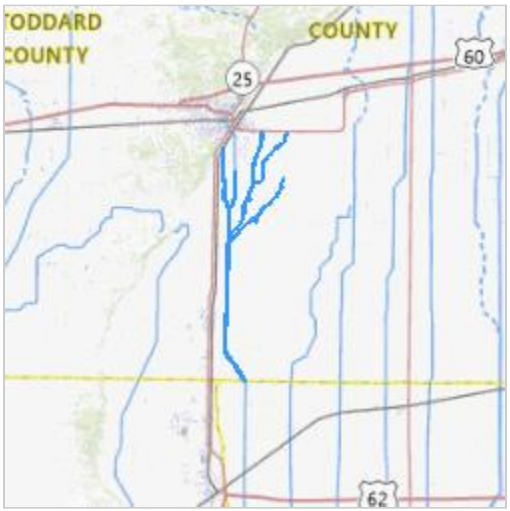
This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

PROJECT SUMMARY

Project Code: 2025-0047330
Project Name: Main Ditch Project Area
Project Type: Drainage Project
Project Description: Maintenance of 100-year-old agricultural canals.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.7086342,-89.95353643794412,14z



Counties: New Madrid and Stoddard counties, Missouri

ENDANGERED SPECIES ACT SPECIES

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ipac.ecosphere.fws.gov/project/GQQE5NGHNBBCTFP42WTFQN6O2A/documents/generated/9456.pdf	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515 General project design guidelines: https://ipac.ecosphere.fws.gov/project/GQQE5NGHNBBCTFP42WTFQN6O2A/documents/generated/9456.pdf	Proposed Endangered

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658 General project design guidelines: https://ipac.ecosphere.fws.gov/project/GQQE5NGHNBBCTFP42WTFQN6O2A/documents/generated/9456.pdf	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Prairie Engineering
Name: Sylvia Harris
Address: 404 North Main Street
City: Columbia
State: IL
Zip: 62236
Email sharris@prairieengineers.com
Phone: 8037414193

LEAD AGENCY CONTACT INFORMATION

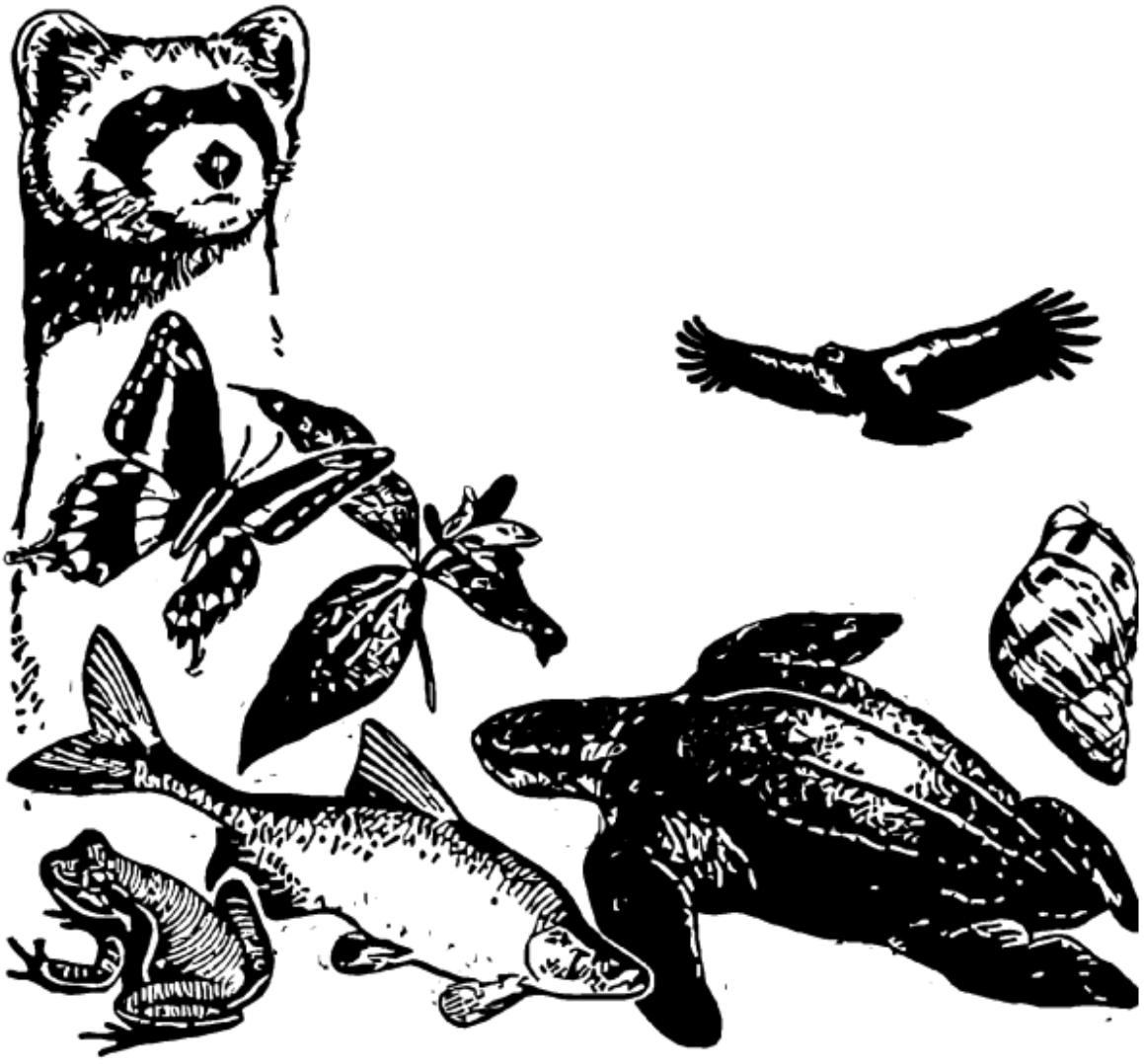
Lead Agency: Natural Resources Conservation Service
Name: Rex McAliley
Email: rex.mcaliley@usda.gov
Phone: 5738769425

U.S. Fish & Wildlife Service

Main Ditch Project Area

Species Survey Guidelines (1 Species)

Generated October 28, 2025 04:45 PM UTC, IPaC v6.128.17-rc2



IPaC - Information for Planning and Consultation (https://ipac.ecosphere.fws.gov/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

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Species Document Availability

Species with survey guidelines

Indiana Bat Myotis sodalis

Species without survey guidelines available

Alligator Snapping Turtle Macrochelys temminckii

Gray Bat Myotis grisescens

Monarch Butterfly Danaus plexippus

Tricolored Bat Perimyotis subflavus

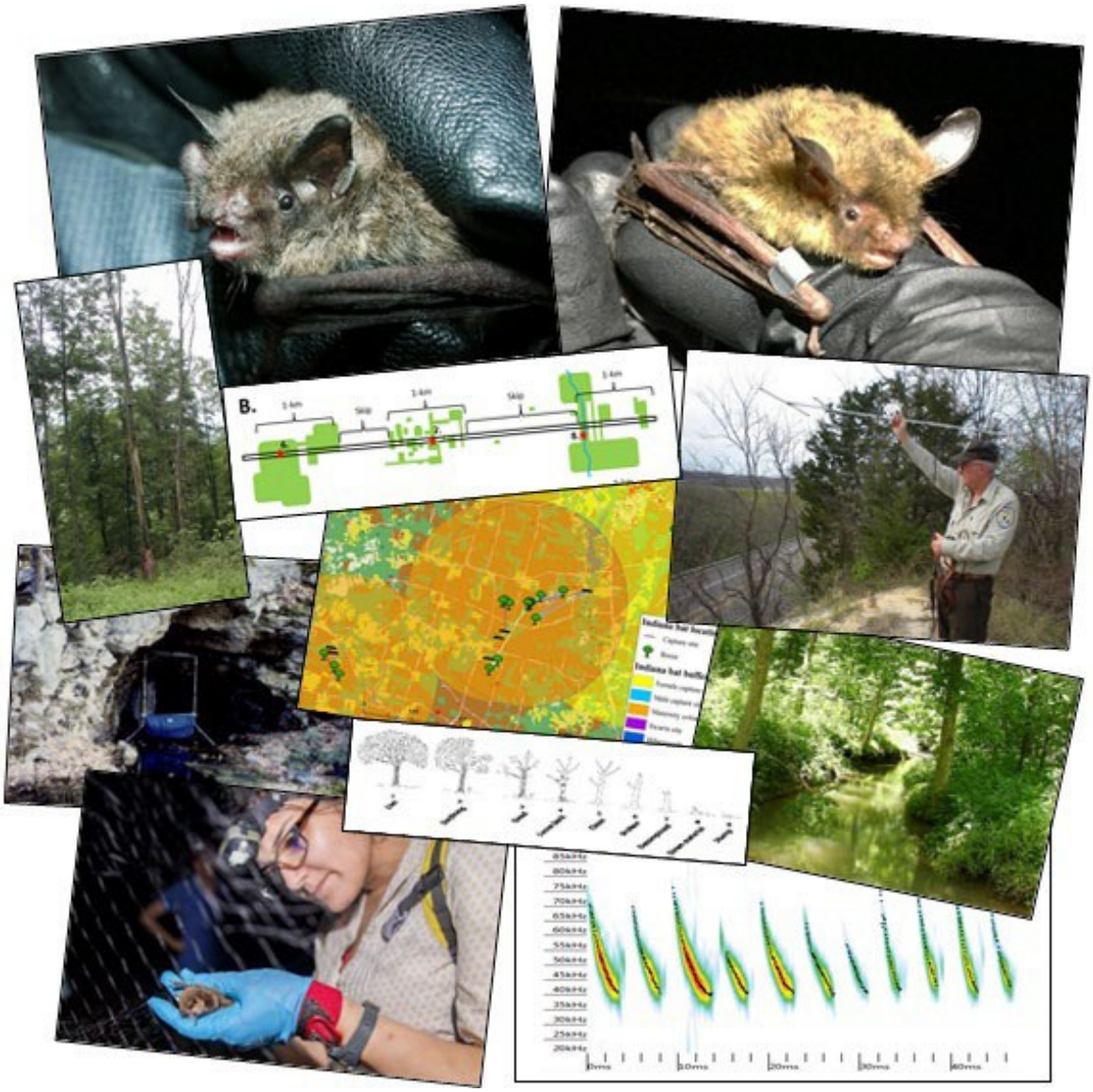
Species Survey Guidelines - Indiana Bat and 4 more species

Published by Missouri Ecological Services Field Office - Publication Date: March 1, 2024 for the following species included in your project

- Indiana Bat *Myotis sodalis*
- Tricolored Bat *Perimyotis subflavus*
- Alligator Snapping Turtle *Macrochelys temminckii*
- Gray Bat *Myotis grisescens*
- Monarch Butterfly *Danaus plexippus*

U.S. Fish and Wildlife Service

RANGE-WIDE INDIANA BAT & NORTHERN LONG-EARED BAT SURVEY GUIDELINES



March 2024

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Recommended Citation for this Document:

U.S. Fish and Wildlife Service. 2024. Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines. U.S. Fish and Wildlife Service, Region 3, Bloomington, MN. 95 pp.

Cover Photos/Graphics: Mike Coffey/USFWS, Kyle Edmonds/USFS, Mark Ford/USFS (USGS), Andrew King/USFWS, Keith Lott/USFWS, Alex Morrison/VA Tech, and Alex Silvis/VA Tech (WV DNR).

RANGE-WIDE INDIANA BAT & NORTHERN LONG-EARED BAT SURVEY GUIDELINES

(modifications from the previous guidelines are in **blue**)

INTRODUCTION

The Indiana bat (IBAT) (*Myotis sodalis*) was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967), and is currently listed as endangered under the Endangered Species Act (ESA) of 1973, as amended. The northern long-eared bat (NLEB) (*Myotis septentrionalis*) was listed as threatened under the ESA on April 2, 2015, and reclassified to endangered on March 31, 2023. This survey protocol provides the U.S. Fish and Wildlife Service's (USFWS) recommended guidance on survey methods and outlines additional reporting requirements for surveyors. These guidelines provide recommendations to project proponents completing habitat assessments and presence/probable absence surveys for IBAT and NLEB. Following these recommendations streamlines project coordination with USFWS[1]. The USFWS does not require surveys for federally listed species to meet ESA compliance within Section 7 or 10 contexts. Therefore, use of these guidelines remains optional, and project proponents may discuss other options with the local USFWS Field Office (FO).

The following guidance is designed to determine whether IBAT or NLEB are present[2] or probably absent (P/A)[3] at a given site during the summer/active season (see Appendices B, C, I, or J), within bridges and culverts (see Appendix K), or during the winter (see Appendix H) (also refer to Table 1). The phased-approach includes coordination with the USFWS, habitat assessments, acoustic, mist-net, and an assortment of survey guidance appendices, and supersedes all prior survey guidance for these two species. Future changes to this document may occur and will be posted on the USFWS IBAT and NLEB survey guidance website by March 31st of each year. Before conducting surveys, please check this website to ensure use of the most current version of this document. All USFWS survey guidance documents can be found at https://www.fws.gov/library/collections/range-wide-indiana-bat-and-northern-long- eared-bat-survey-guidelines.

These protocols may be different from those designed for general bat monitoring as part of the North American Bat Monitoring Program (NABat)[4]. NABat surveys may be thought of as similar to breeding bird surveys and are not project-specific surveys in most cases. Information from NABat surveys can be considered as part of "best available" information when assessing whether there is already some existing information on presence of IBAT or NLEB in the vicinity of a given project.

NOTE: These protocols may also be used for tricolored bat (*Perimyotis subflavus*; TCB) presence/probable absence surveys using the NLEB level of effort (LOE) for the 2024 field season. We collected preliminary data from these datasets to complete an initial evaluation of LOE for TCB to ensure that deferring to the NLEB LOE for 2024 was acceptable. The unique factors and differences from NLEB protocols include:

- The definition of suitable summer habitat for tricolored bats (Appendix A);

[1] Coordinate with the appropriate state natural resource agencies and any involved federal agency(ies) whenever "USFWS" coordination is listed. USFWS FO(s) may direct project sponsors to state agencies for existing occurrence information. Coordinate with your local USFWS FO(s) to understand the process for their area of jurisdiction.
[2] The guidance is not intended to be rigorous enough to provide sufficient data to fully determine population size or structure.
[3] Recognizing protocols are not 100% likely to detect IBAT and NLEB when present and identification errors may occur.
[4] Loeb et al. 2015 available at https://www.nabatmonitoring.org

- Acoustic or combination acoustic and mist-netting surveys are required for TCB when it is the only species (IPaC species list includes TCB but not IBAT or NLEB) being surveyed for P/A (Appendix C or I);

- Manual vetting is necessary for linear projects when using an approved version of Kaleidoscope Pro if the MLE is > 0.05 for all site-nights and 10 or more passes are auto-classified as potentially belonging to TCB at any site-night. If you choose not to manually vet calls meeting these criteria, then you should assume presence of TCB for the project (Appendix C or I);

- Radio-tracking of TCB should prioritize identification of the immediate roosting area (if the exact roosting locations cannot be determined) of the transmittered bat given the frequent difficulty in locating the bats' exact roosting location (Appendix D);

- Emergence surveys of potentially suitable (versus known) roost trees for TCB is not always a viable option given the variability in roosting locations (Appendix E); and

- Internal surveys of potentially suitable hibernacula may be completed for TCB (Appendix H).

OBJECTIVES

The objectives of IBAT and NLEB survey guidelines are to: (1) standardize range-wide survey procedures; (2) maximize the potential for detection/capture of IBAT and NLEB at a minimum acceptable level of effort (LOE); (3) make accurate presence/probable absence determinations; and (4) aid in conservation efforts for the species' by identifying areas where they are present.

BACKGROUND

In 2011, the USFWS developed a multi-agency team to determine whether improvements could be made to the 2007 IBAT Mist-Net Protocols (USFWS 2007). The USFWS implemented the revised guidance in 2014. Since then, a USFWS team with support from USGS has made any necessary revisions to the guidelines each year (e.g., formally incorporated NLEB in 2022). The USGS conducted initial independent testing of automated acoustic software programs during the winter of 2014-15 and continues to provide support to USFWS testing new versions of available software using software- testing procedures updated in January 2019[5].

We considered the best available information for all aspects of the guidance. For example, see our white paper[6] and 2018 addendum outlining the methods used to determine the minimum IBAT LOE. Our 2022 addendum provided the rationale for the NLEB minimum LOE for acoustic and mist-net surveys (previously we deferred to LOE used for IBAT) as well as updating the IBAT acoustic LOE. The 2023 addendum utilized new data to provide updated mist-netting LOE recommendations for IBAT and NLEB and year-round active LOE recommendations for NLEB. As we receive additional information, we may incorporate additional survey recommendations for the IBAT, NLEB, and/or other bat species. The USFWS continues to partner with local, State, and Federal biologists; scientific and academic institutions; commercial organizations; and other interested parties to collect additional data on the distribution, ecology, and biology of the IBAT and NLEB, as well as other at- risk bat species, and looks forward to receiving any additional pertinent information from partners.

[5] Revised USFWS Software Testing Procedures are available on the USFWS website provided in the intro.
[6] The white paper, 2018, 2022 and 2023 addenda are available on the USFWS website provided in the intro.

GENERAL PROCESS

IBAT and NLEB surveys for some proposed projects will require modification (or clarification) of this guidance through coordination with the USFWS Ecological Services Field Office(s) (FOs) responsible for the state(s) in which the project occurs[7]. Before coordinating with the USFWS FO(s) on survey plan development, project proponents should submit their project through the Information for Planning and Consultation (IPaC) website (https://ipac.ecosphere.fws.gov/). If not already required by federal permit, federal action agencies and surveyors should develop a proposed survey study plan in coordination with the USFWS FO(s) so that all parties fully understand which methods will be deployed, what assumptions will be made, and what the various outcomes would be based on the results of each step. Although optional, we encourage the use of the fillable USFWS Study Plan Form for Bat Surveys and Monitoring as it will ensure all the information necessary is provided to the USFWS FO and expedite review and approval. Project proponents are encouraged to coordinate with the USFWS FO(s) regarding when they may cease survey work once an assumption or documentation of their targeted species presence occurs. Pre-survey coordination typically will preclude the need for subsequent reviews of intermediate steps by USFWS FO(s) during the busy field season. An online directory of USFWS FO(s) is available on the USFWS website (https://www.fws.gov/our-facilities). Unless otherwise agreed to by the USFWS, negative P/A survey results obtained using this guidance are valid for a minimum of five years[8] from their completion unless new information (e.g., other nearby surveys) suggest otherwise. If negative survey results are older than 5 years, coordinate with the USFWS FO(s) to discuss if additional surveys are needed. If not already required by federal permit, submit all results (negative or positive) from any phase to the USFWS FO(s) you have been in coordination with. We strongly encourage this coordination as it improves the USFWS' understanding of (1) the level of survey effort underway and (2) the distribution of the species. A single report can be submitted at the end of all phases conducted for a given project. Results of acoustic survey data collected as part of P/A surveys must also be submitted annually in Section 10 reporting spreadsheets to the USFWS.

USFWS FO-level coordination is also important during the survey planning process. USFWS Section 10 permits require FO approval for each individual survey study plan in order to be in compliance. Field Offices have the authority to deny a proposed survey if it is determined that the study plan is insufficient for Section 7 consultation requirements of the ESA. For example, radio-tracking of captured IBAT and/or NLEB may be required by individual FOs and should be discussed as part of the study plan and pre-survey coordination. The guidelines that are described in this document are designed to be implemented during acceptable survey windows (see Table 1) and in typical habitats that are conducive to the standard survey techniques described herein. However, the USFWS recognizes that occasionally there may be some site-specific conditions in summer habitats or at potential hibernacula sites that do not lend themselves to being surveyed using the standard survey options (e.g., mist nets, acoustic detectors, or harp traps) even though a site may otherwise meet the definition of suitable IBAT and/or NLEB habitat. Therefore, we strongly encourage coordination with the FO(s) prior to using methods that may not be appropriate for site-specific habitat conditions. The bat activity timeframes (see Appendix L) are intended to provide consistency across the species' ranges and aid conversations between project proponents and USFWS FOs regarding Section 7 consultations (e.g., avoidance and minimization). Similarly to other components of the guidelines, these timeframes are subject to change based on use of the best science available.

[7] For example, project sponsors for large acreage and/or landscape-scale projects that do not result in permanent habitat loss and would not pose an ongoing threat of lethal take, especially those proposed by land management agencies, may work with local USFWS FOs to apply different scales of surveys (broad vs. project-level) or different types of surveys, such as long-term monitoring results (e.g., forest-wide acoustic data) and/or targeted survey efforts (e.g., sub- sampling of large project areas), to address P/A concerns.
[8] The timeframe may be reduced if significant habitat changes have occurred in the area or increased based on local information.

Because surveys that result in the capture of IBAT and/or NLEB result in take, such surveys should only be conducted by a qualified biologist[9]. Generally, a recovery permit for the IBAT and NLEB authorizes the capture of bats for identification, and handling of bats for measurements, photography, banding, and radio transmitter attachment; some (but not all) may also authorize entry into potential hibernacula to conduct internal surveys and other study-specific collection. Following this survey guidance will meet standard USFWS Section 10 recovery permit requirements; however, surveyors also need to ensure they meet all applicable state permitting and reporting requirements. Failure to follow the survey guidance, as written, and/or failure to follow a study plan which has received concurrence from the local USFWS FO(s), may result in a USFWS FO requesting additional survey effort.

The following provides a step-by-step outline of how IBAT and/or NLEB summer surveys and/or potential hibernacula surveys should be conducted. Some of these steps can occur concurrently.

NOTE: If surveys are specifically targeting both the IBAT and NLEB, **make sure to use the higher minimum LOE for chosen survey methods (e.g., NLEB range-wide acoustic or mist-netting LOE, also see 2022 and 2023 Addendum)** to ensure it meets the needs for both species.

PHASE 1 – INITIAL PROJECT SCREENING

Step 1. Determine if your project is within the range of IBAT and/or NLEB through the U.S. Fish and Wildlife Service's Information for Planning and Consultation website (https://ipac.ecosphere.fws.gov/). Once completed, coordinate with the U.S. Fish and Wildlife Service Field Office(s)[10] regarding existing IBAT and/or NLEB summer and/or winter occurrence information. [*Projects located within known IBAT and/or NLEB summer habitat and/or known hibernacula/spring-staging/fall swarming zones will not proceed to Phase 2 of this process unless the project meets the definition of an "outer-tier project" outlined in Appendix G. "Outer-tier" guidance only applies to summer captures/detections (not hibernacula)*].

a) If a project (located within or outside of a known maternity colony home range or spring-staging/fall-swarming zone of a known hibernaculum) is already covered under an existing Endangered Species Act (ESA) incidental take authorization (e.g., HCP, BO), then no further summer and/or potential hibernacula surveys are needed, follow the procedures previously authorized by the USFWS FO(s).

b) If there are known IBAT or NLEB occurrences (e.g., known roost trees, capture locations, foraging locations or hibernacula) within the project action area[11];

OR

if there are no known IBAT or NLEB summer or spring/fall/winter occurrences within the proposed project area itself, but the project area is located within a known maternity colony

[9] A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for IBAT and/or NLEB in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to net and handle IBAT and/or NLEB. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.
[10] Coordinate with the appropriate state natural resource agencies and any involved Federal Action agencies whenever "USFWS" coordination is listed. USFWS FO(s) may direct project sponsors to state agencies for existing occurrence information. Coordinate with your local USFWS FO(s) to understand the process for their area of jurisdiction.
[11] The "action area" is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. [50 CFR Section 402.02]

home range and/or the spring-staging and fall-swarming zone of a known hibernaculum[12];

OR

if the project is located outside a known maternity colony home range and/or spring- staging and fall-swarming zone of a hibernaculum but is within the range of the IBAT and/or NLEB (note this can change over time), then proceed to Step 2.

Step 2. Conduct Habitat Assessment (Desktop or Field-based; see Appendix A, H, and K).

a) If suitable summer habitat, a potential hibernaculum(a), and/or a potential bridge/culvert roost is present within the action area, then proceed to Step 3.

b) If suitable summer and winter habitat (i.e., potential hibernaculum) and potential bridge/culvert roosts are absent within the action area, then no further P/A surveys are recommended; however, additional coordination with the USFWS FO(s) may be recommended if IBAT and/or NLEB may be present in an action area during other seasons (e.g., spring and fall migration) and may be affected by the proposed project.

Step 3. Assess potential for adverse effects to IBAT and/or NLEBs

a) If the project is not anticipated to result in adverse effects to IBAT and/or NLEB (as proposed), then no further summer, bridge/culvert roost, and/or potential hibernacula surveys are recommended, coordinate with the USFWS FO(s).

b) If the project may result in adverse effects to IBAT and/or NLEB, but impacts can be adequately assessed and conservation measures can be designed to minimize those effects without additional P/A information (this includes **all** proposed projects within known summer maternity colony home ranges and /or at known hibernacula and their surrounding spring-staging and fall-swarming zones, but may include other areas as well), then no further surveys are recommended. Coordinate with the USFWS FO(s) regarding an assessment of the project's potential effects, development of conservation measures, determination of the need for any ESA incidental take authorization, and discussion of value of additional surveys.

c) If the project does not meet the conditions of 3a or 3b, then proceed to **Phase 2, 5, and/or 6**.

PHASE 2 – SUMMER/ACTIVE SEASON P/A SURVEYS (NETTING AND/OR ACOUSTIC)[13]

Presence/probable absence (P/A) of IBAT and/or NLEB may be determined by conducting either Step 4 (mist-netting; see Appendix B or Appendix J) or Step 5 (acoustics; see Appendix C or Appendix J) as outlined below. If the project area contains habitat that is appropriate to conduct either survey method, it is the project proponent's choice as to which option to use, for each survey area unit (i.e., ≤123-acre area or 1-km section of linear project). A combined mist-netting and acoustic approach is also acceptable (see "pilot" Appendix I). Under no scenario can a project proponent use either mist-netting or acoustic Phase 2 surveys to challenge the other methods results. The USFWS accepts the results of either option and has no preference for methods. The USFWS FO(s) can discuss pros and cons of different approaches depending on project sponsor needs and project- specific habitat conditions. For example, a project area may not have suitable conditions for a mist- net survey and an acoustic survey may be the only

[12] See USFWS IBAT Section 7 and Section 10 Guidance for Wind Energy Projects (Questions 4 & 5) on the USFWS website provided in the introduction.
[13] NOTE: acoustic and/or mist-net surveys should be conducted in the best suitable habitat possible for each survey type to increase the likelihood of detecting/capturing IBAT and/or NLEB. In some cases, the most suitable habitat for effectively conducting surveys may occur outside a project site boundary and may be sampled if landowner permission is granted.

appropriate method for establishing P/A. It is up to the surveyor's professional judgment to determine whether the habitat on-site has the appropriate structure for the survey method chosen prior to the survey and to coordinate with the FO(s) if issues arise with the method chosen and need to be reconsidered.

Acoustics at the Phase 2 level of effort (LOE) (or otherwise agreed to with the USFWS FO) may be used as a coarse screening tool for conducting subsequent mist-netting at the Phase 2 LOE. For example, if NO high frequency (HF) calls (≥35 kHz) are detected, then no netting is required within that 123-acre (non-linear) or 1-km (linear) survey area due to IBAT and/or NLEB probable absence. If ANY HF calls are detected, then mist-net at the Phase 2 LOE. Any project study plan that includes use of both acoustics and netting needs to be written clearly to avoid potential misunderstandings between the project proponent and the USFWS FO.

Also, Phase 2 acoustic results should be used to inform whether, when, and where to conduct any optional Phase 3 mist-netting. In this case, acoustics is the P/A method and if presence is detected (HF screen, automated/MLE and/or manual vetting), then IBAT and/or NLEB presence is established. Negative results from follow-up mist-netting (at any LOE) does not refute a previously established positive acoustic result. The goal of Phase 3 netting is simply to verify where IBAT and/or NLEB(s) are active and to capture and track individuals to document roost trees and population size to further inform consultation or coordination under the ESA.

The summer survey season for IBAT and the hibernating[14] NLEB range is from 15 May through 15 August, unless the survey is being conducted within the year-round active portion of the NLEB range where the survey season is from 1 March through 15 October (see Appendix J). All P/A surveys should be completed by the end of the designated survey season unless otherwise indicated by USFWS FO[15]. The minimum prescribed survey level of effort for any given survey area unit (i.e., ≤123-acre area or 1-km section of linear project) **cannot** be completed in a single calendar night regardless of which survey method (netting or acoustic) is used (i.e., minimum survey effort must be spread over at least 2 calendar nights with suitable weather conditions). If netting is chosen as the preferred P/A method and an IBAT and/or NLEB is captured, then surveyors may immediately begin Phase 4/radio- tracking. Project proponents must decide whether they will proceed to Phase 4 in coordination with the USFWS FO before any mist-netting occurs. Submit Phase 2 study plans to USFWS FO prior to conducting surveys for their review and site-specific authorization.

Step 4. Conduct Mist-Netting Surveys following IBAT and/or NLEB Protocols[16] (See Figure 1, Table 2, and Appendix B, I, or J)

OR

Step 5. Conduct Acoustic Surveys[17] (see Figure 1, Table 2, and Appendix C, I, or J)

[14] The hibernating NLEB range includes the portion of the range where the species hibernates in the winter, stages and swarms outside of hibernacula in the spring and fall, and migrates to summer home ranges.
[15] With prior USFWS FO approval, a survey may be completed after the end of the designated survey season if it was initiated in time to be completed by August 15 or October 15 (year-round active portion of the NLEB range) and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15. If tracking is proposed, surveys should be scheduled so that tracking is concluded prior to August 15 or October 15.
[16] We have no recommendations for reducing the mist-netting minimum level of effort to demonstrate probable absence for projects <123 acres in size. Level of effort is based on detection probabilities and occupancy estimates that were derived from past survey efforts that used the same acreage threshold. Level of effort for mist-netting is designed to reach 90% confidence in negative survey results (see Niver et al. 2014; Armstrong et al. 2023).
[17] Acoustic surveys are available as a P/A option throughout the ranges of both species. We have no recommendations for reducing the minimum level of effort required to demonstrate probable absence for projects <123 acres in size. Level

PHASE 3. CONDUCT MIST-NETTING SURVEYS TO CAPTURE INDIANA and/or NORTHERN LONG-EARED BATS.

If mist-netting was not conducted as the P/A method, then mist-netting may be conducted in Phase 3 to capture and characterize (e.g., sex, age, reproductive condition) the IBAT and/or NLEB that are present in an area and to facilitate Phase 4 efforts. We encourage working with the FOs to develop Phase 3 netting plans based on best available information (e.g., positive acoustic locations). There are no minimum requirements for this phase as this is not a P/A phase.

a) If no IBAT and/or NLEB are captured, then coordinate with the USFWS FO.

b) If IBAT and/or NLEB are captured, then proceed to **Phase 4**.

PHASE 4. CONDUCT RADIO-TRACKING AND EMERGENCE SURVEYS (See Appendices D and E)

PHASE 5. CONDUCT POTENTIAL HIBERNACULA SURVEYS (See Appendix H)

PHASE 6. CONDUCT BRIDGE AND CULVERT ROOST SURVEYS (See Appendix K)

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of effort is based on detection probabilities and occupancy estimates that were derived from past survey efforts that used the same acreage threshold. Level of effort for acoustics is designed to reach 90% confidence in negative survey results (see Niver et al. 2014; Armstrong et al. 2022).

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TABLE 1. Standard survey seasons for conducting P/A surveys for IBAT and/or NLEB.

IBAT & NLEB SURVEY SEASONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
IBat Internal Winter Hibernacula Surveys[1,2]												
Acceptable survey window (1 Jan. - 28 Feb.)												
Traditional survey window of known sites (15 Jan. - 15 Feb.)												
IBat & NLEB Spring & Fall Surveys at Entrances of Potential Hibernacula [3,4]												
Acceptable survey window (1 - 21 Apr. & 15 Sep. - 31 Oct.)												
IBat & NLEB Summer Surveys of Suitable Summer Habitat [5]												
Acceptable survey window (15 May - 15 Aug.)												
Optimal survey window (1 Jun. - 31 Jul.) [6]												
NLEB Surveys of Suitable Habitat in Year-round Active Range												
Acceptable survey window - (1 Mar. - 15 Oct.)												
Optimal survey window (1 May - 30 Sep.) [6]												
IBat & NLEB Bridge and Culvert Surveys [7]												
Acceptable survey window (Year-round)												

[1] visual and photographic surveys conducted within known and/or potential hibernacula (if deemed safe to enter).

[2] internal winter hibernacula surveys are seldom appropriate for NLEB as they typically fail to reliably detect and accurately enumerate the species when present.

[3] conducted using harp traps or mist nets at cave/mine entrances.

[4] if State/USFWS FO approve, spring and fall survey windows can "drift" a bit earliler or later to better accommodate prevailing weather patterns and/or climate conditions in the location of the proposed survey. For example, the fall survey window in nothern portions of the IBAT or NLEB range may begin on or after 1 Sep. and end prior to 31 Oct. pending local State and FO approval. Likewise, if agencies approve, spring surveys of potential hibernacula may be pushed back/extended a few days or longer due to an extended period of unseasonably cold spring weather.

[5] conducted using mist nets or acoustic detectors deployed within suitable flight corridors and foraging areas.

[6] the middle of the maternity season is considered by many to the best or "optimal" time to capture resident bats.

[7] coordinate with your local USFWS FO to determine best time to conduct bridge or culvert surveys for your project.

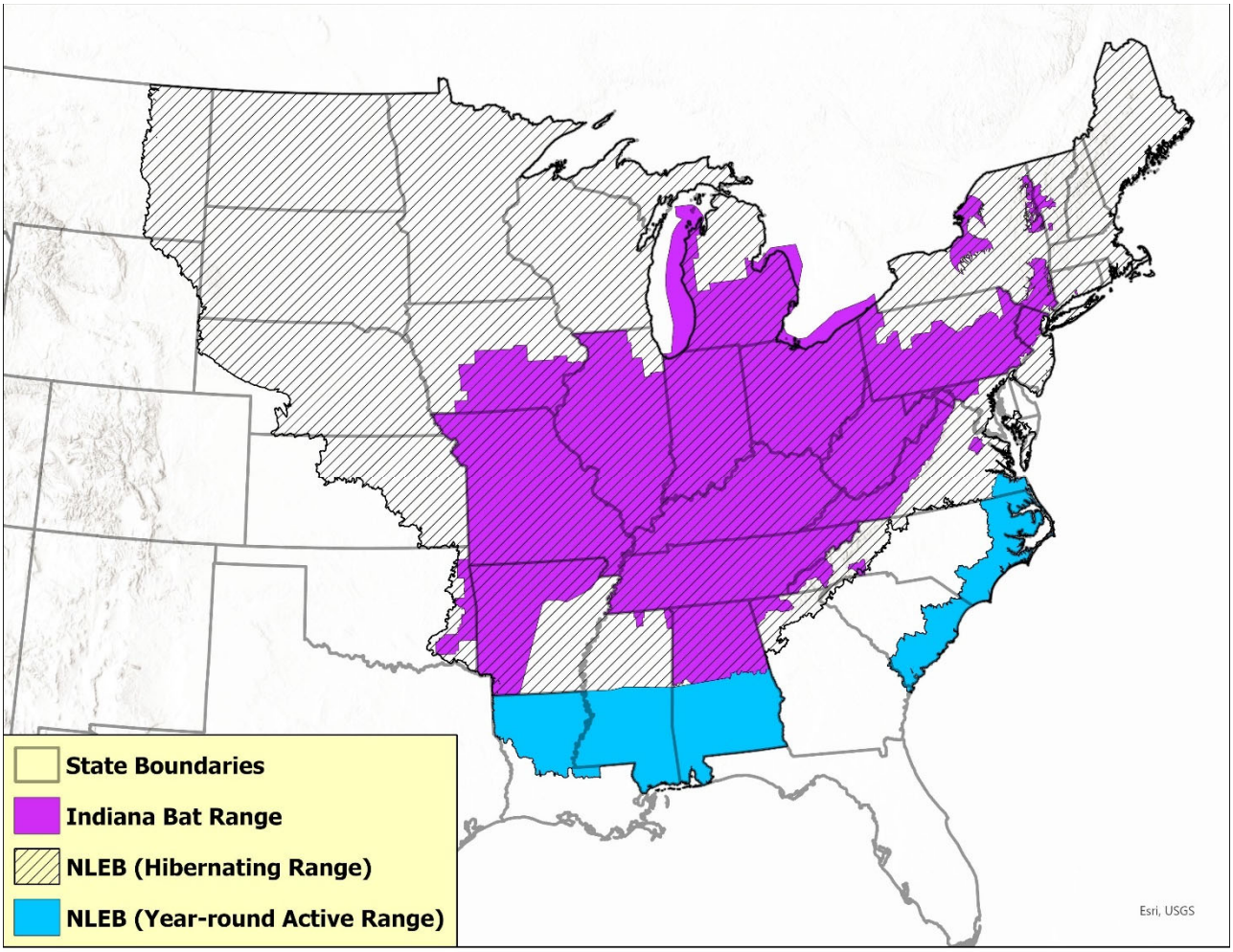


FIGURE 1. IBAT and NLEB ranges as defined for use in presence/ probable absence surveys (also see Table 2).

TABLE 2. Summary of current survey LOEs for IBAT and NLEB.

		MIST-NETTING (net nights)		ACOUSTICS (detector nights)	
Species	Region	Linear (per km)	Non-Linear (per 123 ac.)	Linear (per km)	Non-Linear (per 123 ac.)
IBAT	Range-wide	2	6	4	10
NLEB	Hibernating Range (non-coastal areas)	4	10	4	14
	Year-round Active Range (coastal areas)	2	6		

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Summer habitat and potential hibernacula assessments are Step 2 of Phase 1- Initial Project Screening. The information below is provided to assist applicants, consultants, and/or project proponents (hereinafter termed the "applicant") in establishing whether surveys for IBAT and/or NLEB should be conducted. As a reminder, the first steps for determining presence of IBAT and/or NLEB at a given site is to 1) use the USFWS's Information for Planning and Consultation (IPaC) website (https://ipac.ecosphere.fws.gov/), and 2) determine whether there is any existing occurrence data available for the vicinity of the project from the local USFWS FO. This step can be conducted remotely via a desktop analysis (e.g., use of aerial photography to assess the potential presence of suitable summer habitat); however, on-site field assessment is always preferred. The applicant is responsible for developing and providing sufficient information as to whether suitable summer habitat and/or potential hibernacula exist within a proposed project area. If suitable habitat is present, the applicant should calculate the amount and submit this to the USFWS FO(s) and determine the need for any P/A surveys (Phase 2).

NOTE: If IBAT and/or NLEB are present or assumed to be present during any phase, more detailed habitat information may be necessary to adequately assess the potential for impacts (see attached example Bat Habitat Assessment Datasheet). If no suitable habitat is present or it is determined through discussions with USFWS FO(s) that no adverse effects are anticipated from the proposed project, no surveys are recommended to assess risk. Habitat assessments for IBAT and/or NLEB can be completed any time of year and applicants are encouraged to submit results and proposed Phase 2 study plans well in advance of survey seasons.

PERSONNEL

Habitat assessments should be completed by individuals with a natural resource degree or equivalent work experience demonstrating skills and knowledge in area-specific ecoregions, landscapes, habitats, and ecosystems.

DEFINITION FOR SUITABLE INDIANA BAT SUMMER HABITAT

Suitable summer habitat for IBAT consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats[18] such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches dbh[19] (12.7 centimeter) that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable

[18] Non-forested habitats typically should be excluded from acreages used to establish a minimum level of survey effort for Phase 2 surveys.

[19] While trees <5 inches (<12.7 cm) dbh that have exfoliating bark, cracks, crevices, and/or hollows may have some potential to be male IBAT summer roosting habitat, the USFWS does not consider early successional, even-aged stands of trees <5 inches dbh to be suitable roosting habitat for the purposes of this guidance. Suitable roosting habitat is defined as forest patches with trees of 5-inch (12.7 cm) dbh or larger. However, early successional habitat with small diameter trees may be used as foraging habitat by IBATs. Therefore, a project that would remove or otherwise adversely affect ≥20 acres of early successional habitat containing trees between 3 and 5 inches (7.6-12.7 cm) dbh would require coordination/consultation with the USFWS FO to ensure that associated impacts would not rise to the level of take. The USFWS may request P/A surveys if >20 acres of early successional habitat were proposed for removal.

habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat.

Indiana bats have also been observed roosting in human-made structures, such as bridges and bat houses (artificial roost structures); therefore, these structures should also be considered potential summer habitat[20]. We recommend that project proponents or their representatives coordinate with the appropriate USFWS Field Office (FO) to define suitable habitat more clearly for their region as some differences in state/regional suitability criteria may be warranted (e.g., high-elevation areas may be excluded as suitable habitat in some states).

Examples of unsuitable habitat:

- Individual trees that are greater than 1,000 feet from forested/wooded areas;
- Trees found in highly developed urban areas (e.g., street trees, downtown areas); and
- A pure stand of less than 3-inch dbh[21] trees that are not mixed with larger trees.

DEFINITION FOR SUITABLE NORTHERN LONG-EARED BAT SUMMER HABITAT

Suitable summer habitat for the NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel. Although they may also traverse habitat adjacent and interspersed with forest habitat, such as emergent wetlands and field edges, they are predominately found in forest/wooded habitat. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. NLEBs are nocturnal foragers and use hawking (catching insects in flight) and gleaning (picking insects from surfaces) behaviors in conjunction with passive acoustic cues (Nagorsen and Brigham 1993, p. 88; Ratcliffe and Dawson 2003, p. 851). NLEB often prefer intact mixed-type forests with small gaps (i.e., forest trails, small roads, or forest-covered creeks) in forest with sparse or medium vegetation for foraging and commuting rather than fragmented habitat or areas that have been clear cut (USFWS 2015, p.17992). Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested/wooded habitat[22]. The NLEB has also been observed roosting (although to a lesser degree than forested habitat) in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat[23].

NLEBs typically occupy their summer habitat from mid-May through mid-August each year[24] and the

[20] If human-made structures are present within your project area and are proposed to be removed or modified, see Appendix E (Emergence Surveys) and then coordinate with the local USFWS FO(s) regarding how to determine P/A.
[21] Suitable roosting habitat is defined as forest patches with trees of 5-inch (12.7 cm) dbh or larger. However, early successional habitat with small diameter trees may be used as foraging habitat by IBAT. Therefore, a project that would remove or otherwise adversely affect ≥20 acres of early successional habitat containing trees between 3 and 5 inches (7.6- 12.7 cm) dbh would require coordination/consultation with the USFWS FO to ensure that associated impacts would not rise to the level of take. The USFWS may request P/A surveys if >20 acres of early successional habitat were proposed for removal.
[22] This number is based on observations of bat behavior indicating that such an isolated tree (i.e., ≥1000 feet) would be extremely unlikely to be used as a roost. This distance has also been evaluated and vetted for use for the NLEB. See the "Indiana bat Section 7 and Section 10 Guidance for wind Energy Projects," question 33, found on the USFWS website provided in the intro.
[23] Trees found in highly-developed urban areas (e.g., street trees, downtown areas) are extremely unlikely to be suitable habitat.
[24] Exact dates vary by location., with NLEBs typically being found earlier in spring at lower latitudes. Also, NLEBs in

species may arrive or leave some time before or after this period. In most areas, roosting habitat is considered suitable summer habitat because NLEBs are only present in forested habitat during the summer active months. In some areas of the southern U.S., NLEBs are present in potential roosting habitat year-round. In these areas (see Figure 1 and Figure 3 in Appendix J), habits and habitat use differ significantly from the rest of the species' range.

Examples of unsuitable habitat:

- Individual trees that are greater than 1,000 feet from forested/wooded areas;
- Trees found in highly developed urban areas (e.g., street trees, downtown areas); and
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees.

DEFINITION FOR SUITABLE TRICOLORED BAT SUMMER HABITAT

Suitable TCB summer habitat consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and include some adjacent and interspersed non-forested habitats such as emergent wetlands, shrublands, grasslands, and forested edges of agricultural fields, old fields, and pastures. Roosting habitat includes forests, woodlots, and linear features (e.g., fencerows and riparian corridors) containing trees with potential roost substrate (e.g., live and dead leaf clusters of live and recently dead deciduous trees, Spanish moss [*Tillandsia usneoides*], and beard lichen [*Usnea trichodea*]).[25] TCBs will roost in a variety of tree species, especially oaks (*Quercus spp.*), and often select roosts in tall, large-diameter trees, but will roost in smaller diameter trees when potential roost substrate is present (e.g., 4-inch [10-centimeter]; Leput 2004). TCBs commonly roost in the mid to upper canopy of trees although males will occasionally roost in dead leaves at lower heights (e.g., < 16 feet [5 meters] from the ground; Perry and Thill 2007) and females will occasionally roost in Spanish moss of understory trees (Menzel et al. 1999). TCBs seem to prefer foraging along forested edges of larger forest openings, along edges of riparian areas, and over water and avoid foraging in dense, unbroken forests, and narrow road cuts through forests (Davis and Mumford 1962; Kurta 1995; Lacki and Hutchinson 1999; Ford et al. 2005; Menzel et al. 2005; White et al. 2006; Thames 2020; Hantulla and Valdez 2021).

TCBs also roost in human-made structures, such as bridges and culverts, and occasionally in barns or the underside of open-sided shelters (e.g., porches, pavilions); therefore, these structures should also be considered potential summer habitat. TCBs occupy similar forest habitats in the spring, summer, and fall (i.e., non-hibernating seasons) but in the southern portion of the range, where TCBs exhibit shorter torpor bouts and remain active and feed year-round, they may roost in culverts, bridges, cavities in live trees, live and dead leaf clusters, and/or Spanish moss during the winter (Sandel et al. 2001; Newman et al. 2021). TCBs may roost and forage in forested areas near anthropogenic structures and buildings (e.g., suburban neighborhoods, parks, etc.) (Helms 2010; Shute et al. 2021). However, highly developed urbanized areas generally devoid of native vegetation (including isolated trees surrounded by expansive anthropogenic development) are considered unsuitable habitat (e.g., parking lots, industrial buildings, shopping centers).

SUBMISSION OF PHASE 1 HABITAT ASSESSMENT & PHASE 2, PHASE 5, AND/OR PHASE 6 STUDY PLAN (IF NEEDED)

the year-round active portion of the range are an exception as they utilize the same habitat in summer as they do in winter.

[25] Occasional summer roosts also include clusters of dead pine needles of large live pines (Pinus echinata), live branches of Norway spruce (Picea abies), eastern red cedar (Juniperus virginiana), abandoned gray squirrel (Sciurus carolinensis) nests, and under exfoliating birch (Betula spp.) bark (Veilleux et al. 2003; Perry and Thill 2007; WDNR 2016; WDNR 2017a; WDNR 2017b; WDNR 2018; Thames 2020; Hammesfahr et al. 2022).

If a proposed project may affect (positively or negatively) IBAT and/or NLEB and the conditions outlined in Step 3 a or b are not met, a habitat assessment report should be submitted to the appropriate USFWS FO(s) (and/or to the lead Federal Action Agency as appropriate) along with a draft study plan for the Phase 2 (acoustic or netting), Phase 5 (potential hibernaculum), and/or Phase 6 (bridge/culvert potential roost) survey(s) (if suitable habitat(s) is present). Although optional, we encourage the use of the new fillable USFWS Study Plan Form for Bat Surveys and Monitoring as it will ensure all the information necessary is provided to the USFWS FO and expedite review and approval of your study plan. If you choose not to submit the study plan form, ensure all information requested on the form applicable to your survey are included with your study plan request submittal to your local USFWS FO(s). Complete Phase 1 reports will include the following:

1. Full names and relevant titles/qualifications of individuals (e.g., John E. Smith, Biologist II, State University, B.S. Wildlife Science 2007) completing the habitat assessment and when the assessment was conducted
2. A map and latitude/longitude or UTM clearly identifying the project location (or approximate center point) and boundaries
3. A detailed project description (if available)
4. Documentation of any known/occupied spring staging, summer, fall swarming, winter habitat, and/or bridge/culvert roosts for IBAT and/or NLEB within or near the project area
5. A description of methods used during the habitat assessment
6. A summary of the assessment findings and a completed Bat Summer Habitat Assessment Datasheet (see example below; use of this datasheet is optional)
7. Other information that may have a bearing on use of the project area (e.g., presence of fall or winter habitat [caves, crevices, fissures, or sinkholes, or abandoned mines of any kind], bridges/culverts and other non-tree potential summer roosts.)
8. A Phase 1 Habitat Assessment on all potential hibernacula that could be affected by the proposed project (see Appendix H for additional instructions for completing this assessment and sample datasheet), if necessary
9. A Step 1 Initial Assessment of Suitability and Safety on all bridges and culverts that could be affected by the proposed project (see Appendix K for additional instructions for completing this assessment and sample datasheet), if necessary
10. Any other information requested by the local USFWS FO(s) related to the project

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BAT HABITAT ASSESSMENT DATASHEET

Project Name:_____ Date:_____

Township/Range/Section:_____

Lat Long/UTM/ Zone:_____ Surveyor:_____

Brief Project Description

Project Area				
Project	Total Acres	Forest Acres		Open Acres
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres- no clearing	

Vegetation Cover Types	
Pre-Project	Post-Project

Landscape within 5 mile radius
Flight corridors to other forested areas?
Describe Adjacent Properties (e.g. forested, grassland, commercial or residencial development, water sources)

Proximity to Public Land
What is the distance (mi.) from the project area to forested public lands (e.g., national or state forests, national or state parks, conservation areas, wildlife management areas)?

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): _____

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees				
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? _____

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BATS? _____

Additional Comments:

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX B: PHASE 2 OR PHASE 3 MIST–NETTING

Mist-netting can be used as a P/A method (Phase 2 surveys) or it can be conducted for the purpose of attempting to capture IBAT and/or NLEB after detection during acoustic P/A surveys (Phase 3 surveys). The same recommendations (e.g., season, personnel, equipment, net placement, checking nets) apply for either use of mist-netting surveys. NOTE: Appendix B is intended for use within the IBAT range and/or NLEB hibernating range (see Figure 1); also refer to Appendix J for additional guidance on conducting mist-netting in the year-round active range of the NLEB.

SUMMER MIST-NETTING SEASON: May 15 – August 15[26]

Capture of reproductive adult females (i.e., pregnant, lactating, or post-lactating) and/or young of the year during May 15 – August 15 confirms the presence of a maternity colony in the area. Since adult males and non-reproductive females have commonly been found summering with maternity colonies, radio-tracking results will be relied upon to help determine the presence or probable absence of a maternity colony or large concentrations of bats in the area when only males and/or non-reproductive females are captured.

PERSONNEL

A qualified biologist(s)[27] must (1) select/approve mist-net sets in areas that are most suitable for capturing IBAT and/or NLEB, (2) be physically present at each mist-net site[28] throughout the survey period, and (3) confirm all bat species identifications. This biologist may oversee other biological technicians and manage mist-net sets in close proximity to one another if the net-check timing (i.e., every 10 minutes) can be maintained while **walking** between net-sets[29]. A minimum of two (2) biologists (e.g., one qualified and one technician) must be on-site for every four (4) net-sets being operated. Exceptions to on-site minimum staffing levels may be allowed under extenuating circumstances, provided written justification is included in the proposed survey study plan and subsequently approved by the local USFWS FO(s).

NOTE: The mist-netting survey protocol may also be used for determining P/A of TCBs using the NLEB LOE for the 2024 field season when the survey is also being conducted for IBAT and/or NLEB; however, an acoustic or combined acoustic/mist-net survey must be completed in portions of the range where TCBs are the only species identified by IPaC and the project proponent chooses to conduct a P/A survey.

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[26] With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15. If tracking is proposed, surveys should be scheduled so that tracking is concluded prior to August 15.

[27] A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for IBAT and NLEB in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to net and handle IBAT and/or NLEB. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

[28] A Net Site is defined as one or more net sets that can be efficiently walked to and checked by a survey team (typically 2 people) within a 10-minute window from a central bat-processing location. For example, a single net "site" is often composed of 4 individual net sets (separated by at least 30 m apart) that are checked every 10 minutes by a 2-person team (each person checks 2 nets for each net check).

[29] A Net-Set is defined as one mist-net deployment consisting of two poles and typically from 1-3 affixed mist-nets stacked onto one another. A typical net set is at least 5 m to 9 m high consisting of two or more nets stacked on top of one another (without gaps) and from 6 m to 18 m wide.

COORDINATION WITH USFWS FIELD OFFICES (FOs)

If not already required by federal permit, we recommend that applicants submit a draft study plan for all survey phases to the USFWS FO(s) for review and approval (See Appendix A for guidance on submitting a draft study plan).

EQUIPMENT

Use the finest, lowest visibility mesh mist-nets commercially available, as practicable. Currently, the finest net on the market is 75 denier, 2 ply, denoted 75/2 (Arndt and Schaetz 2009); however, the 50 denier nets are still acceptable for use currently. The finest mesh size available is approximately 1½ inches (38 millimeters). No specific hardware is required. There are many suitable systems of ropes and/or poles to hold nets. The systems of Gardner et al. (1989) and Chenger's BCM triple high has been widely used. See NET PLACEMENT discussion below for minimum net heights, habitats, and other netting requirements that affect the choice of hardware.

To minimize potential for disease transmission, any equipment that comes in contact with bats should be kept clean and disinfected, following approved protocols; this is particularly a concern relative to white-nose syndrome (WNS). Disinfection of equipment to avoid disease transmission (e.g., WNS) is required; protocols are posted at http://www.whitenosesyndrome.org/. Federal and state permits may also have specific equipment restrictions and disinfection requirements.

MINIMUM P/A MIST-NETTING LEVEL OF EFFORT (PHASE 2)

The level of netting survey effort required for a non-linear project will be dependent upon the overall acreage of suitable habitat that may be impacted by the action (directly or indirectly). To determine the survey effort, quantify the amount of suitable summer habitat within the project area.

NOTE: for projects where other impacts than tree removal are likely (e.g., collision), ensure that P/A surveys are designed to cover all suitable habitat within the entire project area (where exposure to any kind of impacts may be anticipated) and NOT just the locations where tree removal is planned. Additional guidance for linear projects is in Appendix F.

Conduct Mist-Netting Surveys following IBAT and/or Hibernating NLEB Range Level-of-Effort Recommendations (See Figure 1 and Table 2)

Range-wide IBAT Mist-netting LOE:

Linear projects: a minimum of 2 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

Non-linear projects: a minimum of 6 net nights per 123 acres[30] (0.5 km^2) of suitable summer habitat.

After 2 consecutive nights of netting at the same location without capturing target species, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

[30] We have no recommendations for reducing the minimum level of effort required to demonstrate probable absence for projects <123 acres in size. Detection probabilities and occupancy estimates were derived from past survey efforts that used the same acreage threshold (see Niver et al. 2014).

a) If no capture of IBAT(s), then no further summer surveys are recommended[31].

b) If capture of IBAT(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO(s).

Hibernating NLEB Range Mist-netting LOE:

Linear projects: a minimum of 4 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

Non-linear projects: a minimum of 10 net nights per 123 acres (0.5 km^2) of suitable summer habitat.

After 2 consecutive nights of netting at the same location without capturing target species, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

a) If no capture of NLEB(s), then no further summer surveys are recommended.

b) If capture of NLEB(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO.

MIST-NETTING SURVEYS TO CAPTURE INDIANA AND/OR NORTHERN LONG- EARED BATS AFTER ACOUSTICS WERE USED AS P/A METHOD (PHASE 3)

If netting was not conducted as the P/A method, then netting may be conducted to capture and characterize (e.g., sex, age, reproductive condition) the IBAT and/or NLEB (documented through the Phase 2 acoustic P/A survey) present in an area and to facilitate radio-tracking (Phase 4) efforts. We encourage working with the FO(s) to develop Phase 3 netting plans based on best available information (e.g., positive acoustic locations). There are no minimum requirements for this phase as this is not a P/A phase.

a) If no IBAT and/or NLEB are captured, then coordinate with the USFWS FO.
b) If IBAT or NLEB are captured, then proceed to **Phase 4** as previously decided in coordination with the FO(s).

NET PLACEMENT

Indiana and Northern long-eared bats typically forage in habitats that do not completely overlap (see species-specific habitat definitions in Appendix A) therefore, net placement should reflect these differences when targeting both species. Net placement along potential travel corridors (e.g., streams, logging trails, roads) as well as other edge habitats (e.g., other water sources, field edges) have traditionally been the most common habitats sampled due to their ease of access. However, non-traditional net placement in interior forest habitats may also be productive, especially for NLEB and IBAT (Carroll et al. 2002). Because the best survey sites for capturing bats may fall outside of a project footprint, the surveyor and project proponent should coordinate with the appropriate USFWS FO(s) to establish a project-specific maximum net placement distance from the centerline or project boundary

[31] NOTE: For Phase 2 P/A Surveys, wherever the phrase “no further summer surveys are recommended” occurs within this document, the USFWS FO(s) is in affect assuming probable absence of IBAT and/or NLEB during the summer.

prior to initiating surveys.

When sampling traditional travel corridors with defined edges, place net-sets approximately perpendicular to the edge and, ideally within bends or curves in the corridor that reduces bat reaction time to avoid capture. Net-sets should fill the corridor from side to side, extending beyond the corridor boundaries and into the interior forest to prevent bats from flying along the edges of the corridor and avoiding the nets, and from water (or ground) level up to the overhanging canopy. Surveyed corridors must have overhanging branches, most often within 9 m of the ground, that force bats to fly downward and into the nets. Net-sets of varying widths and heights may be used as the situation dictates. A typical net-set is at least 5 m to 9 m high consisting of two or more nets stacked on top one another (without gaps) and from 6 m to 18 m wide. If netting over water, ensure there is enough space between the net and the water so that captured bats will not get wet. Justification for placing net-sets perpendicular to a forest edge, or any net-set, without overhanging vegetation (i.e., no funneling effect) should be specifically provided in the survey report or ideally discussed with the FO(s) prior to sampling.

Because a) NLEB is a clutter-adapted gleaning species (see definition of suitable summer habitat in Appendix A) or b) a project area may not have well-defined travel corridors, surveyors may sample more non-traditional habitat types (e.g., small forest openings, ponds, interior forest). The typical equipment and placement described in the section above may be inadequate when netting for IBAT and NLEB in these non-traditional locations, where a travel corridor is less obvious. This would require innovation on the part of the surveyor (see Humphrey et al. 1968). For example, net placement in interior forests should be a minimum of 50 m from edge habitats and should represent a variety of understory cover and canopy closure (Carroll et al. 2002). Ponds and large water-filled road ruts can be productive places to net when other water sources are limited. See Kiser and MacGregor (2005) for additional discussion about net placement.

Mist-net sets should be spaced a minimum of 30 m apart, surveyors should attempt to evenly distribute net-sets throughout suitable habitat and not over-sample individual habitat features (e.g., three or more mist-net sets on a single travel corridor or stream). Surveyors must provide written justification in their report if net-sets were not distributed throughout suitable habitat (i.e., why were they clumped?). Surveys conducted for northern long-eared bat should include both traditional and non-traditional (as described above) net placements within suitable habitat when present. Net-sets can be repeatedly sampled throughout the project, but no more than 2 nights at a single location is recommended. In addition, changing locations within a project area may improve capture success (see Robbins et al. 2008; Winhold and Kurta 2008). Photo-document placement of net-sets.

SURVEY PERIOD

The survey period for each net shall begin at sunset[32] and continue for at least 5 hours (longer survey periods may also improve success).

CHECKING NETS

Each net-set should be checked every 10 minutes (Gannon et al. 2007). If surveyors monitor nets continuously, take care to minimize noise, lights, and movement near the nets. Monitoring the net-sets continuously with a bat detector (ideally using earphones to avoid alerting bats) can be beneficial: (a) bats can be detected immediately when they are captured, (b) prompt removal from the net decreases stress on the bat and potential for the bat to escape (MacCarthy et al. 2006), and (c) monitoring with a bat detector also allows the biologist to assess the effectiveness of each net placement (i.e., if bats are active near the

[32] Surveys may need to start a little earlier or later than official sunset times (i.e., at “dusk”) in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: https://sunrise-sunset.org.

net set but avoiding capture), which may allow for adjustments that will increase netting success on subsequent nights. There should be no other disturbance near the nets, other than to check nets and remove bats. Biologists should be prepared to cut the net if a bat is severely entangled and cannot be safely extracted within 3 or 4 minutes (CCAC 2003; Kunz et al. 2009). Capture and handling are stressful for bats. Emphasis should be on minimizing handling and holding bats to as short a time as possible to achieve field study objectives. Indiana and/or northern long-eared bats should not be held for more than 30 minutes after capture, unless the individual is targeted for radio-tracking. Bats targeted for radio-tracking should be released as quickly as possible, but no longer than 30 minutes[33] after capture, or as allowed in federal and state permits. See Kunz and Kurta (1988) for general recommendations for holding bats.

WEATHER, LIGHTING, AND OTHER ENVIRONMENTAL CONDITIONS

Severe weather adversely affects capture of bats. Some IBAT and NLEBs may remain active despite inclement weather and may still be captured while others in the same area become inactive. Therefore, negative surveys combined with any of the following weather conditions throughout all or most of a sampling period are likely to require an additional night of mist-netting[34]: (a) temperatures that fall below 50°F (10°C)[35]; (b) precipitation, including rain and/or heavy fog, that exceeds 30 minutes or continues intermittently during the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/seconds; 3 on Beaufort scale) for 30 or more minutes.

NOTE: Provided that nets are not dripping wet, surveyors can resume netting to meet the minimum 5-hour requirement after short periods of adverse weather. If nets are under good cover, light rain may not alter bat behavior. However, if no bats are being captured during marginal weather, coordinate with the USFWS FO(s).

It is typically best to place net sets under the canopy where they are out of moonlight, particularly when the moon is half-full or greater. Net sets illuminated by artificial light sources should also be avoided. The shining of lights, and noise should be kept to a minimum with no smoking around the survey sites. In addition, the use of radios, campfires, running vehicles, punk sticks, citronella candles and other disturbances will not be permitted within 300 feet of mist nets (or acoustic detectors) during surveys.

DOCUMENTATION OF INDIANA AND/OR NORTHERN LONG-EARED BAT CAPTURES

If an IBAT and/or NLEB is captured during mist-netting, protocols for radio-tracking and emergence survey requirements, as provided in Appendix D and E, respectively, should be followed. In addition, the appropriate USFWS FO(s) must be notified of the capture within 48 hours (or in accordance with permit conditions), and the sex and reproductive condition of the bat and GPS coordinates of the capture site should be provided. Ensure GPS coordinates are recorded for each individual net set on datasheets.

Several species of bats from the genus *Myotis* share common features which can make identification difficult; IBATs and little brown bats (*Myotis lucifugus)* can be particularly difficult to distinguish. Photo documentation of all bats captured and identified as IBAT and/or NLEB and the first 10 little brown bats

[33] Current standard federal Section 10 bat permit conditions require prior written approval from the Field Supervisor in the USFWS FO(s) if capture times may exceed 30 minutes.
[34] With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays because of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15. If tracking is proposed, surveys should be scheduled so that tracking is concluded prior to August 15.
[35] Overnight survey temperatures may be lower in northern portions of the NLEB range, coordinate with the local USFWS FO in the northern portions of the range for any variation in temperature requirements.

per project are requested to verify the identifications made in the field.

Photo documentation should include diagnostic characteristics:

- a ¾-view of face showing ear, tragus, and muzzle
- view of calcar showing presence/absence of keel
- a transverse view of toes showing extent of toe hairs

Consider taking short video clips of the bat and its diagnostic features, as videos may also be helpful to later confirm bat identification. If a bat from the genus *Myotis* is captured during mist-netting that cannot be readily identified to the species level, then species verification may be attempted through fecal DNA analysis. Collect one or more fecal pellets (i.e., guano) from the bat in question by placing it temporarily in a holding bag (15 minutes is usually sufficient, no more than 30 minutes is recommended). The pellet (or pellets) collected should be placed in a small vial (e.g., 1.5 ml) with silica gel desiccant; pellets from each individual bat should be stored in separate vials and out of direct light. Fees charged by independent laboratories for sequencing fecal DNA samples is generally inexpensive (approx. $50 per guano sample).

BAT BANDING

Bat banding (i.e. application of any type of band to the forearm of a bat) should be limited to well-designed projects with clear objectives addressing a research question of significant importance to the species' conservation and coordinated with the appropriate USFWS FO and state agency. Bat banding should be limited to efforts that are committed to returning to the capture site or a location where marked bats have a high likelihood of being recovered (e.g., hibernacula), thus enabling meaningful data collection from marked individuals. If approved to band bats, surveyors are required to demonstrate that banding is approved on their USFWS 10(a)1(A) Recovery Permit and adhere to any State permit conditions.

Banding pliers are required for applying bands to bat forearms; securing bands by pinching a band down with fingertips is not permitted. Banding pliers should be maintained at the correct calibration to ensure proper function. Surveyors must carry needle nose pliers that can be used to safely remove a band that was either improperly placed or is causing distress to a bat.

Bats must be banded with bands that are appropriate in size for the species. TCB should receive 2.4 mm aluminum metal-lipped bands and IBAT and NLEB should receive 2.9 mm bands. Males should be banded on the right forearm and females on their left. Proposals that deviate from these standards must include written justification in the site-specific Study Plan submitted to the USFWS FO for approval. All band information needs to be included in the mist net survey report and as part of the annual Section 10 reporting spreadsheet.

Any recovered bats with bands on their forearms should be assessed for injury and their condition noted on the mist net data form, and as part of the USFWS 10(a)1(A) Permit reporting spreadsheet in the comment section of the Capture Data Worksheet. Surveyor should note (1) type of injury and (2) whether band was left on or removed. Photos and/or videos of the site of injury should be included with the report. If known, duration from time the band was applied should also be noted. Bands should be cautiously removed when bats show signs of injury, except in situations where band removal may result in additional trauma or fatality.

SUBMISSION OF MIST-NETTING RESULTS

Provide results of netting surveys to the appropriate USFWS FO(s) in accordance with previously agreed

upon[36] timeframes and formats[37]. If IBAT and/or NLEB are captured, this report should also include the results of subsequent radio-tracking and emergence counts. Reports should include the following:

1. Copy of prior phase reports (if not previously provided).
2. Explanation of any modifications from original survey plan (e.g., altered net locations)[38]
3. Description of net locations (including site diagrams), net sets (include net heights), survey dates, duration of surveys, weather conditions, and a summary of findings.
4. Map identifying netting site locations and information regarding net sets, including lat/long or UTM, individual net placement, net spacing (i.e., include mist-netting equipment in photographs of net locations), and adequate justification if net sets are not evenly distributed across suitable habitat within the project area.
5. Full names of mist-netting personnel attending each mist-net site during an operation, including the federally permitted/qualified biologist present at each mist-net site. Indicate on the field data sheet the full name of person who identified bats each night at each site.
6. Legible copies of all original mist-netting datasheets (see example datasheet below) and a summary table with information on all bats captured during the survey including, but not limited to: capture site, date of capture, time of capture, sex, reproductive condition, age, weight, right forearm measurement, band number and type (if applicable), and Reichard's wing damage index score (Reichard and Kunz. 2009).
7. Photographs of all net sets, as well as **all** IBAT and NLEB and the first 10 little brown bats captured from each project, so that the placement of netting equipment and identification of species can be verified. Photographs of bats should include all diagnostic characteristics that resulted in the identification of the bat to the species level.
8. Any other information requested by the local USFWS FO(s) related to the project.

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[36] As discussed in the Introduction, we encourage coordination with USFWS FO(s) prior to implementation of any surveys to ensure that all parties agree upon the need for surveys, the methods proposed, and the decisions from various survey results.
[37] In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using the standardized permit reporting spreadsheets available on the USFWS website provided in the intro.
[38] If the USFWS previously agreed upon the study plan, we need to understand whether the revised work still accomplished the agreed upon methods.

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Sample Data Sheets for Bat Surveys

Site No.				Project/Firm:								Date:
Location:												
County:				State:		Quad:						Quadrant:
Lat/Long (DMS):		N		W			Zone:					Surveyors:

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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25											
26											
27											
28											
29											
30											

Moon Phase:		%
	Rise	Set
Moon:		
Sun:		

Time	Temp	Sky	Wind	# Bats
Avg				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Smoke or fog
5	Drizzle or light rain
6	Thunderstorm

Beauford Wind Code	
0	Calm (0 mph)
1	Light wind (1-3 mph)
2	Light breeze (4-7 mph)
3	Gentle breeze (8-12 mph)
4	Moderate breeze (13-18 mph)

*Repro. Cond (Reproductive Condition): (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

Sample Data Sheets for Bat Surveys

Net Site Diagram	Dominant Vegetation
	1
	2
	3
	4
	5

Net Site(s) by Habitat				
Habitat	**A**	**B**	**C**	
River				
Stream				
Pond				
Road Rut				
Corridor				
Cave/mine				
Total				

No. of Poles X Net length				
A	=		X	
B	=		X	
C	=		X	
D	=		X	

Other Species:

Comments:

APPENDIX C: PHASE 2 ACOUSTIC SURVEYS

SUMMER ACOUSTIC SURVEY SEASON: May 15 – August 15[39]

PERSONNEL[40]

Overall: Acoustic surveyors should have either completed one or more of the available bat acoustic courses/workshops put forth by various entities (e.g., Bat Conservation & Management, Bat Survey Solutions, Titley/AnaBat, Wildlife Acoustics, USFWS, Vesper Bat Detection Services) or be able to show similar on-the-job or academic experience. NOTE: Appendix C is intended for use within the IBAT range and/or NLEB hibernating range (see Figure 1); also refer to Appendix J for additional guidance on conducting acoustic surveys in the year-round active range of the NLEB.

Detector Deployment: Acoustic surveyors should have a working knowledge of the acoustic equipment and IBAT and/or NLEB ecology. Surveyors should be able to identify appropriate detector placement sites and establish those sites in the areas that are most suitable for recording high-quality IBAT and/or NLEB calls. Thus, it is highly recommended that all potential acoustic surveyors attend appropriate training and have experience in the proper placement of their field equipment.

Acoustic Analysis: Acoustic surveyors should have a working knowledge of the approved acoustic analysis programs, and any candidate acoustic analysis programs used for surveys. Thus, it is highly recommended that all potential acoustic surveyors attend appropriate training and have experience in the analysis of acoustic recordings.

Qualitative Analysis: Individuals qualified to conduct qualitative analysis of acoustic bat calls typically have experience: (1) gathering known calls as this provides a valuable resource in understanding how bat calls change and the variation present in them; (2) identifying bat calls recorded in numerous habitat types; (3) familiarity with the species likely to be encountered within the project area; and (4) individuals must have multiple years of experience and must have stayed current with qualitative ID skills. A resume (or similar documentation) must be submitted along with final acoustic survey reports for anyone making final qualitative identifications.

NOTE: The acoustic survey protocol may also be used for determining P/A of TCBs using the NLEB LOE for the 2024 field season; however, at this time, qualitative analysis is necessary for linear projects when using an approved version of Kaleidoscope Pro if the MLE is > 0.05 for all site-nights and 10 or more passes are auto-classified as potentially belonging to TCB at any site-night to reduce risk of false negatives. If you choose not to manually vet calls meeting these criteria, then you should assume presence of TCB for the project.

COORDINATION WITH USFWS FIELD OFFICES (FOs)

If not already required by federal permit, we recommend that applicants submit a draft study plan for all survey phases to the USFWS FO(s) for review and approval. Study plans should include a map/aerial photo identifying the proposed project area boundaries, suitable bat habitats and acreages within the project area, the proposed number and tentative locations of acoustic monitoring sites, and the identification of the approved (or candidate[41]) acoustic software program(s) (and version #) used for

[39] With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.
[40] Coordinate with your local FO regarding any state-specific requirements.
[41] At this time, all acoustic software programs are considered 'candidate' for locations identified in Figure 2.

analysis of calls for the specific project. If a single software program is used for analysis, surveyors will not be allowed to switch programs from what was originally identified in their final study plan.

DETECTOR AND MICROPHONE REQUIRED CHARACTERISTICS

Full-spectrum (FS) and/or zero-crossing (ZC) detectors are suitable for use in this survey protocol, however, FS is preferred given that FS call files capture more detail and can be converted to ZC for analysis if desired. Detectors used during surveys must be able to retain detailed information that is important for distinguishing between bat species with overlapping echolocation characteristics (e.g. high frequency component of the call). Multiple detectors capable of recording high-quality data are available for commercial use (e.g. Anabat Swift, Wildlife Acoustics SM4BatFS, Pettersson D500×). Until further refinements and testing of the AudioMoth detector (Open Acoustic Devices) take place, use of this detector for P/A surveys is not acceptable (Starbuck et al. 2022; Kunberger and Long 2023).

Directional, hemispherical, and omnidirectional microphones are acceptable for acoustic surveys. The use of external microphones on an extension cable is the preferred deployment as it further limits degradation of call quality. Recording without directional horns on hemispherical and omnidirectional microphones is preferred as the addition of these systems may result in some signal degradation and directional microphones are commercially available.

Use recommended manufacturer detector settings for conducting IBAT and/or NLEB P/A surveys unless otherwise noted on the Service's IBAT Summer Survey Guidance webpage. For ZC detectors (as well as when converting WAV files to ZC files), the data-division ratio must be set to 8.

ACOUSTIC SAMPLING PROTOCOL

Detector/Microphone Placement

IBAT and NLEB typically forage in habitats that do not completely overlap (see species-specific habitat definitions in Appendix A); therefore, acoustic sites should reflect these differences when targeting both species. When sampling for multiple species, surveyors are expected to understand which sites are more likely to detect each species of interest and avoid oversampling habitat that only one species is likely to use. Early coordination with the FOs is highly encouraged to ensure the sampling methods are suitable. For instance, NLEB is a clutter-adapted gleaning species (see definition of suitable summer habitat in Appendix A), and therefore acoustic sites should target interior forests and forested riparian streams representing a variety of understory cover and canopy closure (Carroll et al. 2002). Ponds and large water-filled road ruts can be productive places to deploy detectors when other water sources are limited. Detectors placed on forest edges are less likely to detect NLEB.

Detector/Microphone placement is critical to the successful isolation of high-quality bat call sequences for later analysis. The following locations are likely to be suitable sites for detectors/microphones to sample for IBAT and/or NLEB, including, but not limited to: (a) forest-canopy openings; (b) near water sources; (c) wooded fence lines that are adjacent to large openings or connect two larger blocks of suitable habitat; (d) blocks of recently logged forest where some potential roost trees remain; (e) road and/or stream corridors with open tree canopies or canopy height of more than 33 feet (10 meters); and (f) woodland edges (Britzke et al. 2010). Of equal importance to acoustic site selection is the surveyor's working knowledge of the sampling volume and area of highest sensitivity within the zone of detection around a given microphone, which helps to ensure that detector placement as well as microphone selection and orientation are best suited for a particular site to ensure the detection zone is free of clutter. Detection distance, placement (e.g., location, orientation, height of microphone), and specific features (e.g., vegetation, water, and other obstructions) at the sample site should dictate whether a directional,

hemispherical, or omnidirectional microphone is used. If detectors/microphones are placed in unsuitable locations, effective data analysis may be impossible, and the results of the sampling effort will likely be invalid.

Many features (e.g., vegetation, water, wind turbines, high-tensile powerlines, micro-wave towers) can obstruct and reflect call sequences recorded in the field and thereby reduce the surveyor's ability to record high-quality bat call sequences. The following recommendations are provided to aid surveyors in their selection of acoustic sites (also see Chenger and Tyburec 2014). If surveyors choose acoustic sites outside of these recommendations, then adequate justification for doing so should be provided with the acoustic survey report provided to the USFWS FO(s); otherwise, results from these sites will not be accepted. Surveyors should deploy microphones: (a) at least 10 feet (3 meters) in any direction from vegetation or other obstructions (Hayes 2000; Weller and Zabel 2002; Chenger and Tyburec 2014, Fraser et al. 2020); (b) in areas without, or with minimal[42], vegetation within 100 feet (30 meters) of highly directional microphones or 33 feet (10 meters) from other microphones; (c) parallel to woodland edges; and (d) at least 49 feet (15 meters) from known or suitable roosts[43] (e.g., trees/snags, buildings, bridges, bat houses, cave or mine portal entrances).

Elevating a detector greater than 3 meters above ground level (AGL) vegetation may dramatically improve recording quality. Microphones can be attached horizontally to a pole to listen out into flight space, rather than just listening up from the ground. This will serve to increase the volume of airspace sampled and avoid the distortion effect of recording near the ground. However, the relationship between the zone of detection and the vegetation/clutter, not the placement of the detector is the most important consideration during site selection. Because NLEBs are a clutter- adapted gleaning species (see definition of suitable summer habitat in Appendix A), placement of detectors should be as close to clutter as possible but not in clutter.

Surveyors should distribute acoustic sites throughout the project area or adjacent habitats. In most cases, acoustic sites should be at least 656 feet (200 meters) apart. If closer spacing is determined to be necessary or beneficial (e.g., multiple suitable habitats and acoustic sites immediately adjacent to each other), sufficient justification must be provided in the acoustic study plan and survey report submitted to USFWS FO(s).

Verification of Deployment Location

It is recommended to temporarily attach GPS units to each detector (according to manufacturer's instructions) to directly record accurate location coordinates for each acoustic site that is paired with the acoustic data files. Regardless of technique used, accurate GPS coordinates must be generated and reported for each acoustic detector location.

Verification of Proper Functioning

It is highly recommended that surveyors ensure acoustic detectors are functioning properly through a periodic verification of performance to factory specifications (a service currently offered or in development by several manufacturers). It may be possible that independent service bureaus would be willing to perform this service, providing that a standard test/adjustment procedure can be developed.

[42] If necessary, surveyors can remove small amounts of vegetation (e.g., small limbs, saplings) from the estimated detection zone at a site, much like what is done while setting up mist-nets. Deployment of detectors/microphones in closed-canopy locations that typically are good for mist-netting are acceptable as long as the area sampled below the canopy does not restrict the ability of the equipment's detection zone to record high-quality calls (i.e., vegetation is outside of the detection zone).

[43] If the surveyor discovers a potential roost and wishes to document bat use, refer to Appendix E for guidance on conducting emergence surveys and contact the USFWS FO(s).

It is also recommended to ensure equipment is working during set-up in the field. This can be done simply by producing ultrasound (e.g., finger rubs, calibrator, or follow the equipment manufacturer's testing recommendations) in front of the microphone at survey start and survey finish. These tests document that the equipment was working when deployed and when picked up (and by assumption throughout the entire period). Detector field settings (e.g., sensitivity, frequency, etc.) should follow the recommendations provided by the manufacturer. Surveyors should also save files produced by detectors (e.g., log files, status files, sensor files) as an excellent way to provide documentation when equipment was functioning within the survey period. Many types of detectors allow for setting timers that initiate and end recording sessions. This saves battery life as well as reducing the number of extraneous noise files recorded. However, if the units are visited when the timer is on (i.e., unit is in standby mode), the surveyor cannot verify that the unit is functioning properly. This is particularly important in areas where no bat activity is recorded for the entire night or during the last portion of the night. In these cases, if the surveyor cannot demonstrate that the detector was indeed functioning properly throughout the survey period, then the site will need to be re-sampled, unless adequate justification can be provided to the USFWS FO(s).

Selection of acoustic sites is similarly important. Suitable set-up of the equipment should result in high-quality call sequences that are adequate for species identification. Nights of sampling at individual sites that produce no bat calls may need to be re-sampled unless adequate justification (e.g., areas with significant bat population declines due to WNS) can be provided to the USFWS FO(s). Modifications of the equipment (e.g., changing the orientation and/or microphone type) at the same location on subsequent nights may improve quantity and quality of call sequences recorded, which can be determined through daily data downloads. If modifications of the equipment do not improve call identification, then the detectors will need to be moved to a new location.

Orientation

Detectors deployed with directional microphones should be aimed to sample the majority of the identified flight path/zone to maximize the number of call pulses recorded from individual bats. Omnidirectional microphones deployed on a pole in the center of the flight path/zone should be oriented horizontally. In some circumstances, it might be desirable to aim a directional microphone straight up in smaller forest openings. As always, the goal is to sample as large a volume of likely bat flight space as possible while minimizing clutter. Hemispherical microphones should be aimed vertically, creating a dome-like detection field. Hemispherical microphones are best suited for open areas where deploying at heights greater than 3 meters AGL is problematic because of the lack of structure to hide the microphone and prevent it from becoming a novel item of interest to bats. Vertical orientation, however, precludes the use of weatherproofing for protection of the microphone. Once acoustic sites are identified, photographs documenting the orientation, detection zone (i.e., "what the detector is sampling"), and relative position of the microphone should be taken for later submittal to the USFWS FO(s) as part of the acoustic survey report (See Submission of Acoustic Survey Results for additional description).

Weather Conditions

If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night[44]: (a) temperatures fall below 50°F (10°C)[45] during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period. At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and

[44] With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.
[45] Overnight survey temperatures may be lower in northern portion of the NLEB range, coordinate with the local USFWS FO in the northern portion of the range for any variation in temperature requirements.

summarized in the survey reports.

Weatherproofing

Depending on the brand and model, bat detectors may or may not be weatherproof when delivered from the factory or supplier. Recording without after-market weatherproofing is preferred as the addition of these systems may result in some signal degradation. The decision to weatherproof detectors or not should be determined nightly based on the likelihood of precipitation in the survey area. If necessary, detectors should be placed in after-market weatherproof containers and an external microphone, attached by an extension cable should be deployed greater than 3 meters AGL.

For directional microphones, the use of a polyvinyl chloride (PVC) tube[46], generally, in the form of a 45-degree elbow the same diameter as the microphone (Britzke et al. 2010) is acceptable, if the situation requires the use of after-market weatherproofing. The microphone should be placed facing the open end of the elbow and as close to the opening as is consistent with the aim of weatherproofing. The microphone should be pointing at an angle below horizontal so water will not collect in it. Corben & Livengood (2014) showed that the direction of greatest sensitivity of tubes like this varies greatly depending on details of the specific tube shape and the exact position of the microphone. Often the greatest sensitivity will be pointed up at a substantial angle (up to 45 degrees) above horizontal when the microphone itself is pointing 45 degrees below horizontal. Users should be aware of the characteristics of the setup they use so they can know what region is being sampled. Again, the preferred option for weatherproofing detectors is to detach the microphone from the detector so that the detector can be placed in a weatherproof container, but the microphone (tethered by a cable) remains unobstructed.

Other after-market weatherproofing systems may become available and approved by the USFWS provided they show that call quality and the number of calls recorded are comparable to those without weatherproofing.

MINIMUM LEVEL OF EFFORT

The level of acoustic survey effort required for a project will be dependent upon the overall acreage of suitable habitat that may be impacted by the action (directly or indirectly). To determine the acoustic survey effort, quantify the amount of suitable summer habitat within the project area.

NOTE: for projects where impacts other than tree removal are likely (e.g., collision), ensure that P/A surveys are designed to cover all suitable habitat within the entire project area and NOT just the locations where tree removal is planned.

IBAT Range-wide Acoustic LOE (See Figure 1 and Table 2)

Linear projects: a minimum of 4 detector nights per km (0.6 miles) of suitable summer habitat (See Appendix F).

At least 1 detector location for at least 2 calendar nights (can sample the same location or move within the km site).

Non-linear projects: a minimum of 10 detector nights per 123 acres (0.5 km^2) of suitable summer habitat.

At least 2 detector locations per 123-acre "site" shall be sampled over the course of at least 2 calendar nights (may be consecutive) until at least 10 detector nights has been completed.

[46] The PVC option has only been tested with AnaBat SD1/SD2 detectors and directional microphones. It may not perform as well with other detector microphone combinations.

NLEB Range-wide Acoustic LOE (See Figure 1 and Table 2)

Linear projects: a minimum of 4 detector nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

At least 1 detector location for at least 2 calendar nights (can sample the same location or move within the km site).

Non-linear projects: a minimum of 14 detector nights per 123 acres (0.5 km^2) of suitable summer habitat.

At least 2 detector locations per 123-acre "site" shall be sampled over the course of at least 2 calendar nights (may be consecutive) until at least 14 detector nights has been completed.

The acoustic sampling period for each site must begin at sunset[47] and ends at sunrise each night of sampling.

ANALYSIS OF RECORDED ECHOLOCATION CALLS

Step 5. Optional coarse screening - for high frequency (HF) or myotid calls (depending on available H/L frequency filters) or Proceed to Step 6.

a) If no positive detection of HF calls[48] (≥35 kHz) or myotid calls, no further summer/active season surveys recommended.

b) If positive detection of HF or myotid calls, then
   i) proceed to Step 6 for further acoustic analysis; **OR**
   ii) assume presence of IBAT and/or NLEB and coordinate with the USFWS FO(s); **OR**
   iii) assume presence and proceed to **Phase 3**.

Step 6. Conduct Automated Acoustic Analyses for each site that had HF or Myotid calls from Step 5 or ALL sites and ALL calls if Step 5 was not conducted.

Use **one or more** of the currently available 'approved' acoustic bat ID programs[49] (use most current approved software versions available and manufacturer's recommended settings for IBAT and/or NLEB P/A surveys) as previously identified in your Phase 2 study plan.

'Candidate' programs are not yet approved by USFWS for stand-alone use for P/A surveys but may be used in conjunction with one or more of the approved programs. At this time, no acoustic bat ID programs are 'approved' for many western states (Figure 2). Two or more of the currently available 'candidate' programs must be used for surveys conducted in these locations (always use most recent versions of software programs).

Include your plans for which specific software program(s) you will use in your survey study plan and submit for USFWS FO(s) review prior to conducting surveys. Beginning with acoustic data

[47] Surveys may need to start a little earlier or later than official sunset times (i.e., at "dusk") in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: https://sunrise-sunset.org
[48] HF calls are defined as individual call pulses whose minimum frequency is ≥35 kHz.
[49] Approved and candidate programs are listed on the USFWS website provided in the intro; note all programs are considered 'candidate' for areas identified in Figure 2.

from night one at each acoustic site, run each night's data for each site through your chosen ID program(s). Review results by site by night from each acoustic ID program used[50].

a) If IBAT and NLEB presence is considered unlikely by the approved and candidate program(s) used in analysis, then no further summer surveys recommended.

b) If IBAT and/or NLEB presence is considered likely at one or more sites on one or more nights by any approved or candidate program(s) used in analysis, then

i) proceed to Step 7 for qualitative ID; **OR**
ii) assume presence of IBAT and/or NLEB and coordinate with the USFWS FO(s); **OR**
iii) assume presence and proceed to **Phase 3**.

Step 7. Conduct Qualitative Analysis of Calls.

At a minimum, for each detector site-night a program identified IBAT and/or NLEB presence likely (i.e., P<0.05), review all HF (i.e., ≥35 kHz) call files (regardless of MLE value and including no ID files) from that site-night. Qualitative analysis (i.e., manual vetting) must also include and present within a written report a comparison of the results of each acoustic ID program by site and night (see Reporting Requirements below).

a) If no visual confirmation of IBAT and NLEB, then no further summer/active season surveys recommended[51].

b) If visual confirmation of IBAT and/or NLEB, then

i) assume presence of IBAT and/or NLEB and coordinate with the USFWS FO(s); **OR**
ii) assume presence and proceed to **Phase 3**.

SUBMISSION OF ACOUSTIC SURVEY RESULTS

NOTE: All originally recorded (ZC or FS) data MUST be maintained for a period of 7 years and be made available to the USFWS FO(s), if requested. Failure to do so may result in invalidation of survey results. Results of acoustic survey data collected as part of P/A surveys must also be submitted annually in Section 10 reporting spreadsheets to the USFWS.

Provide results of acoustic surveys to the appropriate USFWS FO(s) within 30 days of completing the survey unless otherwise agreed upon with the local USFWS FO(s)[52]. Each acoustic survey report should include the following[53] (also, see checklist at end of this appendix):

[50] The approved acoustic identification programs all have implemented a maximum likelihood estimator (MLE) at this time. If the analysis of collected calls at a given site on a given night results in the presence of IBAT and/or NLEB with high levels of certainty (P<0.05), then select one of the options available in Step 6b.
[51] If you identify any suspected mis-identifications from programs, the Service will share those results with the software manufacturer(s) and the USGS to assist with future improvements and testing of software.
[52] As discussed in the Introduction, we encourage coordination with USFWS FO(s) prior to implementation of any surveys to ensure that all parties agree upon the need for surveys, the methods proposed, and the decisions from various survey results.
[53] In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using the standardized permit reporting spreadsheets available on the IBAT Summer Survey Guidance webpage (http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html).

APPENDIX C. PHASE 2 ACOUSTIC SURVEYS

1. Copy of habitat assessment (if not previously provided)
2. Explanation of any modifications from original survey plan (e.g., altered site locations)[54]
3. Full names of all personnel conducting acoustic surveys, including those that selected acoustic sites and deployed detectors
4. Full name and resume of individual(s) conducting qualitative acoustic analyses (if applicable)
5. Description of acoustic monitoring sites, survey dates, duration of survey, weather conditions, and a summary of findings
6. Table with information on acoustic monitoring and resulting data, including but not limited to: detector GPS coordinates for each detector, survey dates, survey hours
7. Map identifying acoustic detector locations and a corresponding table including the GPS coordinates. Include arrow(s) showing direction(s) of microphone(s)
8. Photographs documenting the location of each detector, the orientation of the detector, and the intended sampling area. Include detector and something for scale (e.g., vehicle, person) in photographs of acoustic sites
9. Description of acoustic detector and microphone brand(s) and model(s) used, microphone type, use of weatherproofing, acoustic monitoring equipment settings (e.g., sensitivity, audio division ratios), deployment data (i.e., deployment site, habitat, date, time started, time stopped, orientation), and call analysis methods used
10. A description of how proper functioning of bat detectors was verified
11. Discussion of what software program(s) was/were used (including settings)
12. Acoustic detector log files renamed by site identifier
13. Acoustic analysis software program output/summary results by site by night (i.e., number of calls detected, species composition, MLE results, settings files)
14. Discussion for any site-nights with zero bat calls (were additional nights added? was detector functioning? was placement appropriate?)
15. If manual vetting was used, discussion of how this was done (e.g., what keys were used?)
16. If manual vetting was used, detailed analysis and results of any qualitative acoustic analysis conducted on those projects where a program(s) considered IBAT and/or NLEB presence likely, including justification for rejecting any program MLE results (if applicable). We recommend providing a table with each species ID from the program(s), suggested species ID from manual vetting, and rationale for any changes.
17. Any other information requested by the local USFWS FO(s) related to the project

[54] If the USFWS previously agreed upon the study plan, we need to understand whether the revised work still accomplished the agreed upon methods.

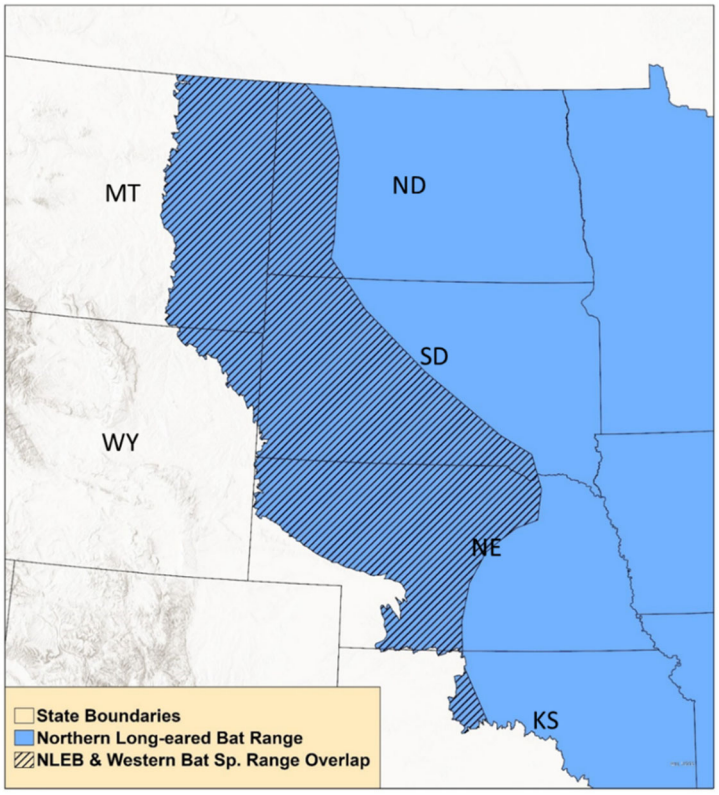


FIGURE 2. Portion of NLEB range overlapping with western bat species.

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General Checklist for Acoustic Surveys of Indiana and/or Northern Long-eared Bats

The following items should be documented and clearly presented within acoustic bat survey reports submitted to the Service

ACOUSTIC SURVEY INFO

- ☐ Project Name
- ☐ Site ID No./Name
- ☐ State and County
- ☐ Site Lat./Long. Coordinates (e.g., decimal degrees, NAD83)
- ☐ Approx. accuracy of Lat./Long. Coordinates
- ☐ Survey Date(s)
- ☐ Person who Selected Acoustic Site(s)
- ☐ Person who Deployed Detector(s)
- ☐ Detector Brand & Model
- ☐ Microphone Brand & Model
- ☐ Microphone Type: Directional/Hemispherical/Omnidirectional
- ☐ Type of Weatherproofing (if any)
- ☐ Microphone Height above Ground-level Vegetation(m)
- ☐ Distance from Nearest Vegetation or other Obstruction (m)(apart from veg. on ground)
- ☐ Horizontal Orientation of Microphone (1-360°)
- ☐ Vertical Orientation of Microphone (assuming 0° is parallel with horizon)
- ☐ Photographs of Detector Set-up at each Site
- ☐ Detector Settings and/or Log Files (all settings used for each brand/model of detector. For example, sensitivity, gain, data division, 16k high filter, sample rate, min/max duration, min trigger freq., trigger level, etc.)
- ☐ Survey Start Time (military)
- ☐ Survey End Time (military)
- ☐ Methods used to Field-test proper Functioning of Detector
- ☐ Were calls collected in Full Spectrum or Zero Crossing?
- ☐ Habitat Type and/or Feature Surveyed
- ☐ Weather Conditions during Survey Period

ACOUSTIC ANALYSIS INFO

- ☐ Program used to convert Full Spectrum to Zero Cross (if applicable)?
- ☐ Filter(s) used (if any) and parameters used (e.g., CFRead, noise, bug, etc.)
- ☐ Name of Service-approved Bat ID Software Program(s) and Version(s) used and Candidate program(s)(if used)
- ☐ Program Settings (if applicable):
  - Min. # of pulses for species ID
  - Min. # of pulses per group ID
  - Min. discrim. prob. for species ID
  - Other relevant settings affecting ID
  - Suite of species/groups included in program analysis
- ☐ Table summarizing Number of Calls ID'd for each Species/Site/Night/Program (including MLE p-values)
- ☐ If Qualitative Analysis was conducted, include Number of Calls Confirmed through Qualitative ID for each Species/Site/Night
- ☐ Full Name of Person(s) who conducted Qualitative Analysis
- ☐ Additional Survey Reporting Requirements
- ☐ Acoustic Report Appendices:
  - data sheets and maps,
  - photographs of detector set-ups,
  - computer screen captures of representative bat species identified during acoustic analyses, and
  - resume(s) highlighting relevant qualifications of person(s) who conducted qualitative analysis (e.g., experience visually identifying *Myotis*, certificates of training, publications etc.)

APPENDIX D: PHASE 4 RADIO-TRACKING

PERSONNEL

Transmitter Attachment: A qualified biologist[55] who is experienced in handling IBAT and/or NLEB and attaching radio transmitters must perform transmitter attachments, as further explained in the protocol below.

Tracking: Biological technicians and/or a qualified biologist who is experienced in tracking transmittered bats must be present and actively involved in all tracking activities for IBAT and/or NLEB as further explained in the protocol below.

NOTE: The radio-tracking protocol may also be used for captured TCBs; however, radio-tracking of TCB should prioritize identification of the immediate roosting area of the transmittered bat given the difficulty in locating the bats exact roosting location.

METHODS

If one or more IBAT and/or NLEB are captured, the following radio-tracking protocols will be applicable:

1. Biologists should coordinate in advance with USFWS FO(s) regarding radio-tracking recommendations (e.g., number and distribution of transmitters, including prioritization of sex/age and maximum number per site) and whether foraging data would be beneficial to collect. Also, professional judgment should be used to determine whether attachment of transmitters could compromise the health of a bat. Since the maximum holding times for IBAT and/or NLEB targeted for radio-tracking is 30 minutes[56], or as allowed in federal and state permits, surveyors should be prepared to place transmitters on bats immediately following their capture to minimize holding times.

2. The radio transmitter, adhesive, and any other markings (e.g., wing bands) should weigh less than 5% of pre-attachment body weight (Aldridge and Brigham 1988, American Society of Mammalogists 1998) and must comply with any USFWS and state permits. In all cases, the lightest transmitters capable of the required task should be used, particularly with pregnant females and volant juveniles. With pregnant bats, biologists should always use the lightest transmitter possible but no more than 5% of their expected non-pregnant weight.

3. Proper application methods are paramount to the successful retention of an applied transmitter. Qualified biologists should apply commonly accepted methods. Examples of available resources include:

    - https://tccarterlab.files.wordpress.com/2017/10/application-of-transmitters-in-small-insectivorous-bats1.pdf

[55] A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for federally-listed bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to mist-net for IBAT and/or NLEB. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.
[56] Current standard federal Section 10 bat permit conditions require prior written approval from the Field Supervisor in the USFWS FO(s) if capture times may exceed 30 minutes

- https://www.holohil.com/wp-content/uploads/2015/07/carter2009.pdf
- https://www.holohil.com/links/bat-attachment/#:~:text=Transmitters%20should%20be%20attached%20to,the%20fur%20is%20not%20clipped.

4. Adhesives (or "glues") used during radio-tracking and telemetry studies[57] to attach transmitters to bats must be included in the "Approved Adhesives for P/A Telemetry Studies" list (Table 3)[58]. The list includes commercially available latex and silicone-based cements that are known to adhere transmitters to bats for approximately 1 to 30 days. Latex-based rubber cements have a long history of use by researchers and to our knowledge have no adverse health effects to bats. Products that are likely to adhere transmitters to bats for more than 4 weeks or have been reported to have adverse reactions are not permitted (see Figure 3). For a list of examples of products that are currently not permitted, see Table 4.

TABLE 3. Approved Adhesives

Type	Active ingredients	Name	Manufacturer
Latex-based Surgical Cement[1]	Liquid latex, N-hexane, zinc oxide	Torbot	Torbot Group, Inc.
	Liquid latex, N-hexane, zinc oxide	Ostobond	Montreal Ostomy Products.
	Liquid latex, N-hexane, zinc oxide	Permatype	Perma-Type Company, Inc.
Silicone-based Surgical Adhesive[2]	Silicone solids, ethyl acetate	Uro-Bond III 5000	Urocare Products, Inc.
Butyl-cyanoacrylate Surgical Adhesives[3]	100% n-butyl cyanoacrylate	Vetbond	3M

[1] Liquid, malleable bonding cements that contain latex and take several minutes to cure. Bonds skin to skin.
[2] Liquid, malleable surgical adhesives that contain silicone and takes several minutes to cure. Bonds appliances to skin.
[3] Stiff, cyanoacrylate-based products react quickly with water to form a durable, waterproof bond.

TABLE 4. Examples of Prohibited Adhesives. (This list is not exhaustive)

Type	Active ingredients	Name	Manufacturer
Octyl-cyanoacrylate Surgical Adhesives[1]	100% 2-octyl cyanoacrylate	Dermabond	Zoetis Canada Inc
	100% 2-octyl cyanoacrylate	Surgi-Lock 2oc	Meridian Animal Health
	60% 2-octyl cyanoacrylate, 40% n-butyl cyanoacrylate	GluTure	Ethicon, Inc
	60% cyanoacrylate	Locktite 422	Henkel Adhesives

[1] Stiff, cyanoacrylate-based products react quickly with water to form a durable, waterproof bond.

[57] The Guidelines do not address recommendations for MOTUS based transmitter applications, wound closure for pit-tag studies, or other applications of adhesives. However, we strongly recommend researchers review SDS information for products prior to use to determine their safety for use on bats. Adhesives that are not recommended for use on human or animal skin should never be used to attach transmitters to bats or to close up pit tag wounds. Therefore, products such as (but not limited to) F2 Adhesive, Lash Grip, Shut Eye, and Locktite Superglues, whose Safety Data Sheets specifically state that the product is not intended for application to skin and may cause skin irritation, should be avoided.
[58] To request a specific product addition to the list of adhesives in Table 3, submit a request to FW4_Bat_Survey_Guidance@fws.gov. In the email, provide the product name, product Safety Data Sheet, manufacturer recommendations for product use, active ingredient list, whether the product was developed for human or veterinary purposes, if the product is designed for bonding appliances to skin (preferred) or for closing wounds and any other relevant information.

NOTE: Surveyors who recapture a bat after using any adhesive should observe the bat's skin for signs of irritation, infection, excessive fur loss, and take photos or a video of the area where transmitter was applied (for example, see Figure 3). Report information to the Guidelines Team (FW4_Bat_Survey_Guidance@fws.gov).



FIGURE 3. A photo of a back of an Indiana bat with significant fur loss three weeks after transmitter was attached using GluTure. In this example, the transmitter was applied using a small dab of GluTure between the scapulae.

5. Proposed radio telemetry equipment (e.g., receivers, antennas, and transmitters) and frequencies should be coordinated with the appropriate state natural resource agency and USFWS FO(s). Prior to purchasing transmitters, biologists should inquire with transmitter manufacturers about signal boosting to determine if this option would improve bat detectability in their planned work areas. Transmitters with modified signals must be built to last the duration of the telemetry study approved in the Site Study Plan (e.g., > 7 days).

   Surveyors should thoroughly test transmitter function prior to the Study. Transmitters should be new or no more than one year old at the time they are applied to a bat and should be stored as recommended by manufacturer prior to use. Transmitters more than 1 year old must be tested prior to the study to ensure function and no degradation in anticipated signal strength. To establish function, all transmitters should be temporarily activated for at least 24 hours. To determine signal strength, surveyors should temporarily activate transmitter and test receiver signal strength. Topography, ambient weather conditions, and location of the bat and direction of antenna are all examples of variables that will dictate the distance at which a signal is detectable, but in general, the signal should be consistently detectable from at least one mile away. Transmitters more than 2 years old should be refurbished before using for P/A surveys.

6. The qualified biologist or biological technician(s) should track all radio-tagged bats captured to diurnal roosts in accordance with permit requirements. We generally recommend tracking until the transmitter fails, fall off, or cannot be located for at least 7 days and should conduct a minimum of 2 evening emergence counts at each identified roost (See Appendix E for Emergence Survey Protocols). However, biologists are encouraged to continue radio-tracking efforts for the life of the transmitter. Biologists should contact the USFWS FO(s) immediately if they plan to cease tracking efforts before the 7-day tracking period ends. If landowner access is denied, approximate roost locations (i.e., coordinates) should be determined using triangulation.

7. Daily radio telemetry searches for roosts must be conducted during daylight hours and should be conducted until the bat(s) is located or for a minimum of 4 hours of ground or 1 hour of aerial-searching effort per tagged bat per day for 7 days. However, multiple bats captured at the same net location or nearby may be tracked simultaneously. Once a signal is detected, tracking should continue until the roost is located. At a minimum, biologists should document all ground and aerial-searching effort for all bats not recovered during radio- tracking for submittal with the survey report. For each roost identified during tracking, the biologist should complete a "USFWS

IBAT and/or NLEB Roost Datasheet".

8. To minimize potential for disease transmission, any equipment that comes in contact with bats should be kept clean and disinfected, following approved protocols; this is particularly a concern relative to WNS. Protocols are posted at http://www.whitenosesyndrome.org/. Federal and state permits may also have specific equipment restrictions and disinfection requirements.

SUBMISSION OF RADIO-TRACKING RESULTS

Phase 4 radio-tracking results should be included with the Phase 2 or 3 mist-netting report and submitted to the appropriate USFWS FO(s). Each report should include the following information related to radio-tracking efforts[59]:

1. Copy of prior phase reports (if not previously provided)
2. Explanation of any modifications from original survey plan (e.g., number of transmitters used, frequency of transmitters changed)[60]
3. Map and narrative detailing all ground and aerial search effort for all bats not recovered during radio-tracking and relative to the negotiated or agreed effort as determined by the appropriate USFWS FO(s)
4. Map summarizing IBAT and/or NLEB data collected from summer surveys for the proposed project (e.g., project area boundary and results from the site habitat assessment, acoustic survey, mist-net survey, radio-tracking, and emergence surveys)
5. Full names and permit numbers of personnel who attached transmitters to IBAT and/or NLEB and full names of all personnel conducting radio-tracking efforts
6. Photographs of all roosts identified during radio-tracking
7. Legible copies of all original USFWS IBAT and/or NLEB Roost Datasheets
8. Any other information requested by the local USFWS FO(s) where work was conducted

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American Society of Mammalogists. 1998. Guidelines for the capture, handling and care of mammals. Journal of Mammalogy 79:1416-1431.

[59] In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using standardized permit reporting spreadsheets available on the USFWS website provided in the intro.
[60] If the USFWS previously agreed upon the study plan, we need to understand whether the revised work still accomplished the agreed upon methods.

USFWS INDIANA AND/OR NORTHERN LONG-EARED BAT ROOST DATASHEET

Biologists (Full Name):_____ Date: _____

UTM: Zone_____ Easting _____ Northing_____ *OR*

LAT_____ LONG_____

Property Owner: _____ Phone#_____

State_____ County_____ Site #_____

Roost #_____ Roost Name: _____

Roost Tree Data

Species: _____ Live __ Snag __ Other _

(if other, explain) _____

DBH (in or cm) _____ Total Height (ft or m) _____

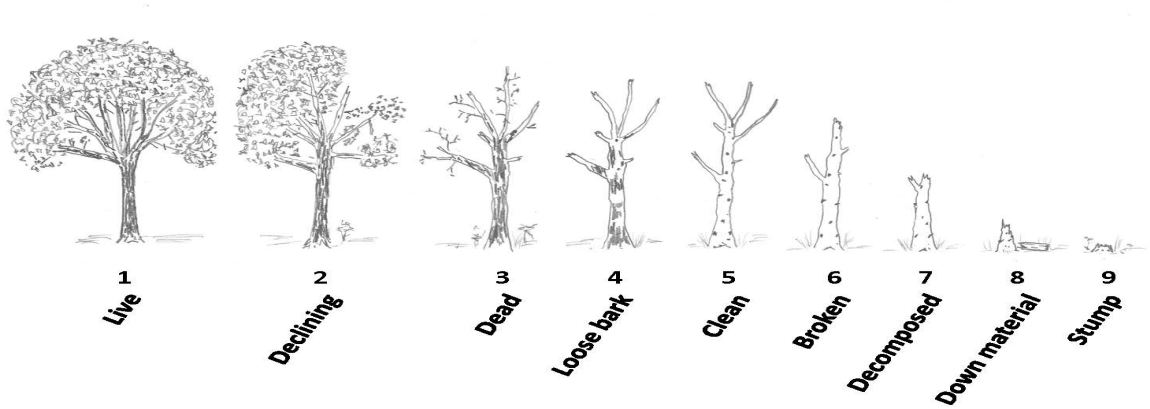
Height of roost area (if known) _____Dist. from capture site_____

Roost position aspect (deg) _____

Exfoliating bark on bole (%) _____ Describe: sloughing _ platy_ tight_

Cavities present? ____ If so, describe: _____

Roost Decay State: 1 2 3 4 5 6 7 8 9 Other



Roost tree or snag canopy position: Dominant __ Co-Dominant __ Suppressed _

Surrounding Habitat Condition

Canopy closure at roost (%) _____

Approximate woodlot size (ac or ha) _____ Distance to non-forest (ft or m) _____

Describe forest/woodlot current condition (mature, partially cut-over, burned, insect damage, etc.)
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Additional Comments_____

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APPENDIX E: PHASE 4 EMERGENCE SURVEYS

PERSONNEL

Qualified biologists[61], biological technicians, and any other individuals deemed qualified by a local USFWS FO may conduct emergence surveys for IBAT and/or NLEB by following the protocols below.

EMERGENCE SURVEYS FOR KNOWN IBAT AND/OR NLEB ROOSTS

The following protocols should begin as soon as feasible after identification of a diurnal roost (ideally that night):

NOTE: The emergence survey protocol should not be used for radio-tracked TCBs or emergence surveys of identified potential roosts given the variability in roosting locations typically used by the species (e.g., roosting in dead leaf clusters in the canopy of live trees) and difficulty observing bats emerging. An emergence count may be attempted on the rare occasion that the surveyor is able to discover the exact roosting location of a transmittered TCB and believes he/she can observe the bat(s) emerging.

1. Bat emergence surveys should begin one half hour before sunset[62] and continue until at least one hour after sunset or until it is otherwise too dark to see emerging bats. The surveyor(s) should be positioned so that emerging bats will be silhouetted against the sky as they exit the roost. Tallies of emerging bats should be recorded every few minutes or as natural breaks in bat activity allow. There should be at least one surveyor per roost. Surveyors must be close enough to the roost to observe all exiting bats but not close enough to influence emergence. That is, do not stand directly beneath the roost, do not make noise or carry on a conversation, and minimize use of lights (use a small flashlight to record data, if necessary). Do not shine a light on the roost as this may prevent or delay bats from emerging. Use of an infra-red, night vision, or thermal-imaging video camera or spotting scope is encouraged but not required. Likewise, use of an ultrasonic bat detector may aid in identifying the exact timing of bats emerging and may be used to help differentiate between low- and high-frequency bats species, and therefore, is strongly recommended. If multiple roosts are known within a colony, then simultaneous emergence surveys are encouraged to estimate population size. [NOTE: If a roost cannot be adequately silhouetted, then the local USFWS FO(s) should be contacted to discuss alternative survey methods].

2. Bat activity is affected by weather; therefore, emergence surveys should not be conducted when the following conditions exist: (a) temperatures that fall below 50□F (10□C); (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale).

3. Surveyors should use the attached (or similar) “Bat Emergence Survey Datasheet”.

[61] A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for federally listed bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to mist-net for IBAT and/or NLEB. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

[62] Surveys may need to start a little earlier or later than one half hour before official sunset times (i.e., before “dusk”) in some settings such as deep/dark forested valleys or ridge tops, respectively. Sunset tables for the location of survey can be found at: https://sunrise-sunset.org

4. Surveyors should also complete an "IBAT and/or NLEB Roost Datasheet" for each roost known to be used by one or more IBAT and/or NLEB (see Appendix D for an example).

5. Completed datasheets should be included in reports prepared for the USFWS.

EMERGENCE SURVEYS FOR POTENTIAL IBAT AND/OR NLEB ROOSTS

In some limited cases (e.g., individual hazard tree removal during the active season[63]), surveyors may have the option of conducting emergence surveys for individual potential IBAT and/or NLEB roosts to determine use prior to removal. Evaluations whether potential roosts meet the criteria to conduct emergence surveys should be for each individual tree rather than groups of trees. The following protocol applies to these surveys:

1. Consult with the local USFWS FO(s) to determine whether a tree(s) that needs to be felled/ cleared may be potential roosting habitat for IBAT and/or NLEB and whether conducting an emergence survey is an appropriate means of avoiding take of IBAT and/or NLEB[64]. In general, the USFWS only approves of conducting emergence surveys as a means of avoiding direct take of bats for projects that only affect a very small number of potential roosts (e.g., less than or equal to 10)[65] in relatively small project areas. In addition, emergence surveys are only valid if all parts of the tree (limbs and trunk) can be observed by the surveyor. Therefore, trees within woodlands that are directly adjacent to other trees and whose canopy is blocked are not suitable for emergence surveys. An online directory of USFWS offices is available at: http://www.fws.gov/offices/.

2. If the USFWS FO(s) approves/concurs with Step 1, then follow the emergence guidelines for Emergence Surveys for Known IBAT and/or NLEB Roosts (above) to determine if any bats are roosting in the tree(s).

3. At the conclusion of the emergence survey:

    a. If **no** bats were observed emerging from the potential roost(s), then it maybe felled immediately. If safety concerns dictate that a tree cannot be felled immediately (i.e., in the dark), then the tree(s) should be felled as soon as possible after sunrise on the following day. If a tree is not felled during the daytime immediately following an emergence survey, then the survey must be repeated, because bats may switch roosts on a nightly basis. Immediately after the tree is felled, a visual inspection of the downed tree must be completed to ensure that no bats were present, injured, or killed. The USFWS FO should be contacted immediately if bats are discovered during this inspection.

    b. If **1 or more** bats (regardless of species, because species identification cannot reliably be made during visual emergence counts alone) are observed emerging from the roost, then it should **not** be felled, and the USFWS FO(s) should be contacted the next working day for further guidance.

[63] The active season periods for IBat and NLEBs are available in Appendix L.
[64] If a potential bat roost tree poses an imminent threat to human safety or property, then emergency consultation procedures should be followed as appropriate. (50 CFR §402.05). If a hazard tree does not pose an imminent threat, then the USFWS requests that it be felled during the bat's inactive season. When possible, felling of potential roost/hazard trees should be avoided during the primary maternity period to avoid potential adverse effects to non-volant pups (see Appendix L for specific inactive and pup season dates for your area).
[65] Areas containing >10 hazard trees will be assessed by the USFWS on a case-by-case basis with the project proponent.

SUBMISSION OF EMERGENCE SURVEY RESULTS

Emergence survey results should be included with the mist-netting survey report, unless the survey was completed as an evaluation of potential roosts and should be submitted to the appropriate USFWS FO(s) for review. Each survey report should include the following information related to emergence survey efforts[66]:

1. Copy of prior phase reports (if not previously provided)
2. Explanation of any modifications from the Phase 4 emergence count study plan (e.g., number of potential roosts surveyed), if applicable
3. Summary of roost emergence data
4. Map identifying location of roost(s) identified during radio-tracking and/or emergence surveys for IBAT and/or NLEB(s) including GPS coordinates
5. Full names of personnel present during emergence survey efforts and who conducted emergence surveys of roosts
6. Photographs of each identified roost
7. Copies of all “Emergence Survey” and “IBAT and/or NLEB Roost” datasheets
8. Any other information requested by the local USFWS FO(s) where work was conducted
9. Copy of the pre-approved site-specific written authorization from USFWS and/or state natural resource agency (if required)

[66] In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using standardized permit reporting spreadsheets available on the USFWS website provided in the intro.

USFWS BAT EMERGENCE SURVEY DATASHEET

Date: _____ Surveyor(s) Full Name: _____

State: _____ County: _____ Project Name: _____
Site Name/#: _____ Roost Name/# _____ Bat #:_____

Lat/Long or UTM of Roost: _____
Description of Roost/Habitat Feature Surveyed: _____

_____

Bat Species Known to be using this Roost/Feature (if not known, leave blank):

_____

Other Suspected Bat Species (explain): _____
Weather Conditions during Survey (temperature, precipitation, wind speed):

_____

Survey Start Time: _____ Time of Sunset: _____ Survey End Time: _____

NOTE: Emergence surveys should begin ½ hour before sunset and continue until at least one hour after sunset or until it is otherwise too dark to see emerging bats. The surveyor(s) should position him or herself so that emerging bats will be silhouetted against the sky as they exit the roost. Tallies of emerging bats should be recorded every few minutes or as natural breaks in bat activity allow. Ensure that surveyor(s) are close enough to the roost to observe all exiting/returning bats, but not close enough to influence emergence (i.e., do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights other than a small flashlight to record data, if necessary). Do not shine a light on the roost tree crevice/cave/mine entrance itself as this may prevent or delay bats from emerging. If available, use of an infra-red, night vision, or thermal-imaging video camera or spotting scope and an ultrasonic bat detector are strongly recommended but not required.

Time	Number of Bats Leaving Roost*	Comments / Notes

APPENDIX E: PHASE 4 EMERGENCE SURVEYS

Site Name/#: _____ Roost Name/#: _____

Time	Number of Bats Leaving Roost*	Comments / Notes
Total Number of Bats Observed Emerging from the Roost/Feature During the Survey:		

* If any bats return to the roost during the survey, then they should be subtracted from the tally.

Describe Emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. If a radio-tagged bat was roosting in the tree, at what time did it emerge?

APPENDIX F: LINEAR PROJECT GUIDANCE

For linear projects (e.g., pipelines and roadways) >1 km in length (shorter lengths should be considered as a non-linear project), surveyors have the option to use either mist nets or acoustic detectors in any given 1-km segment of suitable habitat. A survey site may also cover other associated linear project facilities (e.g., access roads) that are located within a pre-determined distance of each segment. When possible, surveyors should seek out the best available survey sites located within the footprint of the project alignment, and directly adjacent to, or near, the alignment if no suitable sites are available within the footprint. Because the best survey sites for capturing/detecting bats may fall outside of a project footprint, the surveyor and project proponent should coordinate with the appropriate USFWS FO(s) to establish a project-specific maximum distance from the centerline or project boundary prior to initiating surveys.

Tentative survey site locations along linear projects should be included in a proposed study plan to be reviewed and approved by the USFWS FO(s). Adequate survey effort should be conducted within each approximate 1-km segment that contains suitable forested habitat along the proposed workspace. It is not appropriate to cumulatively add up each habitat block crossed until 1km of habitat has been traversed. Segments along a linear project that do not contain suitable habitat should be skipped until the next patch of suitable habitat is encountered (Figure 4). Establishing exactly how many survey sites are needed for P/A surveys along a linear project often involves some give and take particularly in fragmented habitat areas (Figure 4, rows B and C). The final number of survey sites could be greater than the minimum number of sites prescribed in the protocol to adequately cover the areas of suitable habitat to be impacted. When available, habitat quality and quantity (e.g., size and location of suitable maternity roost trees) from on-the-ground habitat assessments can be used to fine tune and guide the placement of survey sites. In some marginal habitat areas, the quality and quantity of the existing habitat may be low enough to justify skipping some survey segments (e.g., Figure 4, Site 11). Likewise, some isolated woodlots, fence lines or individual trees may be considered too isolated and/or small to independently support bats and may be skipped if the USFWS FO(s) concurs. Habitat suitability in fragmented areas should be assessed on a site-specific basis and consider habitat configuration and connectivity to other suitable habitat patches. In general, we recommend surveying a few more sites for a project than the absolute minimum required.

In instances where a mist netting survey has been proposed, but no suitable mist net sites can be found or accessed within a particular segment, biologists should contact the USFWS FO(s) for further guidance or ideally agree in advance as to how such situations will be handled when encountered in the field (e.g., an acoustic survey may be substituted). Similarly, if an area of forest habitat that seemed suitable from aerial photography appears to be unsuitable or of particularly low quality upon field inspection, then you should coordinate with the USFWS FO(s) to determine if an area may be exempted from surveys. To avoid problems, any significant departures from previously agreed to survey plans should be justified and coordinated with the USFWS FO(s) prior to leaving the field.

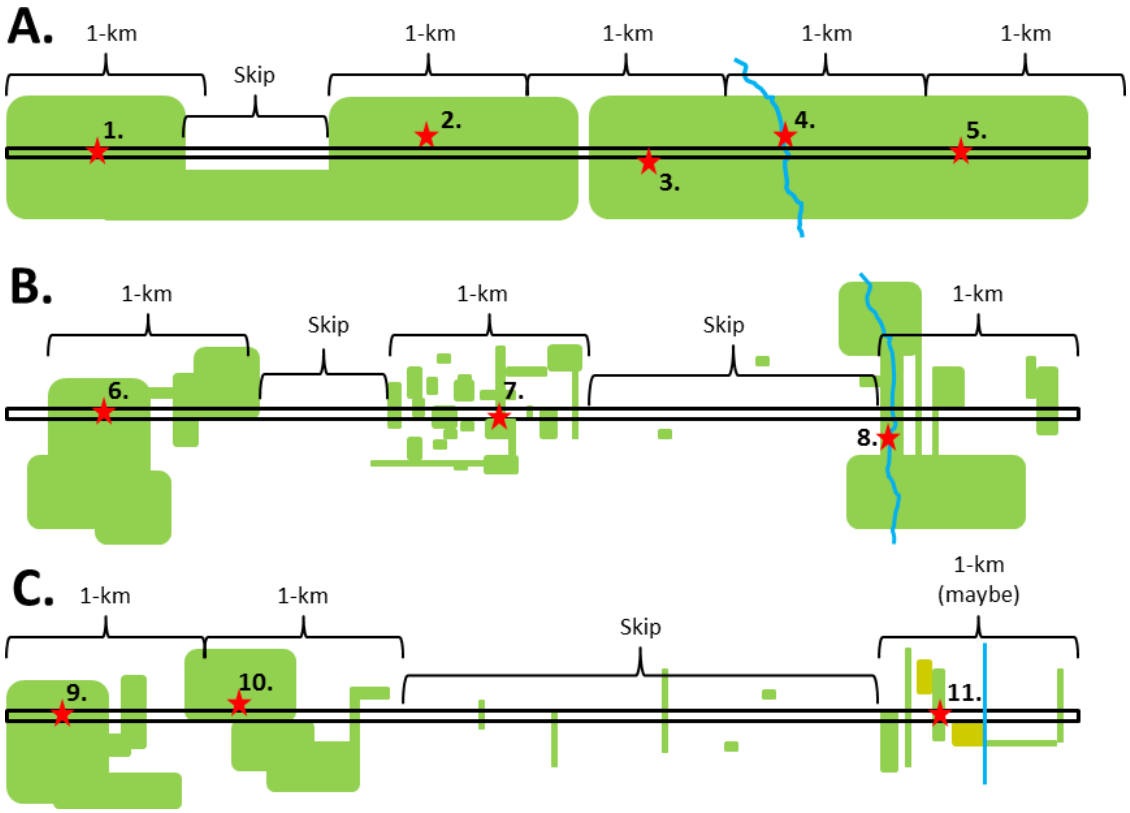


FIGURE 4. Conceptual linear project (black double lines) through relatively contiguous (A.) and fragmented (B. and C.) forested habitats (green patches) delineated into approximate 1-km survey sections. Numbered red stars represent suitable survey sites (1-11) on or near the project boundaries. Blue lines represent natural streams (A. and B.) and a ditch (C.). Yellow-green patches near Site 11 represent low-quality habitat.

APPENDIX G: THE OUTER–TIER GUIDANCE

Since early radio-tracking studies in Illinois, it has become standard practice for USFWS FOs to assume that an IBAT summer maternity colony will utilize suitable habitat within approximately 2.5 miles of its primary roost tree(s)/focal roosting area. However, if a reproductive adult female or juvenile IBAT is captured (or acoustically detected), but not radio-tracked to a roost site, then FOs typically assign its capture site a 5-mile conservation buffer and assume that its roost tree is located somewhere within 2.5 miles of the capture site. This approach is further detailed in the Service's IBAT Section 7 and Section 10 Guidance for Wind Energy Projects[67].

NOTE: The same principles used for the IBAT can be used for the NLEB using a 3-mile conservation buffer around capture/detections. Additionally, the outer-tier guidance may also be used for TCB presence/probable absence surveys using a 3-mile conservation buffer around capture/detections. "Outer-tier" guidance only applies to summer captures/detections (not hibernacula).

Because a 5-mile buffer encompasses four times more area than a 2.5-mile buffer (50,265 acres vs. 12,566 acres), it is reasonable to assume that only approximately 25% of a 5-mile buffered area is actually occupied by the documented IBAT summer maternity colony at any given time and that approximately 75% remains unoccupied or could be used by members of another yet undocumented colony(s). Therefore, if a subsequently proposed project is either ≤123 acres in size or affects ≤1% of existing suitable summer habitat within a 5-mile buffer (whichever is greater) but is situated ≥2.5 miles from the original capture/detection site, then it will have a relatively low probability of being within the true maternity colony home range (assuming suitable habitat is more or less evenly distributed in all directions from the capture site) (See Figures 5 & 6). Allowing project proponents of such "outer tier" projects to conduct a summer P/A survey for IBAT and/or NLEB using the standard survey level of effort (LOE) (as outlined in Appendix B and C) in such cases is reasonable and the additional survey data would 1) help refine the home range boundaries of the original colony, 2) confirm presence of additional colonies if present, 3) provide additional radio-tracking opportunities /roost tree locations, and 4) provide an option for project proponents to survey instead of always assuming presence.

Prior to emergence of WNS, NLEBs were widely distributed throughout much of the eastern U.S. and Canada. Although not nearly as common today, surveys show that the species continues to occur in pockets distributed throughout the WNS-impacted portion of its range. NLEB populations continue to remain stable in portions of the Southeast Coastal Plain (Virginia, North Carolina, and South Carolina) as well as in Alabama, Mississippi, and Louisiana where they are active year-round in forested or wooded habitats due to mild winter temperatures, and these populations, which are not dependent upon caves or mines for hibernation, may not be susceptible to WNS. Similarly, IBATs within the Northeast and Appalachian Recovery Units (RUs) have seen significant declines due to WNS; however, populations remain stable to increasing within the Midwest and Ozark-Central RUs (USFWS unpublished data 2023).

Due to the severity of the impact of WNS on populations across much of the hibernating NLEB and eastern IBAT RUs (i.e., Northeast and Appalachian) ranges, there is uncertainty where surviving NLEBs and IBATs are located in these portions of their ranges. To address this uncertainty, we recommend allowing project proponents whose project is either ≤123 acres in size or affects ≤1% of existing suitable summer habitat within a 5-mile (IBAT) or 3-mile (NLEB) buffer (whichever is greater) the opportunity to survey in both the inner-tier and outer-tier of known Hibernating Range NLEB buffers and IBAT buffers within the Northeast and Appalachian RUs when the buffered occurrence was prior to 2 years[68] after WNS was first confirmed in the state. We recommend coordinating with the local USFWS FO in the state where the proposed project survey is planned to determine whether inner-tier NLEB and/or IBAT

[67] Document is available on the USFWS website provided in the introduction.
[68] An alternative year may be used if the USFWS FO(s) has data to more precisely support when WNS affected abundance and distribution in their state.

buffers can be surveyed or not. Provided proponents use at least the prescribed minimum LOE for NLEBs and/or IBAT in these locations and the survey is approved by the Field Office, the USFWS would accept the results as evidence of presence/probable absence. For example, if WNS was confirmed in 2011, project proponents can survey both inner and outer tiers of a known buffer for presence/probable absence if the occurrence was in 2012 or earlier. For this example, presence/probable absence surveys could not be conducted in the inner tiers of occurrence buffers documented in 2013 and later.

NOTE: USFWS FO(s) may decide not to approve an outer-tier survey under the following circumstances: (1) If available forest habitat with a 5-mile (or 3-mile for NLEB) buffer is not more- or-less evenly distributed, but rather is highly clumped or restricted to a relatively narrow strip(s) (e.g., a riparian corridor); (2) <10% of a 5-mile (or 3-mile for NLEB) buffer contains suitable summer habitat; or (3) other site-specific reasons.

If a project proponent of an "outer-tier" project coordinates with the USFWS FO(s) upfront and conducts a valid summer mist-netting (Appendix B) or acoustic (Appendix C) survey using the appropriate LOE and does not capture/detect an IBAT and/or NLEB(s), then no IBAT or NLEB related restrictions will be required for that specific project area. However, all restrictions/ assumptions of IBAT and/or NLEB presence outside of a completed outer-tier project survey area shall remain intact indefinitely within the 5-mile (or 3-mile for NLEB) buffer zone or until additional negative survey data or discovery of roost trees indicate adjustments to a buffer are warranted by USFWS. Negative survey results from "outer-tier" projects are valid for 5 years for that project area. If an IBAT and/or NLEB(s) is captured/detected/radio-tracked during the survey, then the project area will be presumed to be occupied, restrictions will remain in place, and the USFWS FO(s) will reassess/adjust the original buffer(s) if warranted using the newly acquired bat location data.

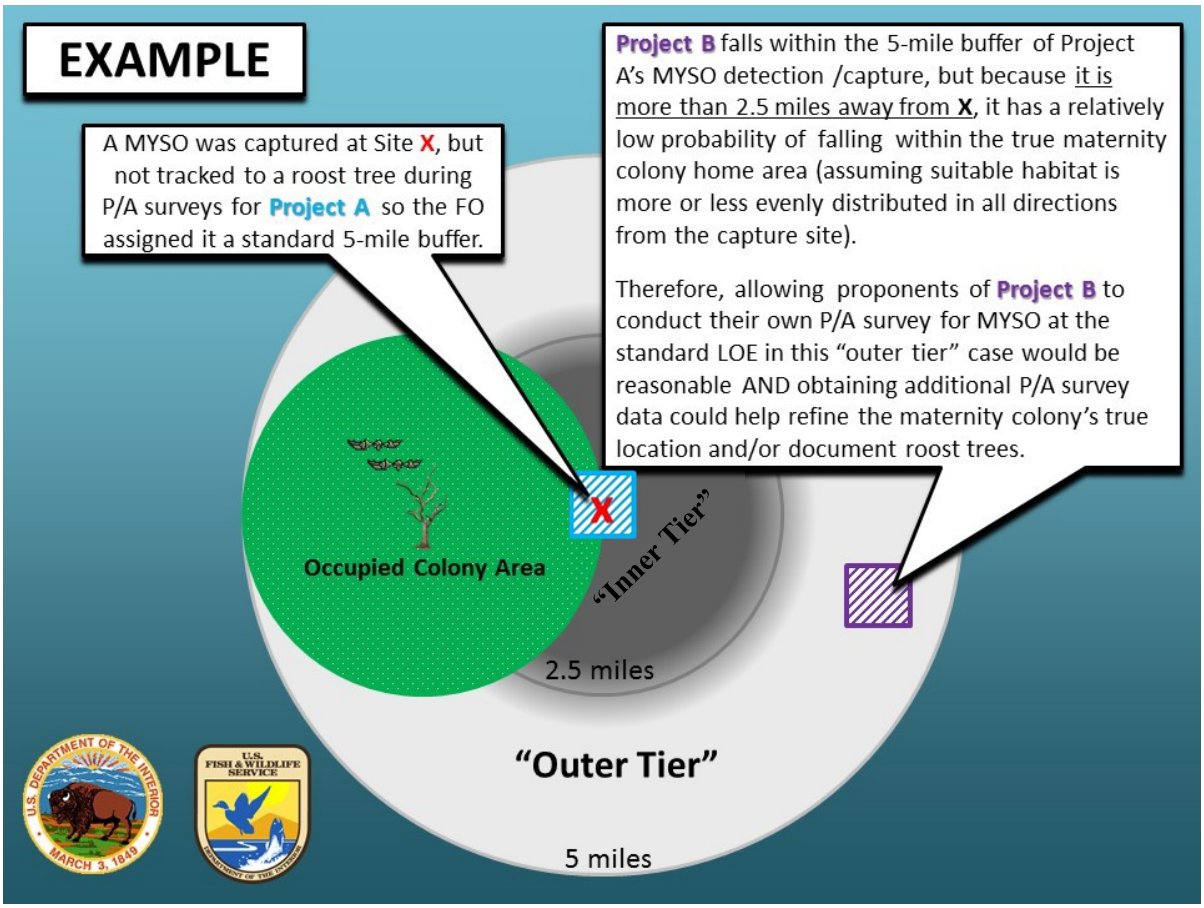


FIGURE 5. Graphical example depicting the proper application of the outer-tier guidance.

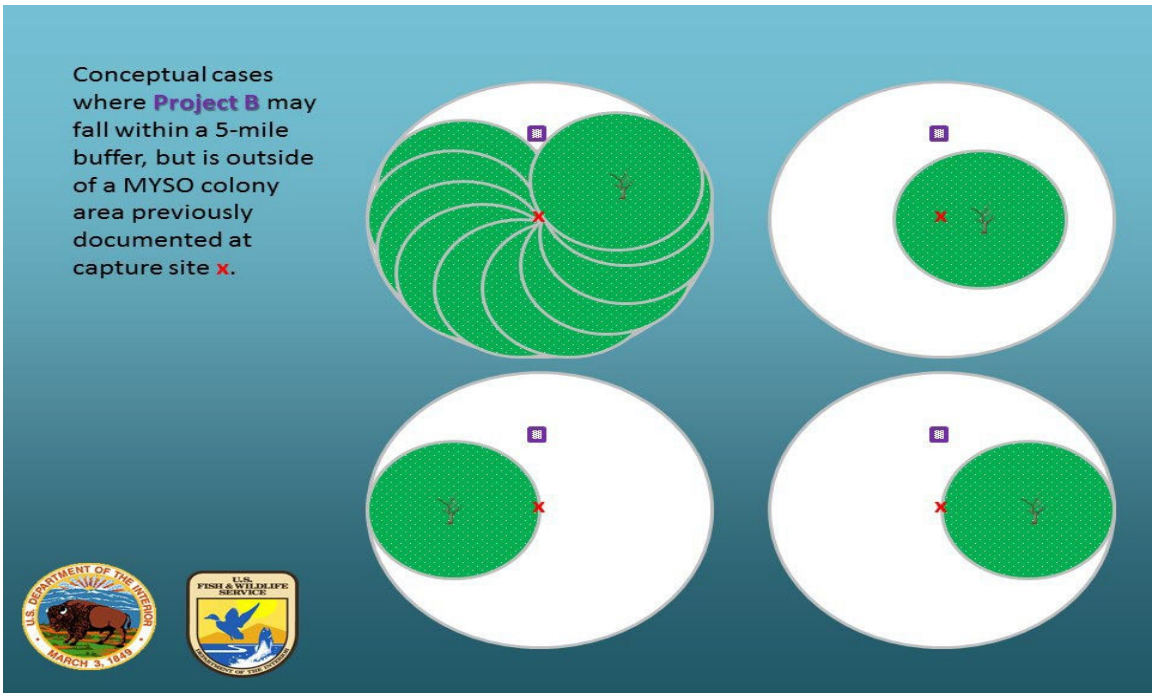


FIGURE 6. Hypothetical outer-tier scenarios where a proposed project area (depicted by a purple square) falls outside of the "true" IBAT maternity colony area(s) (depicted in green).

APPENDIX H: POTENTIAL HIBERNACULUM SURVEY GUIDANCE

Indiana and NLEBs have been documented using caves (and their associated sinkholes, fissures, and other karst features), as well as anthropogenic features such as mines and tunnels as winter hibernation habitat (i.e., hibernacula). Project proponents need to evaluate whether any potentially suitable IBAT and/or NLEB hibernacula exist within a proposed project area. This knowledge will be derived from a variety of sources. The following phased process should be followed to determine presence or probable absence of IBAT and/or NLEB in potential hibernacula:

NOTE: The potential hibernaculum survey guidance may also be used for TCB presence/probable absence surveys, including winter (internal) surveys, in portions of the TCB range that the species hibernates. TCBs use a wider variety and warmer hibernacula than what would often be considered as suitable for IBATs and NLEBs. Coordinate with the local USFWS FO(s) if you are proposing to use this guidance to survey for TCB.

PHASE 1 – INITIAL PROJECT SCREENING

Step 1. Coordinate with the USFWS FO(s) and appropriate state natural resource agencies regarding existing federally listed bat hibernaculum or other occurrence information.

Prior to initiating P/A surveys (Phase 2) of potential IBAT and/or NLEB hibernacula (as determined by the Phase 1 Habitat Assessment), the USFWS FO(s) and appropriate state natural resource agencies must be contacted to determine if any caves or other underground features have been previously documented as hibernacula or other habitat for federally listed bat species. Any proposed surveys of previously documented hibernacula must be coordinated directly with these agencies to ensure that adverse effects to listed species do not occur because of the survey.

Step 2. Desktop Analysis and Initial Field Reconnaissance.

After coordinating with the FO and appropriate state natural resource agency (when applicable), a desktop analysis and initial field reconnaissance should be completed by individuals with a natural resource degree or equivalent work experience and a solid understanding of karst topography and/or surface features associated with underground mines. These initial assessments can be completed at any time of year.

For all projects, a FO-approved field survey of all land within 0.5 miles of the edge of the project footprint (where access can be obtained) and documentation (e.g., a literature search, maps and information provided by local cave survey groups or grottos, review of aerial photography and topographical maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of consultants or other designees) of all known caves and abandoned mines within 3 miles of the outside edge of the project footprint should be conducted. If caves or abandoned mines are found, further detail about the known or estimated underground extent of the cave/mine should be provided to the USFWS FO(s), including minimum and maximum depth of features and where those features are located on a map(s).

In general, underground openings can be deemed unsuitable as a hibernaculum and dismissed from further assessment and surveys if:

a) There is only one horizontal opening, and it is less than 6 inches (15.2 cm) in diameter;

b) Vertical shafts are < 1 foot (0.3 m) in diameter;

c) Passage continues < 50 feet (15.2 m) and terminates with no visible fissures that bats can access;

d) Openings are prone to flooding, collapsed shut and completely sealed, or otherwise are inaccessible to bats; and

e) Openings that have occurred recently (i.e., within the past 12 months) due to human activity or subsidence. (Include written documentation verifying this determination).

The results of initial field assessments should be submitted to the USFWS FO(s) and State regulatory partners (when applicable) for review and approval prior to proceeding to Step 3. FO- approved results from Step 2 will remain valid for a minimum of five years. **NOTE**: longer time frames may not be appropriate due to cave/mine dynamics.

Step 3. Conduct a Phase 1 Habitat Assessment of Potentially Suitable Hibernacula.

If underground openings are documented during field surveys in Step 2 and cannot be dismissed during initial project screening above, then a qualified biologist[69] will need to conduct a Phase 1 Habitat Assessment to determine whether bats using a potentially suitable hibernaculum within a project area could be adversely affected by the proposed project as described below (see Phase 1 Habitat Assessment Sample Data Sheet).

Habitat assessments should include all entrances or openings that will be directly or indirectly impacted by the proposed project. This would include those caves (and their associated sinkholes, fissures, and other karst features), as well as anthropogenic features such as mines and tunnels that are within the project site or that are otherwise connected (i.e., by physical passageway, airflow or hydrologically) to any underground feature that will be directly or indirectly impacted by the proposed project.

The results of a Phase 1 Habitat Assessment should be submitted to the USFWS FO(s) and State regulatory partners (when applicable) for review and approval prior to proceeding to Phase 2. FO-approved results from Step 3 will remain valid for a minimum of five years. **NOTE**: longer time frames may not be appropriate due to cave/mine dynamics.

PHASE 2 – PRESENCE/PROBABLE ABSENCE SURVEYS

Surveys to Confirm Use of Suitable Winter Habitat

If suitable winter habitat is discovered as a result of the Phase 1 Habitat Assessment above, do not alter, modify, or otherwise disturb entrances or internal passages of caves, mines, or other entrances to underground voids (potential hibernacula) within the action area before completing a Phase 2 survey. The survey protocols for determining occupancy are detailed below. Some surveys may require modification (or clarification) of these guidelines; therefore, submittal of a study plan and coordination with the USFWS FO(s) and state natural resource agency is necessary prior to initiating suitable winter habitat/hibernacula surveys. Submit results of completed summer and/or winter surveys to the appropriate FO(s) prior to clearing or altering of identified bat habitat. The USFWS FO(s) will review the results of P/A surveys conducted according to these guidelines for the purposes of determining whether IBAT and/or NLEB are occupying hibernacula in the project area and whether they may be adversely affected by any proposed actions.

[69] A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for IBAT and/or NLEB in the state/region in which they are surveying. Alternatively, in States within Region 5 of the USFWS, state agencies assess qualifications and provide authorization to net, handle, and conduct hibernaculum surveys of/for IBAT and/or NLEB in that State (authorization is only valid in the State that provides the authorization). Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

WINTER (INTERNAL), FALL, AND SPRING SURVEY PROTOCOLS FOR IDENTIFYING POTENTIAL BAT HIBERNACULA

White-nose syndrome (WNS) is a devastating fungal disease that has killed unprecedented numbers of hibernating bats in eastern North America. WNS and/or *Pseudogymnoascus destructans* (Pd), the fungus causing the disease has been detected throughout the range of the IBAT, as well as most of the range of the NLEB. Users of this guidance must follow the recommendations provided in the most recent USFWS Cave Advisory[70] as they relate to reducing the potential for humans to disturb hibernating bats or inadvertently transporting Pd to uncontaminated bat habitats. All surveys conducted at caves/mines should be coordinated with the USFWS FO(s) and appropriate state natural resources agencies prior to initiation (see example USFWS Project Proposal Form).

Winter (Internal) Survey

Working near and within abandoned mines and caves can be inherently dangerous due to a variety of potential hazards (e.g., ceiling collapse and presence of toxic gases)[71]. Therefore, surveyors must thoroughly assess their work sites for any known and potential health and safety hazards and must use appropriate personal protective equipment and take proper precautions to avoid and minimize identified risks. Only sites that are deemed safe should be entered at the surveyor's discretion.

Potential hibernacula that are deemed safe to enter should be entered and all its accessible passages visually surveyed for the presence of IBAT during mid-winter (i.e., beginning January 1st and ending prior to March 1st of the same calendar year (also see Appendix 4 of the USFWS 2007 Indiana Bat Draft Recovery Plan: first revision). **NOTE:** The use of direct internal surveys is not adequate for NLEB due to the difficulty in visually detecting the species inside hibernacula (i.e., it typically roosts in deep cracks and crevices). Only properly trained and qualified individuals with the appropriate federal and/or state permits and equipment should attempt internal P/A surveys for the IBAT. If the qualified biologist, who completed the Phase 1 Habitat Assessment, does not have the necessary experience/permits to complete internal survey work, then this portion of the project should be subcontracted to another individual or group that does. If a site is unsafe or too difficult to enter or it is believed that significant portions of the underground system are inaccessible, it should be surveyed using the Fall or Spring emergence survey guidance to determine presence or probable absence of federally listed bat species, including the IBAT and/or NLEB (also see Sample Data Sheet for Fall or Spring Surveys of Potential Hibernacula).

Fall or Spring Emergence Survey

1A. Fall surveys of mine/cave entrances must be conducted between September 15 and October 31[72] and prior to any tree clearing by the project applicant. A minimum of one night of harp trap sampling per week for 6 weeks (i.e., 6 nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Each night of sampling should be separated by at least one week of the survey window if weather conditions allow it. However, multiple nights of sampling per week can be accepted in the last two weeks of October if forecasted weather conditions

[70] https://www.whitenosesyndrome.org/press-release/updated-cave-advisory-recommendations-for-managing-access-to-subterranean-bat-roosts-to-reduce-the-impacts-of-white-nose-syndrome-in-bats

[71] The Service highly recommends that surveyors seek counsel from an occupational health and safety professional(s) prior to working underground or under other potentially hazardous field conditions.

[72] Timing of fall surveys may need adjustment based on location and weather conditions leading up to the survey. Coordination with local USFWS FO(s) and State regulatory partners (when applicable) during development of the study plan/project proposal form is required.

require it, at least 3 nights of sampling were completed during the first 3 weeks of the survey period, and the modification is approved by the appropriate USFWS FO(s). Survey effort may be suspended if no bats (of any species) are captured after the first 2 nights of acceptable survey effort in the fall. Surveys of a potential hibernaculum are in addition to any summer P/A surveys that may be required for a proposed project.

OR

1B. Spring surveys of mine/cave entrances must be conducted between April 1 and April 21[73] and prior to any tree clearing by the project applicant. Conducting surveys during the spring emergence is typically more complex than conducting fall surveys due to a greater number of uncontrollable factors (e.g., weather related factors). Thus, a minimum of three nights of harp trap sampling per week for three weeks (i.e., 9 nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Due to the need to monitor weather conditions closely, each proposed spring mine/cave survey must be coordinated with the USFWS FO(s) and appropriate state natural resource agencies prior to surveying to ensure that adequate survey results are achieved. Surveys of a potential hibernaculum are in addition to any summer P/A surveys that may be required for a proposed project.

2. Unless otherwise approved by the USFWS FO[74], the capture of an IBAT and/or NLEB during a fall or spring mine/cave survey requires that the applicant complete three additional nights of sampling per week for three consecutive weeks (9 additional nights LOE) to determine the relative significance of the mine(s) and/or cave(s) and their associated underground workings to the IBAT and/or NLEB. If the mine/cave survey season (i.e., September 15 to October 31 for fall sampling and April 1 to April 21 for spring sampling) ends prior to the completion of the required additional sampling, then sampling must be completed the following fall or spring.

3. Harp traps are the preferred method for sampling entrances as they are less stressful on captured bats. Mist nets can also be deployed along corridors immediately adjacent to the entrance to increase survey effectiveness. Mist nets may also be used at the entrance but only when the mine or cave configurations are not suitable to harp trapping. The use of mist nets must be approved by the USFWS FO(s) and appropriate state natural resource agency prior to initiation of survey. Mist nets should be made of the finest, lowest visibility mesh commercially available. Currently, this is 2-ply, 50-denier nylon (denoted 50/2). The mesh should be approximately 1.5-inch in size. No other specific mist netting hardware is required.

4. Entrances must be entirely enclosed by the survey gear when harp trapping. If mist nets are used, entrances should not be entirely enclosed by the survey gear.

5. All entrances that are potentially inter-connected should be surveyed on the same night. In cases where one team of surveyors cannot feasibly sample all entrances in one night, a modified method could also be used; however, a minimum of 100 feet should separate surveyed vs un-surveyed entrances in cases where numerous entrances to a potential hibernaculum exist. This method should only be used in situations where the entrances are known to be interconnected. In this modified method, half of the interconnected entrances are surveyed on the first night, and the other half of the entrances are completely blocked using bird- exclusion netting, plastic sheets, or other impervious material. On the second night, survey efforts are reversed. Any materials used to block the entrances must be removed each night immediately after conducting the survey. No entrances should be left blocked over-night.

[73] Timing of spring surveys may need adjustment based on location and weather conditions leading up to the survey. Coordination with local USFWS FO(s) and State regulatory partners (when applicable) during development of the study plan/project proposal form is required.

[74] Additional survey effort may not be recommended in cases where a project proponent agrees to modify their project to completely avoid adverse impacts to newly documented hibernacula and if abandoned mine openings can be closed with a USFWS FO approved bat friendly gate design.

Plastics or other materials used to block the entrances should be removed each night immediately after conducting the survey. Entrances that are not connected (e.g., as determined by existing mine maps) do not have to be surveyed simultaneously.

6. The sampling period should begin at sunset and continue for at least 5 hours each night. During this time, harp traps (most preferable method) and/ or mist nets (acceptable method, but less preferable from a bat-handling perspective) should be monitored for captured bats on 30- and 10-minute intervals, respectively, to minimize the number of bats that escape while limiting disruption of the swarm in the fall or emergence in the spring. Surveyors monitoring set-ups must minimize noise, lights and movement near the traps or nets. Monitoring with night vision or thermal cameras can be beneficial: (a) bats can be detected when they are captured, (b) any evidence of bats escaping the trap or net can be documented, and (c) monitoring with night vision or thermal camera also allows the biologist to assess the effectiveness of each trap/net placement (i.e., if bats are active near the set-up but avoiding capture), which may allow for adjustments that will increase capture success on subsequent nights. There should be no other disturbance near the set-up, other than to check traps/nets and remove bats. Biologists should be prepared to cut the net if a bat is severely entangled and cannot be safely extracted within 3 or 4 minutes or reduce harp trap check intervals to less than 30 minutes when capture rates are high. Capture and handling are stressful for bats. Emphasis should be on minimizing handling and holding bats to as short a time as possible to achieve field study objectives. Bats should not be held for more than 30 minutes after capture or as allowed in federal and state permits.

7. If captures increase during the survey or if 6 or more bats of any species were captured during the last hour of monitoring, the survey effort must continue until activity declines or fewer than 6 bats are captured per hour. A total of 30 (fall) or 45 (spring) hours of sampling should take place for a mine/cave survey to be approved.

8. Severe weather adversely affects the activity levels of bats. If any of the following weather conditions exist during the fall or spring mine/cave survey, the time and duration of such conditions must be noted on the data sheets and in the survey report, and the survey effort for that night must be repeated: (a) winds sufficiently strong and variable enough to move equipment (i.e., traps or nets) more than 50 percent of the time; and (b) precipitation, including rain and/or fog, that does not stop within 30 minutes or continues intermittently during the survey period; and (c) temperatures that are less than 50° F (10° C) for the first 2 hours, and that drop below 40° F (4.4° C) at any point during the survey.

9. All bats captured during fall or spring surveys must be temporarily marked with a USFWS FO-approved non-toxic material that will last for the remainder of the survey period to identify any recaptures during subsequent survey nights.

10. If IBAT and/or NLEB (or other federally listed species) are captured during fall or spring mine/cave surveys, notification to the local USFWS FO(s) is required within 48 hours (or in accordance with permit conditions), and the sex and reproductive condition of the bat and GPS coordinates of the capture site should be provided.

11. A bat detector/roost logger should be deployed at each entrance during sampling to monitor bat activity when trapping or netting. Bat passes should be monitored and tallied hourly. Bat tallies should be reported along with the time sampled. Report the beginning time and number of bat passes in hour blocks. Analysis of recorded bat calls to attempt species identification should not be completed as these calls are not expected to be foraging calls.

12. Noise, the use of lights, or other potential disturbances should be kept to, at a minimum, no closer than 300 feet (91.4 m) of the sampling site.

13. At least one member of each survey crew must hold, and have in his or her possession, a valid endangered species collection permit issued by USFWS[7581] and/or the appropriate state natural resource agency that allows the qualified biologist to collect bats, including federally listed species. All activities must be carried out with strict adherence to permit conditions and authorizations specified in your federal permit, as well as any State authorizations. A qualified biologist(s) must (1) select/approve harp trap/mist-net sets, (2) be physically present at each site throughout the survey period, and (3) confirm all bat species identifications. This biologist may oversee other biological technicians and manage set-ups near one another as long as the traps/nets are being monitored as defined in bullet 6 above.

14. All survey efforts must follow the most recent USFWS decontamination protocols regarding WNS.

[75] Surveyors working in States within Region 5 of the USFWS only require a permit from the State where the survey is taking place.

Phase I Habitat Assessment Sample Data Sheet

Location _____

Observers (include permit numbers) _____

Latitude _____ **Longitude**[76] _____

Date ___ **Time** _____ **Temp (outside)** _____

	Opening #1	Opening #2	Opening #3	Opening #4
Opening Type (e.g., cave, portal, shaft)				
Opening vertical or horizontal				
Opening Size: Height x Width (or Diameter)				
Internal Dimensions: Height x Width				
Slope (up or down from entrance)				
Entrance Stable?				
Direction of Airflow (In or out?)				
Amount of Airflow (e.g., none, slight, heavy)				
Internal air warmer or cooler than outside temp.?				
Evidence of collapse?				
Ceiling Condition				
Amount of water in opening				
Evidence of past flooding?				
Observed length of internal passage				
Distance to nearest water source				
% Canopy Cover at entrance				
Foraging Signs? (e.g., moth wings)				

Are any portals suspected or known to be connected? Which ones?

Any observable side passages?

Additional comments:

Entry of abandoned mine portals, quarries, or caves can be extremely dangerous because of the potential for ceiling collapse and presence of toxic gases. Safety or health problems may occur as a result of entering abandoned mines. The FWS does not authorize or require anyone to enter any potential hibernaculum that is or could be unsafe while implementing surveys. These guidelines do not require any applicant or applicant employee, consultant, lessee, or other such designee to enter any cave, quarry, or mine portal.

[76] Provide coordinates for each opening.

Sample Data Sheet for Fall or Spring Surveys of a Potential Hibernaculum

DATE:				TEMPERATURE		Start:		End:
PRECIPITATION*:						WIND*:		
MOONLIGHT:				TIME		Start:		End:
PERSONNEL (include permit numbers):							LOCATION (lat/long):	
Time	Species	Age	Sex	Repro Cond.	RFA (mm)	Mass (g)	Flight Direction (in or out)	Notes and General Comments

***Precipitation and Wind should be measured hourly**

****Repro. Cond (Reproductive Condition): (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended**

APPENDIX I: CALCULATING LOE FOR A COMBINED ACOUSTIC AND MIST-NETTING SURVEY

Numerous publications discuss the general advantages of using acoustics and mist-netting in tandem for inventorying bat communities (Kunz and Brock 1975, Kuenzi and Morrison 1998, Murray et al. 1999, O'Farrell and Gannon 1999, Flaquer et al. 2007). One of the stated objectives of the IBAT and NLEB survey guidelines is to maximize the potential for detection/capture of these species at a minimum acceptable LOE. The USFWS has long recognized that offering a combination acoustic and mist-netting option has advantages over the current single technique options presented in Appendices B and C; however, developing the methodology to calculate an acceptable LOE for a combined approach is challenging because our recommended LOE approaches were calculated based exclusively on either mist-netting or acoustic datasets.

Some advantages of a combined approach are that it provides flexibility to address challenging survey conditions (e.g., situations where mist-net set-ups are limited or the reverse). These situations are not uncommon, especially for linear projects which can pass through highly variable habitats. A combined approach provides project proponents with the ability to reduce overall survey time and cost while still providing for a suitable LOE. Finally, a combined approach alleviates challenges associated with number of sites/acoustic locations and limits on number of survey nights per net-site for projects impacting smaller acreages of suitable habitat.

To calculate the mist-netting and acoustic LOE using the combined approach the surveyor must consider survey LOE as a percent, and then balance the netting percent against the acoustic percent, which is what the guidance inherently does in setting the existing sole mist-netting and acoustic LOE standards.

- X mist-net nights of effort/123 acres = Y acoustic nights of effort/123 acres

First, determine the proportion of effort that will be applied using either the mist-netting or acoustic method. The decision to use mist-netting or acoustic should be made with consideration to the project area and the total number of high-quality survey sites of each survey method available for the species (i.e., IBAT and/or NLEB) the survey is being conducted for. Next, refer to Table 2 of the guidance and identify the highest LOE for the selected method and species' being surveyed. Finally, use the information above to calculate the total survey LOE that would be accomplished by the previously selected method at high-quality mist-net sets or acoustic locations for the proposed P/A survey.

Proportion of Effort (PoE) for combined LOE should be calculated as follows:

A. PoE using mist-netting x highest mist-netting LOE for surveyed species' = Total survey LOE in nights accomplished by mist-netting

   – or –

   PoE using acoustics x highest acoustic LOE for surveyed species' = Total survey LOE in nights accomplished by acoustics

Once the number of nights of the total survey LOE to be conducted by either method is known, then it can be used to determine the minimum required LOE for the other survey method. To calculate the necessary LOE for the second survey method, simply subtract the calculated PoE (see A, above) from 1 and multiply that proportion by the highest overall LOE for the second method for the species' being surveyed from Table 2.

B. (1 - PoE used in A, above) x highest overall species LOE prescribed for the method not used in

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A = Total number of survey nights necessary to meet the recommended LOE using the second method.

C. Round nights calculated in A and B up to nearest whole number.

EXAMPLE: The construction of a new bourbon distribution center (non-linear project) in KY falls within the range of IBAT and NLEB according to IPaC. A Phase 1 Habitat Assessment (see Appendix A) determined that 95 acres of suitable habitat for both species would be permanently removed to construct the project. The permitted bat biologist contracted to complete the P/A survey calculated that 35% of the project area could be surveyed with high-quality mist-netting set-ups.
Using the simple equation in A above, a total of 3 nights of mist-netting effort (0.35 x 6 = 2.1; rounded up) are recommended for this project impacting under 123 acres of suitable habitat. Using equation B above, the proposed project would need a total of 10 nights of acoustic effort ([1 – 0.35] x 14 = 9.10; rounded up) for the proposed project.

For the USFWS to approve a combined mist-netting and acoustic survey, the survey must be completed as described below:

1) There must be a minimum of two mist-net sets and two acoustic locations proposed in the study plan and surveyed to be accepted by the USFWS FO(s).
2) Each mist-netting set may only be surveyed two nights (either consecutive or otherwise) if a combined mist-netting/acoustic survey is proposed.
3) Surveyors should distribute mist-netting sets and acoustic locations throughout the project area or adjacent habitats. In most cases, net sets and acoustic locations should be at least 656 feet (200 meters) apart. If closer spacing is determined to be necessary or beneficial (e.g., multiple suitable habitats and acoustic sites immediately adjacent to each other), sufficient justification must be provided in the study plan, approved by the USFWS FO(s), and submitted as part of the survey report to the USFWS FO(s).
4) The combined mist-netting and acoustic survey, including the calculation of LOEs for each method, must be proposed and submitted for approval to the USFWS FO(s) with the study plan. The study plan must also include written justification for the use of the mixed effort including how the proposal will lead to improved survey quality. The mixed LOE may be adjusted before the beginning of the survey with written approval from the USFWS FO(s); however, no modifications are allowed once the survey has started.
5) Because the combined approach represents a single LOE for individual project areas, under no scenario can a surveyor use either mist-netting or acoustic Phase 2 surveys to challenge the other methods results. If a species is documented to be present with one method but not the other, then the USFWS FO(s) will still consider it present in the context of a subsequent consultation or other decision-making process.
6) Except for 1-5 above, all other guidance provided in Appendices B and C apply to individual mist-netting sets and acoustic locations under this combined survey approach.

REFERENCES

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APPENDIX J: GUIDANCE FOR SURVEYING YEAR-ROUND ACTIVE NLEBs

A portion of the NLEB's range overlaps with coastal areas of the eastern and southern U.S. where NLEB behavior, habits and habitat use differ significantly from the rest of the species' range. Bats may be active in these areas (see Figure 7) at any time of year and have not been documented utilizing traditional hibernation strategies found in the rest of the species range. Because of this, the USFWS collated and analyzed mist-netting data from local partners and worked with USGS and Virginia Tech to calculate year-round active NLEB minimum recommended LOE for mist-net surveys to provide expanded survey opportunities where allowed (also see Armstrong et al. 2023). Both acoustic and mist-netting techniques may be used in this region as a presence/probable absence method (Phase 2 surveys). Alternatively, mist-netting can be conducted for the purpose of attempting to capture NLEBs after detection during acoustic presence/probable absence surveys (Phase 3 surveys). The same recommendations (e.g., habitat assessments, personnel, coordination with USFWS FOs, nightly survey period, equipment, net/detector placement, checking nets, weather and other environmental conditions (temperature and precipitation), analysis of recorded echolocation calls, radio-tracking, emergence surveys, linear project guidance, outer-tier guidance, etc.) provided in other guidance appendices apply for either use of mist-netting or acoustics in the year-round active portion of the NLEB's range unless specifically addressed below.

NOTE: Where we consider the TCB active year-round (see Appendix L, Figure 9), surveyors can use these survey protocols applying the year-round active NLEB level of effort (LOE) with the following limitations: (1) an acoustic or combined acoustic/mist-net survey must be completed in portions of the range where IPaC identifies TCB as the only species; and (2) qualitative analysis is necessary for linear projects when Kaleidoscope Pro software produces an MLE > 0.05 for all site-nights and 10 or more passes are auto-classified as potentially belonging to TCB at any site-night. If you choose not to manually vet calls meeting these criteria, then you should assume presence of TCB for the project. Coordinate with the local USFWS FO(s) if you are proposing to use this guidance to survey for TCB to determine which LOE is appropriate for the specific project area.

SURVEY SEASON FOR YEAR-ROUND ACTIVE NLEBs: March 1 – October 15

While NLEBs may be captured in every month of the year in occupied coastal plain regions, the late fall/early winter is not an optimal time to conduct surveys because of lower and inconsistent temperatures as well as reduced availability of insect prey. Capture of reproductive adult females[77] (i.e., pregnant, lactating, or post-lactating) and/or young of the year between March 1 – October 15 confirms year-round presence of NLEB and the presence of a maternity colony in the area. Since adult males and non-reproductive females have commonly been found summering with maternity colonies, radio-tracking results will be relied upon to help determine the presence or absence of a maternity colony or large concentrations of bats in the area when only males and/or non-reproductive females are captured.

[77] We recognize that the reproductive condition of captured female NLEBs in early spring may not be possible; however, available data indicates NLEBs are not migrating to different areas from summer to winter so it is likely many of those adult females are indicative of the presence of maternity colonies.

Likewise, detection of NLEBs using acoustic equipment and approved[78] software program(s) confirms year-round presence in the project area.

MINIMUM PRESENCE/ABSENCE LEVEL OF EFFORT

The level of mist-netting or acoustic survey effort required for a project in the year-round active portion of the NLEB range will be dependent upon the overall acreage of suitable habitat that may be impacted by the action (directly or indirectly). To determine the survey effort, quantify the amount of suitable habitat within the project area. For projects where impacts other than tree removal are likely (e.g., collisions with infrastructure), ensure that presence/probable absence surveys are designed to cover all suitable habitat within the entire project area (where exposure to any kind of impacts may be anticipated) and NOT just the locations where tree removal is planned. Additional guidance for linear projects is available in Appendix F.

Year-Round Active NLEB Mist-netting LOE: (also see Figure 1 and Table 2)

Linear projects: a minimum of 2 net nights per km (0.6 miles) of suitable habitat (see Appendix F).

Non-linear projects: a minimum of 6 net nights per 123 acres (0.5 km2) of suitable habitat.

After 2 consecutive nights of netting at the same location without capturing target species, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

a) If no capture of NLEB(s), then no further surveys are recommended.

b) If capture of NLEB(s), then stop or proceed to Phase 4 as previously decided in coordination with the FO.

Range-wide NLEB Acoustic LOE: (also see Figure 1 and Table 2)

Linear projects: a minimum of 4 detector nights per km (0.6 miles) of suitable habitat (see Appendix F).

Non-linear projects: a minimum of 14 detector nights per 123 acres (0.5 km2) of suitable habitat.

A minimum of 2 detector locations per 123 acre "site" shall be sampled until at least 14 detector nights has been completed over the course of at least 2 calendar nights (may be consecutive).

[78]For surveyors planning optional TCB P/A acoustic surveys in western states where the TCB range overlaps with western bat species and TCBs are year-round active for 2024, note that no acoustic ID software programs are approved for this portion of the TCB range. Refer to optional TCB survey guidance (see FAQ) and use of candidate software programs for 2024.

APPENDIX J. GUIDANCE FOR SURVEYING YEAR-ROUND ACTIVE NLEBs

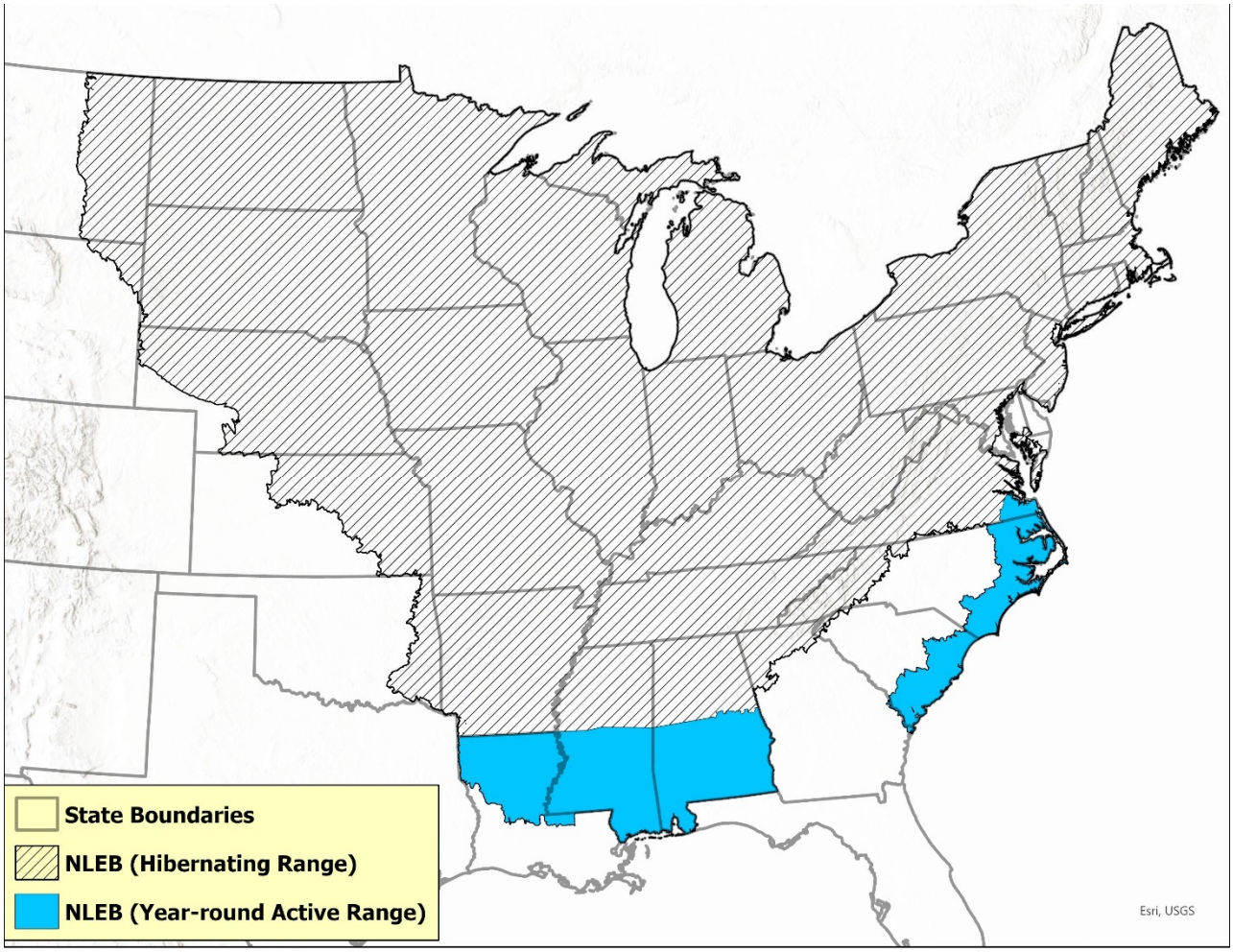


FIGURE 7. Areas delineated for use of year-round active NLEB survey guidance.

APPENDIX K: ASSESSING AND SURVEYING BRIDGES AND CULVERTS FOR BAT USE

Roadway transportation structures, specifically bridges and culverts, can provide suitable roosting habitat for bats. At least 24 North American bat species have been documented using bridges and culverts as roosting sites (Keeley and Tuttle 1999) and our understanding of the frequency of use improves as efforts increase to consider transportation structures as potential bat habitat. Georgia Department of Natural Resources reports presence of bats or guano at 20% of surveyed bridges and > 30% of surveyed culverts (GADNR, unpublished data 2023). Detweiler and Bernard (2023). conducted a literature review of 75 published studies finding that the use of bridges varies greatly across the landscape due to climatic factors, availability of natural roosts, and structural design. NLEBs and IBATs have been found using bridges and/or culverts throughout their ranges, as well as other species of conservation concern, such as the proposed endangered TCB. Use of this protocol is acceptable for TCB in 2024. Bats have been documented throughout the United States using bridges and culverts as maternity sites, hibernation sites, temporary resting sites during foraging, and during periods of staging and swarming. Often bridges are documented as important roosting locations during the active seasons (staging, maternity, and swarming; Detweiler and Bernard 2023, Keeley and Tuttle 1999) whereas culverts are often recorded as winter roost sites in areas where suitable cave habitat may be lacking, especially in the southern United States (USFWS 2022). However, there are exceptions to these generalizations and bats may use bridges or culverts at various times throughout their life histories.

A culvert[79] is a round or rectangular-shaped structure hydraulically and structurally designed to convey water, sediment, debris, and, in many cases, aquatic and terrestrial organisms through roadway embankments (Figure 8). Roadway culverts are usually composed of concrete or corrugated metal but can also be constructed of timber or PVC piping. Bridges[80] are vehicular or pedestrian structures that are larger and more structurally open than culverts and may span over waterways, various uplands, or urban areas. Bridges are constructed in numerous designs and are often composed of concrete, metal, wood, or a combination of these materials (Figure 9).

These guidelines describe who and what is needed to conduct surveys, and when and how to determine if bats, including IBAT, NLEB, and/or TCB, are using bridges and/or culverts as habitat. Bats' use of bridges and culverts as roosts varies considerably and depends on numerous factors such as structure type (including design and structural condition), area geography, surrounding habitat, availability of natural bat roosts in the

[79] The Federal Highway Administration (FHWA) defines a culvert as a structure comprised of one or more barrels or cells, beneath an embankment and designed structurally to account for soil-structure interaction. These structures are hydraulically and structurally designed to convey water, sediment, debris, and, in many cases, aquatic and terrestrial organisms through roadway embankments. Culvert barrels have many sizes and shapes and have inverts that are either integral or open, i.e., supported by spread or pile-supported footings. A culvert typically has soil materials (i.e., backfill) between the travel way (e.g., road or rail or trail) and actual culvert structure (i.e., barrels, cells). To support dead loads and live loads (e.g., cars, trucks, trains, pedestrians, etc.), the culvert consists of those barrels or cells (typically concrete, metal, or plastic material), backfill, and soil bedding underneath the culvert. In comparison, a bridge typically uses structural components and elements in the deck, superstructure and substructure (abutments and piers) to support those dead and live loads.

[80] FHWA defines a bridge as a structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads. A bridge typically uses structural components and elements in the deck, superstructure and substructure (abutments and piers) to support dead and live loads. Bridges typically have an opening of more than 20 feet (measured along the centerline of the roadway) between under copings of abutments, spring lines of arches, or extreme ends of openings for multiple boxes.

vicinity, and seasonality of activity (e.g., year-round active range vs. hibernating range).Due to the numerous factors influencing bat use of bridges and culverts, both seasonally and geographically, the appropriate time of year for assessments should be coordinated with your local USFWS FO(s) and respective state wildlife agency(ies). Surveys resulting in probable absence for IBAT and NLEB are valid for two years[81] if this guidance is followed and the survey report is approved by the local USFWS FO(s). Validity timeframes for other bat species should be coordinated with your local USFWS FO(s) and respective state wildlife agency(ies). Those practitioners utilizing the Programmatic Biological Opinion in conjunction with Federal Highway Administration, Federal Railroad Administration, and Federal Transit Administration for Transportation Projects in the Range of the IBAT and NLEB, should follow these guidelines for completing assessments of bridges or culverts.

PERSONNEL

Before performing assessments for bats on bridges or culverts, surveyors should coordinate with their local USFWS FO(s) and respective state wildlife agency(ies) regarding potential field training opportunities that may be required. At a minimum, surveyors should view the USFWS's virtual bat and transportation structures training[82] before conducting field assessments. Additional trainings may be available in specific states.[83] We recommend individuals conducting reviews for bats use the included sample data form at the end of this Appendix to submit with your survey report as it will ensure all the necessary information is provided to the USFWS FO(s) and expedite review of your study plan and survey report. If you choose to submit a different data form with your survey report, please ensure, at a minimum, it includes all information requested in the sample data form. We also encourage the incorporation of the minimum data field requirements for contributing bridge and culvert assessment data into the North American Bat Monitoring (NABat) database; however, it is not required. Individuals assessing bridges and culverts should employ appropriate safety measures in conducting these reviews and avoid touching any bats.

EQUIPMENT

The following equipment is highly recommended at a minimum to complete bridge or culvert assessments for bats.

- A high-powered flashlight, headlamp, or spotlight (> 600 lumens)
- Binoculars and/or spotting scope
- Digital camera with video recording capability
- Data forms and writing utensil
- Sturdy footwear. Depending on conditions, waders or muck boots may be preferred
- Decontamination[84] equipment if within white-nose syndrome positive area
- Personal protective equipment, according to organizational or agency requirements

[81] The timeframe of two years is to remain consistent with the Programmatic Biological Opinion for Transportation Projects in the Range of the IBAT and NLEB

[82] Virtual Training available at: https://www.youtube.com/watch?v=w3g9HDQFi3A

[83] In Georgia: To express interest in annual field training or additional online materials, please contact the USFWS Georgia Field Office or the Georgia Department of Natural Resources Nongame Conservation Section
In New Jersey: To express interest in field training, please contact the USFWS New Jersey Field Office or the New Jersey Department of Environmental Protection's Endangered and Nongame Species Program
In Indiana: Online training required by Indiana Department of Transportation is available here.

[84] Please refer to the White-nose Syndrome Decontamination Protocol available here.

APPENDIX K: ASSESSING & SURVEYING BRIDGES & CULVERTS FOR BAT USE

The following equipment may be beneficial or advisable depending on conditions at the site, level of difficulty in completing a thorough assessment, safety requirements of your institution, or other site-specific factors.

- Mirror with telescoping handle for viewing tight spaces
- Acoustic bat detectors
- Dust mask or KN95/N95 mask
- Cellular phone
- Handheld GPS
- Easily removed, protective coveralls and change of clothes if access requires crawling
- Guano sample collection materials
- Endoscope, borescope, or similar camera and light, perhaps attached to a telescoping pole. It is recommended to choose a camera with the option to view live footage in real time
- Specialized equipment such as ladders, kayaks or other floating equipment, or under bridge inspection vehicles, etc. may be useful in some circumstances



FIGURE 8. Representative culvert structures of various types, including a box culvert in Indiana (top; photo by USFWS); a round, concrete pipe culvert design in Georgia (bottom left; photo provided by Georgia Department of Natural Resources); and a corrugated metal pipe culvert design in Missouri (bottom right; photo provided by L. Droppelman).



FIGURE 9. Representative bridges with documented bat use, including a bridge with metal struts in Indiana (top; photo provided by Indiana Department of Transportation) and a concrete bridge in North Carolina (bottom; photo provided by North Carolina Wildlife Resources Commission).

ASSESSING BRIDGES/CULVERTS FOR BATS

Bridges and culverts can have many characteristics suitable for bat occupation. Many bat species will take advantage of cracks, crevices, voids, and other openings within structures. These can include cracks and openings caused by structural deterioration (e.g., cracking in concrete, rusted metal, etc.) and typical spaces existing via structural design (e.g., expansion joints). Bats may also roost in the open on rough surfaces or within drain or weep holes, along guardrails, and within jersey barriers or other voids. Additionally, many bridges and culvert designs create artificial “cave-like” environments where conditions are generally stable, thus allowing bats to use for extended periods of torpor, particularly in areas where natural cave-like habitats may be limited.

Step 1. Initial Assessment of Suitability and Safety

Prior to conducting any bridge or culvert assessment, a thorough safety assessment of each structure should be conducted to identify any potential health or safety hazards to surveyors and bystanders. Road traffic, unstable surfaces (e.g., riprap, deep sediment, ice, and swift moving water), or enclosed spaces are examples of some potential safety concerns. Surveyors should use appropriate personal protective equipment and take proper precautions to avoid and minimize identified risks according to their own comfort level and following the safety recommendations and guidelines required by their organization and local authorities. Only structures that are deemed safe should be entered at the surveyor's discretion.

Upon determining that a site is safe to enter, the bridge or culvert should be evaluated to determine whether it is generally suitable for bat roosting. Because most bridges will contain cracks and crevices that are of suitable size for bat roosting, any bridge that is safe to assess should be considered potential habitat for IBAT and NLEB, as well as TCB. Culvert suitability may vary by species. Table 5 includes the minimum diameter measurements for each species for consideration (adapted from USFWS 2022). The minimum length culvert that any of the species of interest has been documented is 23 feet (N. Anderson, personal communication), and should generally be considered the minimum suitable length for all three species. However, for safety reasons we do not recommend entry of any site less than 3 feet in diameter at the entrance, regardless of whether the site is greater than 23 feet in length. Practitioners should coordinate with local USFWS FO(s) and respective state wildlife agency(ies) to determine if local guidance deviates from these minimums when additional species may need to be considered. Additionally, culverts that are fully enclosed or blocked (e.g., under roadway or soil), enclosed with grills or grates, or fully obstructed in any other manner should not require an assessment. Partially enclosed or obstructed structures may be suitable and should be inspected if of the appropriate size. Uncertainties in suitability should be coordinated with the local USFWS FO(s) and respective state wildlife agency(ies).

TABLE 5. Suggested minimum culvert dimensions for determining IBAT, NLEB, and TCB suitability. If a site meets 1) the minimum entrance height/diameter for a particular species and 2) is 23 feet or greater in length*, it may be considered suitable to survey.

Species	Minimum Culvert Entrance Height/Diameter (feet)	Source
IBAT	4	L. Pattavina & E. Ferrall, personal communication, Georgia 2022
NLEB	4.5	N. Anderson, personal communication, Louisiana 2014
TCB	3*	USFWS 2022

* TCBs have been documented in culverts as small as 2 feet in diameter as reported in USFWS 2022; however, instances of TCB in culverts this small are expected to be rare. We do not recommend entry of sites less than 3 feet in height/diameter, regardless of length.

Step 2. Inspections of Bridges/Culverts and Indicators of Bat Presence

After an initial assessment if the bridge/culvert would be suitable for bats, surveyors should submit a completed USFWS Project Proposal Form or Study Plan to the local USFWS FO(s) for approval before they begin inspecting it for evidence of bat occupancy. The most ideal vertical crevices for bats are those that are 0.5 – 1.25 inches wide and > 4 inches deep (if sealed at the top) or >12 inches deep if not sealed. Although these characteristics represent the most ideal size of cracks and crevices for bat roosting, bats may be found in spaces that are larger and smaller than this range. Assessments should identify and inspect all cracking, crevices, spaces, and voids along the under deck of the bridge and support beams and inner walls, such as

below a fillet (a concrete filling between ceiling and vertical beam). Additionally, expansion joints that are unobstructed by debris or other blockages should be identified and inspected. Additional features to inspect include vertical spaces between end walls and bridge deck, areas of spall repair, guardrails and gaps in concrete parapet, plugged drainpipes, and weepholes. During the assessment, individuals should use high-powered flashlights, headlamps, or spotlights to examine all accessible parts of the bridge or culvert. Cave-like areas, recesses, and other similar features inside bridges or culverts (e.g., deck in the case of a bridge; see photos) should be searched in a similar fashion, although these areas may require the use of specialized equipment such as endoscopes. There are numerous indicators that can be used to determine bat use and presence within a bridge/culvert.

Visual

- ***Roosting Bats:*** Upon entry of the bridge/culvert, check for bats roosting out in the open. Open-roosting bats will typically be near the ceiling or on the ceiling itself of a culvert or similarly along the underdeck of a bridge. Bats will occasionally roost on or within bird nests, such as those composed of dried mud and created by various species of swallow (CBWG 2022). Bats may also take flight when disturbed and can be quickly accounted for during the assessment. Use binoculars/spotting scopes when attempting to locate bats roosting in higher areas of the bridge/culvert. If bats are present, record species (if determinable), total number, a description of the respective roosting locations, and representative photographs of the individuals (see Figure 10). Additionally, provide a sketch map, if possible, showing the locations of where the bat roosts exist on the bridge/culvert (use the bridge/culvert plan sheet as base for sketch). If any dead or injured bats are observed, take photographs and promptly notify the local USFWS FO(s) and respective State Agency(ies).



Figure 10 A TCB roosting on the ceiling of a culvert in Georgia (left; photo provided by Georgia Department of Natural Resources) and IBATS roosting in an expansion joint in Indiana (right; photo provided by USFWS).

- ***Urine and/or Body Staining:*** Urine or body oil stains may appear wet when bats have recently used the structure as a roost and are usually found in dark places. When dry, urine staining may have light-colored mineral deposits, but it can be difficult to differentiate from water staining (the latter often has presence of green algae). Dry urine staining can also be difficult to differentiate from concrete efflorescence (a deposit of soluble salts and bases, usually white in color, that sometimes

appears along cracks in concrete or masonry). For body oil staining, look for 4-6 inches-wide dark stains located on concrete support beams and walls immediately below the underdeck of the bridge, and beneath joints (Figure 11). It's important to note that staining on bridges and culverts can be caused by a wide variety of things other than bat presence. Guano deposits almost always accompany bat urine or body staining at structures, so "suspect" staining alone may not be sufficient evidence of bat presence (with the notable exception of structures with roost locations situated over waterways, where guano deposits would be washed away).



Figure 11. Open-roosting Indiana bats (*Myotis sodalis*) and associated urine staining on the underside of a bridge in Indiana (photo provided by R. Yaeger).

- ***Presence of Guano (bat droppings):*** Guano deposition is a relatively quick visual indicator of recent bat use of a structure. Individual bat guano pellets are small, brown/black in color, and unlike fibrous rodent droppings are more easily crushed and contain notable insect parts[85](Figure 12). Older droppings may be gray in color. These droppings will accumulate on the ground, floor of a covered bridge, pier caps, or on other horizontal structural components below where bats roost (Figure 13). Droppings may also adhere to vertical surfaces (e.g., support beams and walls) below roosts. Searches for bat droppings should be performed via the use of a high-powered flashlight. Surveyors should wear a dust mask (e.g., N95), and rubber boots are recommended for traversing

[85] Insect parts may be difficult to see without magnification. Low magnification handheld field microscopes or hand lenses are recommended for those practitioners regularly conducting guano sampling as part of bridge and culvert assessments.

through large guano deposits. All accessible cracks, cave-like areas, and expansion joints should be checked for the presence of guano. Confirmed and suspected bat droppings should be noted and their location within the bridge/culvert should be documented. Additionally, representative photographs should be taken of guano deposits in-situ, with a ruler or other object for scale, prior to crush-testing or collecting any guano samples (note: if guano samples are intended to be collected, refer to the guano sampling section of this Appendix). It is notable that in many cases, guano accumulation in culverts or at bridges over water will be minimal due to the regular inflow and outflow of water. In these situations, urine and body staining may be a more important indicator of bat use than guano accumulation.



Figure 12. Examples of guano accumulations on bridges. (photos provided by Georgia Department of Natural Resources (top) and Indiana Department of Transportation (bottom)).



Figure 13. Examples and comparative sizes and characteristics of bat guano from little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus)* (left; photo provided by Vermont Fish and Wildlife Department)*;* Guano deposit from colony of Yuma bats (*M. yumanensis*) on horizontal bridge structure (right; photo provided by P. Crawford/ Oklahoma Department of Transportation).

Sound and Smell

Bats occupying bridges/culverts may audibly vocalize when approached, thus high-pitched squeaking or chirping can be a quick indicator of current use. Surveyors that have difficulty hearing high pitch noises may find an acoustic detector with an external speaker or headphone jack helpful for detecting bat chatter, but use of this equipment during visual inspections is not required. Guano deposits, especially large amounts, also have an ammonia odor that can be apparent in some situations.

Step 3. Inaccessible Areas and Additional Assessment Options

In some situations, there will be portions of a bridge/culvert that may be inaccessible or unsafe for thorough inspections. In these instances, we recommend coordinating with the USFWS FO, State Agency(ies), and/or local Department of Transportation to determine if any of the following inspection methods or alternate assessment methods included here are recommended.

- ### Acoustic Surveys

  Note: In some circumstances, acoustic surveys can be used to assist in assessing and characterizing bat colony use of a bridge or culvert. However, acoustic surveys should be conducted with caution and only by experienced practitioners. Detectors may also need to be placed further back from the structure to avoid ultrasonic noise associated with vehicle traffic, powerlines, and other nearby infrastructure. Acoustic collections should only be used as a supplement to a larger suite of structural survey/assessment approaches and cannot be used to determine species identification as a

stand-alone method (refer to Appendix C for performing acoustic surveys to determine P/A of IBAT and NLEB). An example scenario where an acoustic survey at a bridge or culvert may be appropriate includes the use of acoustic equipment to assist in an emergence survey for a structure that has been determined to be unsafe to enter or inspect using traditional methods.

- **Emergence Surveys**

  Emergence surveys may be used as a supplementary tool to determine use of a structure and can only be used once IBAT and/or NLEB colony presence has been confirmed. If emergence surveys are planned for the structure for TCB, contact the local USFWS FO(s) and respective State Agency(ies) to determine if Appendix E of the Survey Guidelines is applicable, or if a modified approach is appropriate for the situation.

- **Alternative Techniques**

  Assessments from kayak/boat with binoculars to inspect areas over deep water, as well as ladders or construction equipment (cherry pickers, snooper truck, etc.; Figure 14) to access high areas of structures or areas over deep water may be necessary in certain situations.



Figure 14. Biologists use a snooper truck to assess expansion joints and concrete caps over deep water (photo provided by Georgia Department of Transportation).

SPECIES IDENTIFICATION

Visual Identification

Visual identification of species may be possible by experienced practitioners, such as those individuals that have Section 10(a)(1)(A) permits to conduct bat surveys. However, voucher photos should be taken with high-quality cameras for inclusion in survey reports regardless of the experience of the surveyor. If species identification cannot be verified visually, in photographs, or by other methods when bats are known to use a structure, it may be appropriate to assume presence of IBATs or NLEBs. Please coordinate with the local USFWS FO for guidance about assuming presence.

Acoustic Identification

Species identification may not be reliable using acoustic detectors to confirm occupancy at a bridge. Bats just emerging from roosts are often making social calls, which cannot always be reliably identified to species. Detectors may need to be set further back from suspected roost locations to record "search phase" calls that bats make while navigating/foraging. Automatic or qualitative acoustic identifications from bridges or culverts should only be performed following coordination with and approval from the local USFWS FO. Surveyors can use timestamps of acoustic recordings to glean insight into whether the recorded bats may have been made by bats emerging from the roost, but caution should be used in interpreting acoustic data as the detector may have also recorded bats not using the structure.

Guano Collection & Analysis

Genetic material in bat guano can be analyzed to determine which species deposited the pellet(s). However, samples must be collected in a manner that minimizes contamination and maintains their integrity for lab analysis. If possible, guano should be collected in sufficient amounts to maximize the ability for species to be properly identified.

Recommended standard equipment for performing guano sampling includes a high-powered flashlight (> 600 lumens, preferably a headlamp), hard hat, dust mask, digital camera, writing utensil(s) (e.g., fine- to medium-point permanent marker or pen; pencil for sketches), disposable latex gloves, collection vials (*e.g.*, 1.5 or 15 ml in size), and a collection utensil (e.g., plastic spoon).

Guano collections should only be performed after coordinating with the local USFWS FO(s) and respective State Agency(ies) to develop a collection plan, which may be included in the overall survey Study Plan. The primary goal of a guano collection plan is to obtain samples that provide a full representation of bat use of the structure. Additionally, it should include the following elements: 1) number of distinct areas of guano present in the structure; 2) guano condition (e.g., old vs. fresh), 3) map of guano locations within structure and collection sample points (see Figure 15); 4) photographs of structure, guano deposits, on the ground at the time of sample collection; 5) time of year[86] that samples will be obtained; 6) equipment that will be used to safely collect and curate guano (*e.g.*, sample collection vials, gloves, collection utensils, writing utensils, camera, etc.).

The following protocols* should be followed when collecting guano samples (**check with the institution, lab, or entity you are using to perform guano analysis for any additional protocols, if needed*). Collect the freshest guano possible (freshest guano is likely on walls/sides of the structure, as well as piers vs. the ground). Old guano deposits may be too degraded to be identifiable.

1) Obtain a minimum sample size of 6 pooled samples or 10 individual samples. However, additional pellets and/or more samples covering each location is ideal (for smaller sample sizes, coordinate with local USFWS FO(s) and respective State Agency(ies)). Each sample must be labeled with a unique identifier to link it to the specific location where it was collected.
2) Number of vials collected should be proportional to the surface area of guano under a bridge; 10-20 pellets per ft² is ideal. For a linear line of guano, collect 10 pellets per 15feet or collect a few pellets every 5 feet, depending on the length of the guano deposit. For individual guano piles, collect pellets off the top and around the entire surface of the pile (NOTE: If possible, fill an entire sample

[86] It is recommended to obtain guano samples during bridge and structure use or as close to movement to hibernacula (if applicable) as possible to avoid sample degradation.

vial per single guano pile; do not combine multiple, separate guano pile samples into one vial so that specific roost sites of federally listed bats can be identified.)

3) Per the guano collection plan, work with your local USFWS FO(s) and respective State Agency(ies) to determine which institution or entity will analyze the guano results for species identification.

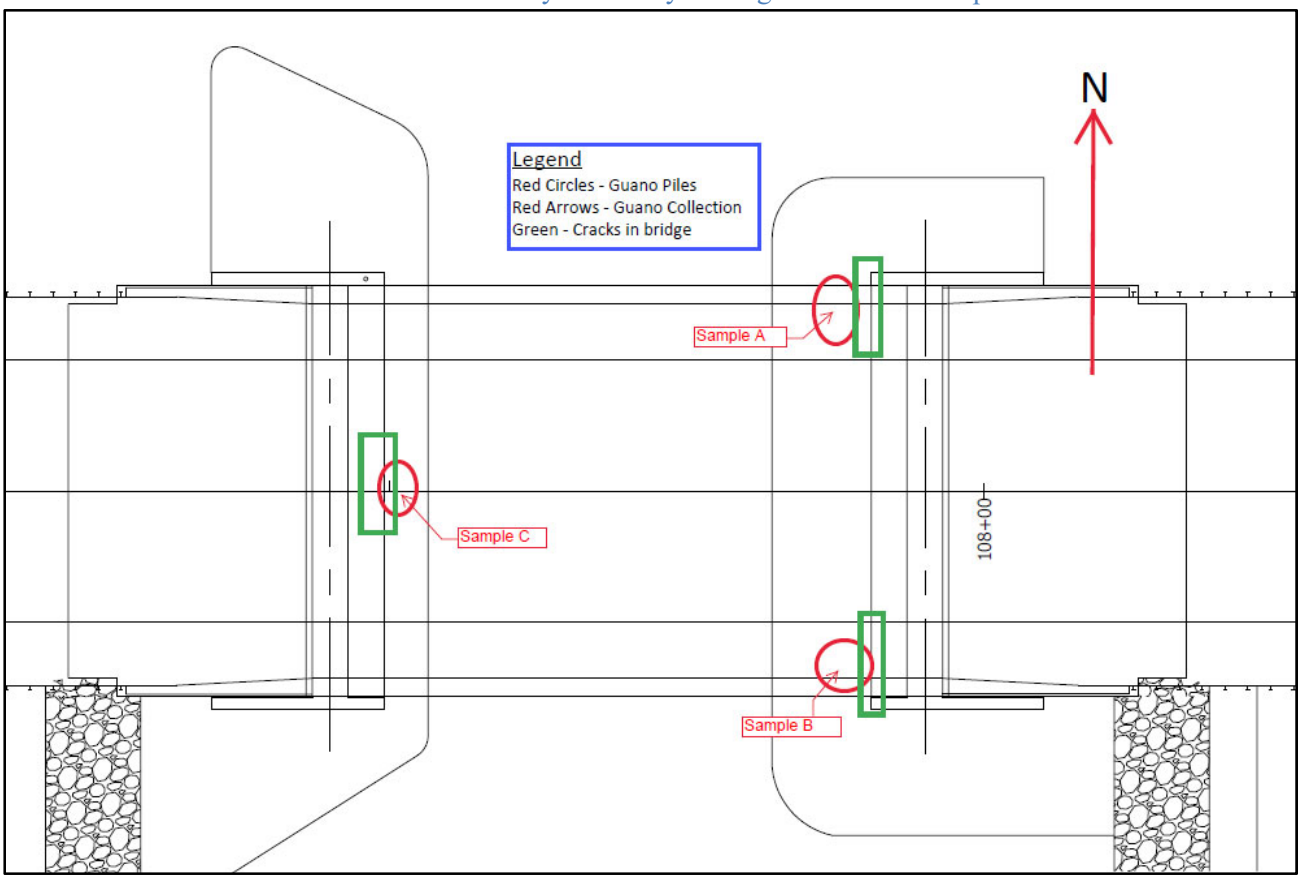


Figure 15. Example map for a guano collection plan, showing top-down view of a bridge, showing linear guano piles located along the abutment walls (underneath the structure's expansion joins). Arrows indicate proposed sample collection locations (Photo provided by Indiana Department. of Transportation).

NEXT STEPS—WHAT TO DO IF BATS ARE FOUND

Findings of bridge or culvert assessments should be submitted to the local USFWS FO(s) and respective State Agency(ies) in a survey report. If IBAT, NLEB, or TCB are positively identified during a bridge or culvert assessment or if species identification cannot be verified at a bridge or culvert with evidence of use, coordinate with your local USFWS FO within 24 hours to determine next steps. For other species, coordinate with your appropriate state agency(ies) (e.g., state wildlife and transportation agencies).

SURVEY REPORTING CHECKLIST

- Completed survey data form
- Annotated photo log w/representative images of surveyed structure (including areas with no indication of bat presence)
- Detailed information on location(s) where roosting bats and/or signs of bat use (e.g., staining, guano, etc.) was documented
- Information pertaining to any guano samples collected and locations within the structure where samples were obtained.

Additional information, photos, results, etc. relevant to any other previously agreed upon survey methods for the structure (e.g., emergence surveys, mist-netting, harp-trapping, acoustics).

DATA MANAGEMENT[87]

USFWS FOs and respective state wildlife agency(ies) may prefer that bridge and culvert assessment data be submitted electronically, in hard copy survey reports, or both. An example data form that can be printed is available on the next page [8889].

REFERENCES

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U.S. Fish and Wildlife Service (USFWS). 2022. WHITE PAPER: Recommended Minimum Culvert Dimensions for Bat Roost Surveys in Western North Carolina. USFWS, Asheville Field Office, Asheville, NC. 11 pp.

U.S. Fish and Wildlife Service (USFWS). 2019. New Jersey Guidance on Surveying Transportation Structures for Bat Occupancy. September 2019. 3 pp.

[87] The submission procedures are not required to be used under the Guidance but are highly recommended. Use of these forms will ensure all the necessary information is provided to the USFWS FO and expedite review of your study plan and survey report. Regardless of the form that is used, please ensure that the necessary data is submitted to the local USFWS FO and appropriate state wildlife agency(ies).

[88] Data submission from bridge and culvert assessments to the North American Bat Monitoring Program (NABat) database is encouraged but not required. The minimum required fields for submission to NABat are highlighted on the sample form.

[89] A template electronic data form that incorporates the minimum fields required for submission to NABat is found at: https://drive.google.com/drive/folders/1U3wCk6EIb8ZtWXSXUlBhkfANOHMJytW4?usp=sharing

APPENDIX K: ASSESSING & SURVEYING BRIDGES & CULVERTS FOR BAT USE

Walker, F. and D. Sanchez. 2021. Standard Operating Procedure – Fecal Collection for Genetics. Northern Arizona University, College of Engineering, Forestry, and Natural Resources. Available at: https://in.nau.edu/wp-content/uploads/sites/51/2021/02/Fecal-Collection-SOP_NAU-Bat-Team_January-2021.pdf

Bridge/Culvert Bat Assessment Form

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
Federal Structure ID	Structure Coordinates (latitude and longitude)	Structure Height (approximate)	Structure Length

Structure Type (check one)

Bridge Construction Style

☐	Cast-in-place	☐	Pre-stressed Girder
☐	Flat Slab/Box	☐	Steel I-beam
☐	Truss	☐	Covered
☐	Parallel Box Beam	☐	Other:

Culvert Type

☐	Box
☐	Pipe/Round
☐	Other:

Other Structure

☐	

Structure Material (check all that apply)

Deck Material		*Beam Material*		*End/Back Wall Material*	
☐	Metal	☐	None	☐	Concrete
☐	Concrete	☐	Concrete	☐	Timber
☐	Timber	☐	Steel	☐	Stone/Masonry
☐	Open grid	☐	Timber	☐	Other:
☐	Other:	☐	Other:		

Creosote Evidence

☐	Yes	☐	No
☐	Unknown		

Culvert Material

☐	Metal
☐	Concrete
☐	Plastic
☐	Stone/masonry
☐	Other:

Notes:

Crossings Traversed (check all that apply)

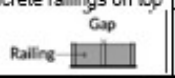
☐	Bare ground	☐	Open vegetation
☐	Rip-rap	☐	Closed vegetation
☐	Flowing water	☐	Railroad
☐	Standing water	☐	Road/trail - Type:
☐	Seasonal water	☐	Other:

Surrounding Habitat (check all that apply)

☐	Agricultural	☐	Grassland
☐	Commercial	☐	Ranching
☐	Residential-urban	☐	Riparian/wetland
☐	Residential-rural	☐	Mixed use
☐	Woodland/forested	☐	Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)			
☐ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Concrete surfaces (open roosting on concrete)	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck 	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☐ Not present	☐ Visual - live # dead #	☐ Guano	☐ Staining	☐ Audible ☐ Odor ☐ Photos ☐ Species

Name:	Signature:

APPENDIX L. BAT ACTIVITY PERIODS TABLE FOR IBAT, NLEB, AND TCB

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
Alabama: Hibernating Range	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
Alabama: Year-round Active Range (Zone 1)[96]	N/A	Dec 15 – Feb 15	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Alabama: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Arkansas	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Colorado	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Connecticut	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31

[90] Only applies in Zone 1 of the year-round active range (see Figure 16).
[91] We currently have no information to inform spring staging timeframe near winter roosts within the year-round active portion of the NLEB or TCB range; consequently, the Service will consider new information in the future that may inform spring staging timeframe.
[92] We currently have no information to inform fall swarming timeframe near winter roosts within the year-round active portion of the NLEB or TCB range; consequently, the Service will consider new information in the future that may inform fall swarming timeframe.
[93] The "active season" is the inverse of the hibernation period. If no hibernation period is listed, bats in this area are active year-round.
[94] State of lowered body temperature and metabolic activity.
[95] IBAT (rangewide) and NLEB (hibernating range) often remain in colonies until the end of Summer Occupancy. TCB (rangewide) and NLEB (year-round active range) roost singly once young can fly and forage independently (i.e., the end of the pup season).
[96] If your project falls within suitable summer IBAT habitat and IBATs are assumed or confirmed present, then default to using the more protective activity periods (AL: hibernating range).

APPENDIX L: BAT ACTIVITY TABLE

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
Delaware	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
District of Columbia	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Florida	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Georgia: Hibernating Range	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
Georgia: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Georgia: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Illinois	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Indiana	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Iowa	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Kansas	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Kentucky	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Oct 15	May 15 – July 31	Aug 16 – Nov 15
Louisiana: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Louisiana: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A

APPENDIX L: BAT ACTIVITY TABLE

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
Maine	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Maryland	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Massachusetts (Inland)	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Massachusetts (Coastal)[97]	Dec 1 – Mar 14		Mar 15 – May 14	Mar 15 – Sept 30	June 1 – Aug 15	Aug 16 – Nov 30
Michigan (Outside Indiana Bat Range)	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Michigan (Within Indiana Bat Range)	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Minnesota	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Mississippi: Hibernating Range	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
Mississippi: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Mississippi: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Missouri	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Oct 15	May 15 – July 31	Aug 16 – Nov 15
Montana	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Nebraska	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15

[97] Coastal Massachusetts includes Martha's Vineyard, Nantucket, and Cape Cod.

APPENDIX L: BAT ACTIVITY TABLE

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
New Hampshire	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
New Jersey	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
New Mexico: Hibernating Range	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
New Mexico: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Apr 1 – July 15	May 1 – July 15	N/A
New Mexico: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Apr 1 – July 15	May 1 – July 15	N/A
New York (Inland)	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
New York (Long Island)	Dec 1 – Feb 28		Mar 1 – May 14	Mar 1 – Sept 30	June 1 – Aug 15	Aug 16 – Nov 30
North Carolina: Hibernating Range	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
North Carolina: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Apr 1 – July 15	May 1 – July 15	N/A
North Dakota	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Ohio	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Oklahoma	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Pennsylvania	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15

APPENDIX L: BAT ACTIVITY TABLE

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
Rhode Island	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
South Carolina: Hibernating Range	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
South Carolina: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Apr 1 – July 15	May 1 – July 15	N/A
South Dakota (Plains)	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
South Dakota (Black Hills)	Oct 1 – April 30	N/A	May 1 – June 1	May 1 – Aug 31	June 15 – Aug 31	Aug 16 – Sept 30
Tennessee	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Texas: Hibernating Range	Nov 16 – Mar 14	N/A	Mar 15 – Apr 30	Mar 15 – Sept 30	May 15 – July 31	Sept 1 – Nov 15
Texas: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Texas: Year-round Active Range (Zone 2)	N/A	N/A	N/A	Mar 15 – July 15	May 1 – July 15	N/A
Vermont	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Virginia: Hibernating Range	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15
Virginia: Year-round Active Range (Zone 1)	N/A	Dec 15 – Feb 15	N/A	Apr 1 – July 15	May 1 – July 15	N/A
West Virginia	Nov 16 – Mar 31	N/A	Apr 1 – May 14	Apr 1 – Sept 30	May 15 – July 31	Aug 16 – Nov 15

APPENDIX L: BAT ACTIVITY TABLE

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, and preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly and forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, and mating) prior to hibernation
Wisconsin	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Wyoming (Plains)	Nov 1 – Apr 14	N/A	Apr 15 – May 14	Apr 15 – Sept 30	June 1 – Aug 15	Aug 16 – Oct 31
Wyoming (Black Hills)	Oct 1 – April 30	N/A	May 1 – June 1	May 1 – Aug 31	June 15 – Aug 31	Aug 16 – Sept 30

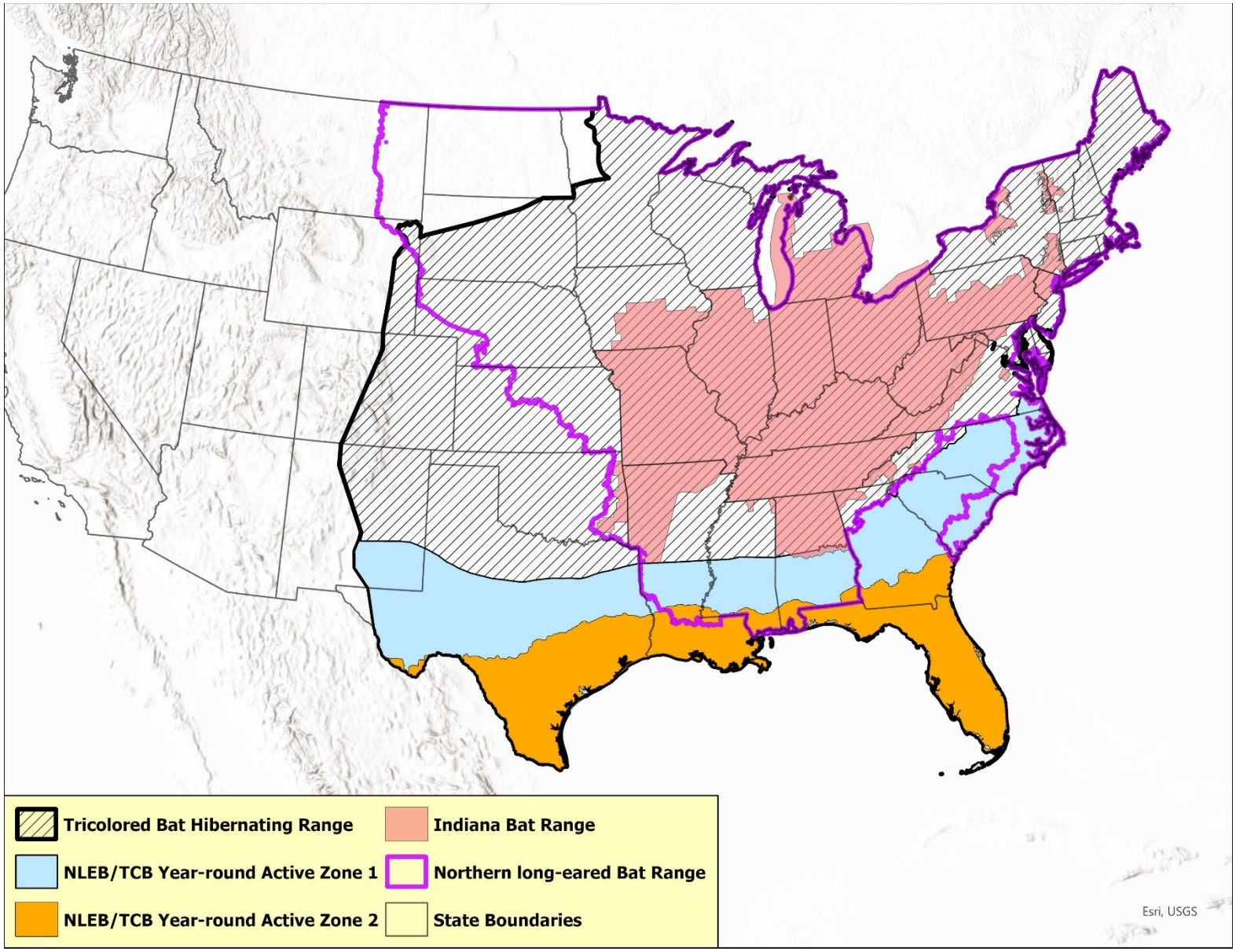


FIGURE 16. Hibernating and/or year-round active ranges of IBAT, NLEB, and TCB.

APPENDIX M: GLOSSARY OF TERMS

Above ground level (AGL) – height at which an acoustic detector microphone is elevated above the top of ground-level vegetation present at the detector deployment location.

Acoustic bat survey – bat sampling conducted through recording and analyzing echolocation calls.

Acoustic location – actual site where an acoustic detector and microphone is deployed; multiple acoustic locations may be used for a full acoustic bat survey.

Approved software program - bat acoustic program (see also *automated bat call ID software*) approved through the USFWS software testing procedures for stand-alone use in presence/probable absence surveys for Indiana bat and/or northern long-eared bat.

Automated bat call ID software – a form of echolocation identification in which recorded files are filtered and identified within a software program; the program compares the statistical properties of a recorded call to a library of known calls to classify to species.

Bat detector – equipment capable of detecting ultrasonic echolocation calls of bats that are above the range of human hearing.

Call quality – how closely the sequence matches typical search-phase behavior for the species.

Call sequence – a series of bat echolocation call pulses.

Candidate software program – bat acoustic program (see also *automated bat call ID software*) submitted to USFWS for software testing, but not yet approved for stand-alone use in presence/probable absence surveys for Indiana bat and/or northern long-eared bat.

Clutter –obstacles present in an area that can affect recording of bat echolocation calls; may be caused by either scattering echolocation calls from sound bouncing off obstacles (thereby reducing call quality) or by bats adjusting their normal search phase calls in response to additional obstacles resulting in changed bat echolocation call parameters.

Detection probability – the likelihood of detecting the presence of a species when that species is present.

Detector sensitivity – measures the ability of a bat detector to detect an echolocation call.

Detector - see *bat detector*.

Directional microphone – a microphone that is more sensitive to sound arriving from certain directions; compared to omni-directional, may detect sounds from a further distance away, but within a narrower cone of detection.

Echolocation – use of ultrasound and the returning echoes to orient and navigate in the environment.

Emergence survey – a survey method that involves visually counting bats that emerge from a known or suspected roost; usually conducted in early evening (e.g., 30 minutes before sunset) when bats exit to forage.

False negative – the failure to detect a bat species when it is present in the area; statistically a type II error in hypothesis testing.

Forest canopy openings – gaps in the continuous forest cover formed by tree crowns, where sunlight

reaches the forest floor.

Forest corridor – Three-dimensional corridors that bats use to travel within forests (also known as flyways).

Forest interior – forest areas surrounded by forest edge, typically 50-300 feet inside from an outer edge.

Forest strip – narrow area with trees. Examples include visual buffers or forest fragments dominated by edge effects.

Forest/woodland edge – transition area between forest and open spaces. Edges create edge effects impacting the species communities and growth of vegetation extending into the forest from the edge. Edge can occur whenever there is a 30-foot break in canopy cover.

Forest/woodland gap – area between intact forest areas that form small open areas. These areas are partially shaded by forest areas and natural regeneration will likely fill the gap.

Frequency filter – pre-programmed range of sound frequencies (in kHz) set for acoustic bat detectors to record.

Full-spectrum detector – bat detectors in which all desirable information about the recorded sound is preserved, including time, frequency, and amplitude.

Harp-trapping – capture method by which a device (harp-trap) composed of a metal frame, multiple strands of equally-spaced nylon strings, and a catch bag at the bottom, is deployed near the entrances of caves, cave-like openings, and mines. Bats are captured as they exit a restricted opening to forage.

Hemispherical microphone – see *omni-directional microphone*.

Hibernaculum (*pl.* "hibernacula") – a thermally-stable roost used by bats for extended periods of torpor during winter. Typically, a cave, natural cave-like feature (e.g., sinkhole, fissure, talus opening, etc.), or anthropogenic structure (e.g., mine, tunnel, bridge, etc.).

High-frequency calls – a general classification of calls that refers to those with minimum frequencies >35 - 40 kilohertz.

Kilohertz (kHz) – a unit of measure of the frequency of sound; one thousand hertz.

Level-of-effort (LOE) – Minimum number of survey nights required (using a particular survey methodology) to determine probable absence of a target bat species; statistically set at a particular confidence level (e.g., 90%, 95%, etc. – depending upon species and region) by USFWS.

Linear project – a project with a footprint greater in length than width (e.g., pipeline, roadway, or right-of-way) with ≥ 1 km (0.6 mi) of suitable habitat; may contain contiguous and fragmented patches of suitable habitat, but only segments at least ≥ 1 km in length can be considered for presence/probable absence survey sites.

Manual-vetting – see *qualitative call identification*.

Maximum-Likelihood Estimate (MLE) – a statistical method of estimating the parameters of a statistical model. For our purposes, the MLE is a statistical method that can be used to determine species presence or probable absence at a particular site on a particular night by means of a classification matrix.

Microphone sensitivity – the minimal amplitude required at a given frequency for a microphone to

detect a sound.

Microphone orientation – the direction in which the microphone is pointing' thereby affecting the cone of detection.

Mist-netting – survey technique that uses low-visibility, mesh nets affixed between two poles to capture foraging bats in areas of increased activity (e.g., travel corridors, ponds, etc.)

Net set – one mist-net deployment consisting of two poles and typically from 1-3 affixed mist-nets stacked onto one another. A typical net set is at least 5 m to 9 m high consisting of two or more nets stacked on top of one another (without gaps) and from 6 m to 18 m wide.

Net site – see *site*.

Noise – unwanted or extraneous environmental sound or electronic interference detected by a bat detector.

Non-linear project – any project generally not linear in nature or linear and < 1 km in length; may contain contiguous and fragmented patches of suitable habitat, but only blocks ≤ 123 acres can be considered for presence/probable absence survey sites.

North American Bat Monitoring Program (NABat) – A multi-national, multi-agency coordinated bat monitoring program across North America that was created to monitor bats at local to rangewide scales. It incorporates winter hibernaculum counts, maternity colony counts, mobile acoustic surveys, and stationary acoustic surveys (https://www.nabatmonitoring.org).

Omni-directional microphone – a microphone that can detect equally in all directions (e.g., has a spherical cone of detection). Hemispherical microphones are a type of omni-directional microphone.

Out-tier project guidance – a USFWS discretionary survey guidance scenario that can be applied when an Indiana and/or northern long-eared bat has been captured or acoustically-detected, but no known roosting areas have been identified. Under "out-tier" guidance, 2.5 and 5-mile or 1.5 and 3.0- mile buffers are placed around the Indiana bat or northern long-eared bat capture or detection location. Surveyors are allowed to perform a standard P/A survey to help refine a maternity colony's true location and/or document roost trees if the project area is more than 2.5 or 1.5 (for NLEB) miles away from the Indiana bat capture/detection site, but within the 5- or 3-mile (for NLEB) buffer.

Pass – a single crossing of a bat through a bat detector's cone of detection; see *call sequence*.

Probable absence – using the appropriate Level of Effort (LOE), a determination that survey protocols are not 100% likely to detect IBAT or NLEB when present and that identification errors may occur.

Pulse – a brief, continuous emission of sound; see *call sequence*.

Qualified biologist – For activities involving the handling of bats, an individual who holds a USFWS Section 10(a)(1)(A) Recovery Permit (Federal Fish and Wildlife Permit) for federally-listed bats in the state/region in which they are surveying. For qualitative analysis of acoustics, an individual that has completed one or more of available bat acoustics trainings/workshops and/or able to show similar on-the-job or academic experience; furthermore, have demonstrated multiple years of experience in 1) gathering known calls of the target species, 2) have identified bat calls recorded in numerous habitat types, 3) are familiar with species likely to be encountered within the project area, and 4) must have stayed current with qualitative identification of bat calls.

Qualitative call identification (manual vetting) – identification of call sequences through visual comparison with a known call library. Qualitative analysis must also include and present within a written

report a comparison of the results of each acoustic ID program by site and night. Qualitative analysis of each acoustic site and night with probable detections of IBAT and/or NLEB should include the entire night's high frequency call data, including "no ID" files, and not just those files making it through the acoustic analysis tools as probable IBAT and/or NLEB; accuracy can be highly variable based on researcher experience; also referred to by some as manual vetting (see *qualified biologist*).

Roost tree – A live or dead standing tree (snag) occupied by one or more bats. Throughout most of the IBAT and NLEB range, trees are typically occupied by bats outside of the hibernation period (spring, summer, fall), although see Appendix J regarding year-round active populations.

Roost – see *roost tree*.

Site – an area containing one or more individual net sets or harp traps in relatively close proximity that can be efficiently walked to and checked by a survey team (typically two people) within a 10- minute window from a central bat-processing location.

Site-night – The standard unit of time for operating an acoustic detector at one site for one calendar night during an acoustic P/A survey. The MLE should be assessed for a target species on a site-night basis.

Ultrasonic/ultrasound – sounds made of frequencies that are beyond the range of human hearing (often arbitrarily set at 20 kilohertz, although most adults have trouble hearing sounds above 15 kHz.)

Weather proofing – various methods/materials used to protect a bat detector/microphone from the elements (primarily rain).

Winter habitat – see *hibernaculum*.

Zero-crossing detector – a detector type that calculates frequencies by measuring the time between moments of zero sound pressure, which corresponds to the period of the wave.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer To: 01/20/2026 15:49:28 UTC
Project code: 2025-0047330
Project Name: Main Ditch Project Area

Federal Nexus: yes
Federal Action Agency (if applicable): Natural Resources Conservation Service

Subject: Technical assistance for 'Main Ditch Project Area'

Dear Sylvia Harris:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on January 20, 2026, for 'Main Ditch Project Area' (here forward, Project). This project has been assigned Project Code 2025-0047330 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project. **Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (Dkey), invalidates this letter.**

Determination for the Northern Long-Eared Bat and Tricolored Bat

Based on your IPaC submission and a standing analysis completed by the Service, you determined the proposed Project will have the following effect determinations:

Species	Listing Status	Determination
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	May affect

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate. Projects that receive a may affect determination for tricolored bat through the key, should contact the appropriate Ecological Services Field Office if they want to conference on this species.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Alligator Snapping Turtle *Macrochelys temminckii* Proposed Threatened
- Indiana Bat *Myotis sodalis* Endangered
- Monarch Butterfly *Danaus plexippus* Proposed Threatened

You may coordinate with our Office to determine whether the Action may cause prohibited take of the species listed above.

Conclusion

Consultation with the Service is not complete. Further consultation or coordination with the Service is necessary for those species or designated critical habitats with a determination of “May Affect.” A “May Affect” determination in this key indicates that the project, as entered, is not consistent with the questions in the key. Not all projects that reach a “May Affect” determination are anticipated to result in adverse impacts to listed species. These projects may result in a “No Effect”, “May Affect, Not Likely to Adversely Affect”, or “May Affect, Likely to Adversely Affect” determination depending on the details of the project. Please contact our Missouri Ecological Services Field Office to discuss methods to avoid or minimize potential adverse effects to those species or designated critical habitats.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

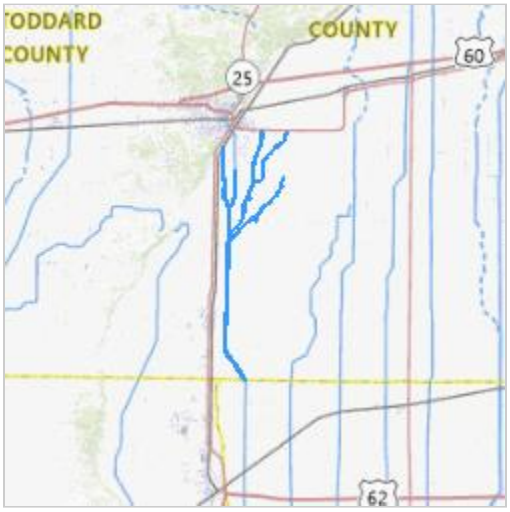
Main Ditch Project Area

2. Description

The following description was provided for the project 'Main Ditch Project Area':

> Maintenance of 100-year-old agricultural canals.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.7086342,-89.95353643794412,14z



DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of “may affect” for a least one species covered by this determination key.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

   Automatically answered
   No

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

   Automatically answered
   No

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

   No

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Note for projects in Pennsylvania: Projects requiring authorization under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act would be considered as having a federal nexus. Since the U.S. Army Corps of Engineers (Corps) has issued the Pennsylvania State Programmatic General Permit (PASPGP), which may be verified by the PA Department of Environmental Protection or certain Conservation Districts, the need to receive a Corps authorization to perform the work under the PASPGP serves as a federal nexus. As such, if proposing to use the PASPGP, you would answer ‘yes’ to this question.

   Yes

6. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

7. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   No

8. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

9. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

   No

10. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

    Automatically answered
    No

11. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

    No

12. Will the action cause effects to a bridge?

    Note: Covered bridges should be considered as bridges in this question.

    No

13. Will the action result in effects to a culvert or tunnel at any time of year?

    No

14. Are trees present within 1000 feet of the action area?

    Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    Yes

15. Does the action include the intentional exclusion of bats from a building or building-like structure? **Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

    No

16. Does the action involve removal, modification, or maintenance of a human-made building-like structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    No

17. Will the action cause construction of one or more new roads open to the public?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

18. Will the action include or cause any construction or other activity that is reasonably certain to increase average night-time traffic permanently or temporarily on one or more existing roads? **Note:** For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

20. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

    Note: For information regarding NSF/ANSI 60 please visit https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects

    No

21. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

22. Will the action include drilling or blasting?

    No

23. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use at night)?

    No

24. Will the proposed action involve the use of herbicides or pesticides (e.g., fungicides, insecticides, or rodenticides)?

    No

25. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

    Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

    Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    No

26. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable northern long-eared bat or tricolored bat roosting habitat?

    Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

    No

27. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    Yes

28. Is the project related to the production of coal, including projects that support the mining of coal, as well as the production and/or distribution of energy produced from coal?

    No

29. Will the proposed action occur exclusively in an already established and currently maintained utility right-of-way?

    No

30. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

    Note: A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property.

    No

31. Does the project intersect with the 0- 9.9% forest density category?

    Automatically answered
    Yes

32. Does the project intersect with the 10.0- 19.9% forest density category map?

    Automatically answered
    Yes

33. Does the project intersect with the 20.0- 29.9% forest density category map?

    Automatically answered
    No

34. Does the project intersect with the 30.0- 100% forest density category map?

    Automatically answered
    No

35. Will the action cause trees to be cut, knocked down, or otherwise brought down across an area greater than 0.5 acre in total extent?

    Yes

36. Does the action area intersect the tricolored bat species list area?

    Automatically answered
    Yes

37. Is the action area located within 0.5-mile of radius of an entrance/opening to any known tricolored bat hibernacula or winter roost?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

    Automatically answered
    No

38. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats? **Note:** The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    Automatically answered
    No

39. Has a presence/probable absence bat survey targeting the tricolored bat and following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines been conducted within the project area?

    No

40. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities?
    (If unsure, answer ""Yes."")

    Note: If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (Tillandsia usneoides), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see Appendix A in the Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines.

    Yes

41. Do you have any documents that you want to include with this submission?

    No

PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

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IPAC USER CONTACT INFORMATION

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City: Columbia
State: IL
Zip: 62236
Email sharris@prairieengineers.com
Phone: 8037414193

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Natural Resources Conservation Service
Name: Rex McAliley
Email: rex.mcaliley@usda.gov
Phone: 5738769425

Sylvia Harris

From: Kuczynska, Vona <vona_kuczynska@fws.gov>
Sent: Tuesday, April 21, 2026 4:20 PM
To: Sylvia Harris
Cc: McAliley, Rex - FPAC-NRCS, MO; Marina Osier; Sarah Stai; Trevor Cunningham
Subject: Re: [EXTERNAL] RE: Main Ditch Watershed Project with NRCS in SE Missouri

Hi Silvia,

The Missouri Field Office reviewed all of the provided information regarding the NRCS Main Ditch Watershed Project, including conservation measures intended to reduce impacts to federally listed bats. As part of the project, NRCS has committed to clearing trees during the inactive season for bats (April 1 to October 15). Based on project information and conservation measures outlined, our Office concurs with your determinations for listed species. As proposed, we do not anticipate that the project will adversely affect any federally listed species. Please reach out to our office if the scope or timing of the project changes and we need to reevaluate our determinations.

Thank you,
Vona

Vona Kuczynska

Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A, Columbia, MO 65203
Mobile: 573-540-3835

FWS Fileshare - Share Files With Me
Bat Recovery Permit Application Tips

Book time to meet with me

From: Kuczynska, Vona <vona_kuczynska@fws.gov>
Sent: Tuesday, April 7, 2026 9:51 AM
To: Sylvia Harris <sharris@prairieengineers.com>
Cc: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>; Marina Osier <mosier@prairieengineers.com>; Sarah Stai <sstai@prairieengineers.com>; Trevor Cunningham <tcunningham@PrairieEngineers.com>
Subject: Re: [EXTERNAL] RE: Main Ditch Watershed Project with NRCS in SE Missouri

Hi Sylvia,

Based on the information provided, the Missouri Field Office concurs with your determinations for listed bat species. One thing I'd like to point out is that to get to a MANLAA determination, the trees need to be removed during the inactive season for bats unless they are not suitable for roosting. This would mean that they do not have any sloughing or exfoliating bark on live trees, or that dead trees do not have any remaining bark under which bats could be roosting. There are still ways to complete projects and fell trees during the active season, but they require a little more effort to determine if bats have moved into them. As long as they have not, those trees can come down anytime of the year. Let me know if that is the case and we can talk about that option.

Thanks,
Vona

Vona Kuczynska

Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

Missouri Ecological Services Field Office

101 Park DeVille Drive, Suite A, Columbia, MO 65203

Mobile: 573-540-3835

FWS Fileshare - Share Files With Me
Bat Recovery Permit Application Tips

Book time to meet with me

From: Sylvia Harris <sharris@prairieengineers.com>
Sent: Tuesday, March 17, 2026 10:50 AM
To: Kuczynska, Vona <vona_kuczynska@fws.gov>
Cc: McAliley, Rex - FPAC-NRCS, MO <Rex.McAliley@usda.gov>; Marina Osier <mosier@prairieengineers.com>; Sarah Stai <sstai@prairieengineers.com>; Trevor Cunningham <tcunningham@PrairieEngineers.com>
Subject: [EXTERNAL] RE: Main Ditch Watershed Project with NRCS in SE Missouri

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hello Vona

As requested, here's some more information on the trees along the ditch for the **MD** project:

Trees were extremely sporadic on this project (typical photo of ditch with no trees 38853). There were only a few mature trees along the ditches, including a large Cottonwood growing right at the top of the bank (38849) with no sloughing bark, that may need to be removed as ditches are cleared (36-40" DBH). There was also a mature Pin Oak (38847) with no sloughing bark, but it was 30-50' from the top of bank and will likely not need to be removed with the clearing. The other mature tree observed was a sycamore (36-40" DBH) with some sloughing bark, but it was 30-50‘ from top of bank and will likely not need to be removed (38855). While the photo of the sycamore shows a roosting BAEA, it is not a nest tree but will not be disturbed as previously noted. These three trees are live, not dead. As only one of these trees may need to be removed, the acreage estimate for disturbance will be less than 0.01 acres. We recommend that the ditch work be conducted in the inactive season for bats (October 15 to March 31). Photos attached.

Sylvia D. Harris, MS, Senior Environmental Scientist | Prairie Engineers, P.C. | 217.605.0403

From: Sylvia Harris
Sent: Thursday, March 12, 2026 8:13 AM
To: Kuczynska, Vona <vona_kuczynska@fws.gov>
Cc: McAliley, Rex - FPAC-NRCS, MO <rex.mcaliley@usda.gov>; Marina Osier <mosier@prairieengineers.com>; Sarah Stai <sstai@prairieengineers.com>
Subject: Main Ditch Watershed Project with NRCS in SE Missouri

Hello Vona

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) implementing regulations to carry out programs for the conservation of endangered species and threatened species, this letter and attachments are being transmitted to initiate consultation, on behalf of NRCS - Missouri in fulfilling its duty to ensure federal actions do not jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species.

Please see the attached T&E Assessment documents, including a report from the Missouri Department on Conservation, and the below summary regarding the proposed Main Ditch Watershed Project with NRCS in SE Missouri. I look forward to discussing this project with you and determining any further assessment and/or conservation measures necessary to include in the Environmental Assessment that is being developed for this project.

Project Summary

Proposed Action:
This Proposed Action (Project) involves flood damage reduction measures aimed at better protecting the Subwatershed from flood damage and soil erosion. This will be achieved by removing accumulated sediment to restore the drainage system’s capacity to its original design, stabilizing banks, and implementing native vegetation for multiple benefits, including safeguarding landowners’ property, reducing safety risks, and preserving farmland.

While this project is planned for drainage ditches within agricultural lands, wildlife habitat along the ditches is minimal as the existing trees are scattered, the waterways are regularly dredged and the herbaceous vegetation on ditch banks is regularly mowed.

Lat/Long:
36?44'38.25" N 89?56'19.74" W

Timing of Project:
Winter 2028/2029 TBD

Attachments Included:

- IPaC Biological Assessment
- IPaC Species List
- IPaC Resource List
- IPaC Technical Assistance Letter
- MODC Level Two Report

Thanks!

Sylvia D. Harris, MS

Sr. Environmental Scientist

Prairie Engineers
ENGINEERS · SURVEYORS · SCIENTISTS

404 North Main Street | Columbia, MO 62236

217.605.0403 | www.PrairieEngineers.com

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Scott R. Hobart

From: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Sent: Friday, August 2, 2024 8:15 AM
To: Scott R. Hobart; Jason Sweet
Cc: Hamilton, Chris - FPAC-NRCS, MO
Subject: FW: NRCS Watershed Studies
Attachments: West Ditch-Main Ditch NRCS.pdf; Mainditch Watershed NRCS.pdf; Brewer Lake Watershed NRCS.pdf

FYI....and for your records.

Steve Hefner

Natural Resources Specialist
USDA-Natural Resources Conservation Service
Butler County USDA Service Center
4327 Highway 67 North
Poplar Bluff, MO 63901

From: Pitcock, Benjamin S CIV USARMY CEMVM (USA) <Benjamin.S.Pitcock@usace.army.mil>
Sent: Monday, July 29, 2024 12:21 PM
To: Hefner, Steven - FPAC-NRCS, MO <steven.hefner@usda.gov>
Subject: NRCS Watershed Studies

Steven,

Sending a note on behalf of Roger Allan. The Memphis District Regulatory Division (USACE) would like to be listed as a cooperating agency during these studies.

Thanks

Ben

US Army Corps of Engineers.

Benjamin Pitcock | Regulatory Supervisor
Regulatory Division
167 N. Main Street
Memphis, Tennessee 38103-1894
Desk Phone: (901) 544-3468
Work Cell: (901) 544-5501
benjamin.s.pitcock@usace.army.mil

Main Ditch Initial Public Meeting August 21st, 2024

6:30pm –7:22pm at Stoddard County USDA Service Center, 18450 Ridgeview Ln, Dexter, MO 63841

In-person sign-in attached. Online attendees – Teams attendance report attached.

Meeting Minutes

1. Presentation by NRCS (~39 min), see attached Power Point slides.
2. Questions
    a. Q: Do you think there will ever be enough funding to improve the entire district? A: Steve Hefner: I doubt it. I'm not going to say it couldn't happen, but you would have a lot more financial obligation.
    b. Q: If you're putting in underground tile, how deep do you do it? A: Scott Hobart: The final depth will be based off of design using tile about 2-3' below where the groundwater currently is to lower the groundwater table so that it is no longer surfacing through the side slopes of the drainage canals. We don't know for sure at this time, but will use an estimated amount in the planning stage and borings to determine final depth in the design phase.
    c. Q: Is it going to be more feasible to do an outside ditch to catch all the seep water? A: Scott:- It would be really tough to dig a secondary outside ditch.
    d. Q: When you drill a bore hole how deep do you do it? A: Scott: Like anything else it depends. What is the holes purpose? The bore holes would go below the bottom of the channel about 5-10ft. You want to know not only what soil its affecting, but also the foundations strength. If these drainage canals are 10-12ft, you would go 5-10ft below that.

Main Ditch Watershed Project, HUC 10: 0802020405
Stoddard County, Missouri
Initial Public Participation Scoping Meeting, August 21, 2024
Attendance

Name	Landowner/Affiliation	Contact Information (Email/Phone)
Scott Hobart	CWJV-MSI	srhobart@mstutz.com
DAVE COUR	ATHENA	dcour@athenaee.com
Steve Hefner	USDA-NRCS	steven.hefner@usda.gov
Allen Rowland	Land owner	arowlandfarms@gmail.com
CHRIS ROWLAND	FARM BUREAU	CROWLANDFARMS@GMAIL.COM
Roger Mayberry	Dist 37	Roger.Mayberry at Yahoo.com
John Robinson	Dist 37	j1502@yahoo.com

1. Summary

Meeting title	Main Ditch - DD37 - Public Meeting
Attended participants	2
Start time	8/21/24, 6:18:19 PM
End time	8/21/24, 7:26:52 PM
Meeting duration	1h 8m 33s
Average attendance time	1h 7m 52s

2. Participants

Name	First Join	Last Leave	In-Meeting Duration
Scott R. Hobart	8/21/24, 6:18:23 PM	8/21/24, 7:26:52 PM	1h 8m 28s
Hefner, Steven - FPAC-NRCS, MO	8/21/24, 6:18:50 PM	8/21/24, 7:26:07 PM	1h 7m 17s

3. In-Meeting Activities

Name	Join Time	Leave Time	Duration
Scott R. Hobart	8/21/24, 6:18:23 PM	8/21/24, 7:26:52 PM	1h 8m 28s
Hefner, Steven - FPAC-NRCS, MO	8/21/24, 6:18:50 PM	8/21/24, 7:26:07 PM	1h 7m 17s

USDA

United States Department of Agriculture

Main Ditch Watershed Project

HUC 10: 0802020405
HUC12: 080202040502

Stoddard County, Missouri
Sponsor – Drainage District 37

Initial Public Meeting
August 21, 2024





Steve Hefner
Natural Resources Specialist
Natural Resource Conservation Service, Columbia, MO

Natural Resources Conservation Service

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Overview of Presentation Topics

1. Basic information about the NRCS and the Watershed Program
2. An explanation of the Watershed and Flood Prevention Program (WFPO)
3. The purpose and requirements of WFPO.
4. The NRCS goals and objectives for the Main Ditch Watershed Plan/Environmental Assessment (Plan-EA).

The NRCS Agency Mission



NRCS provides technical and financial assistance to address natural resource and watershed concerns.

NRCS also helps to plan, build, and/or improve infrastructure that prevents flooding, saves lives, and protects property.

NRCS offers programs that focus on the conservation of soil and water resources throughout the project watershed.

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The NRCS Watershed Program

NRCS Watershed planning is:

a. Science-based

b. Identifies 1 or more resource concerns

c. Evaluates feasible options

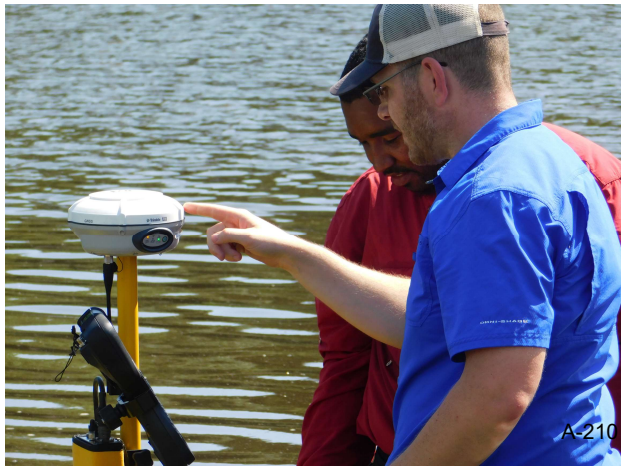
d. Emphasizes a desired outcome (such as reduced flooding)

2. Integrates social, economic, and natural resource concerns
3. Ensures conservation of resources and wise stewardship decisions
4. Protects both natural and cultural resources

WFPO Authorized Purposes

1. Flood prevention (Flood damage reduction)
2. Watershed Protection (sediment reduction)
3. Public Recreation/ Public Fish and Wildlife
4. Agricultural Water Management
5. Municipal Water / Water Quality Protection
6. Watershed Structure Rehabilitation (aging dams)







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A Partnership Effort for a Community Goal

The NRCS Watershed and Flood Prevention Program (WFPO) is dependent upon local sponsor involvement.

A project cannot be planned or installed without having a local entity (City, Township, County, Conservation District, Drainage District, etc.) serve as the project sponsor.





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Main Ditch PL 83-566 Project

Drainage District 37 of Stoddard County

Tim Mayberry, President

Natural Resources Conservation Service

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Responsibilities of the Sponsor

The Sponsor must agree to:

1. Provide local leadership
2. Acquire necessary permits and licenses
3. Have the authority to levy taxes (if needed)

Taxing authority provides assurance that the federal investment of building a structure will be maintained for the life of the project.

Responsibilities of the Sponsor

1. Implement zoning and acquire land if needed
2. Commit financially to cost-share amounts (if required)
3. Support the project planning public participation (meetings, outreach documents, website, etc.)
4. Support NRCS conservation practice implementation within the project watershed

WFPO Project Benefits and Limitations

WFPO planning projects are limited to watersheds of 250,000 acres or less.

Projects over $25 million require the development of an Environmental Impact Statement and Congressional approval.

WFPO pays for 100% of the Engineering and Planning Technical Assistance for flood prevention.

WFPO pays for 100% of installation and construction of flood prevention works of improvement.

WFPO Project Benefits and Limitations

WFPO pays for 100% of the planning and technical assistance for related public recreation works of improvement.

WFPO pays for up to 50% of the installation and construction of related public recreation works of improvement.

WFPO can not pay for real property rights.

WFPO pays a percentage (not to exceed 50%) for conservation easements or floodplain easements.

Works of Improvement -Structural

WFPO planning projects may include structural components such as construction of a new watershed structure and/or substantial upgrades in stormwater management infrastructure.





Watershed Operations Program Cost Share

Federal Cost Share	Planning/ Engineering/ TA	Installation/ construction	Real Property Rights
Flood Prevention	100%	100%	0%
Watershed protection - Flood control, sedimentation, water quality, water conservation, wildlife, etc.	100%	variable	0%
Public Recreation	100%	Not to exceed 50%	Not to exceed 50%
Public Fish and Wildlife	100%	Not to exceed 50%	No to exceed 50%
Agricultural Water Management - Drainage, Irrigation, Ground water discharge, etc.	Up to 100%	Up to 75%	0%
Municipal and Industrial Water Supply - Reservoir Structure	0%	Not to exceed 50%	0%
Water Quality Management - Reservoir Structure	Up to 100%	TBD	0%

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Works of Improvement – Nonstructural



WFPO projects may include nonstructural components:

1. Wetland restoration
2. Wetland creation
3. Conservation easements



NRCS Watershed Program Timelines

1. Investigation Phase:
   Preliminary Investigation Feasibility Study or PIFR
   (completed in 2023)

2. Planning Phase:
   Watershed Plan/Environmental Document (initiated in 2024)
   Estimated timeframe: 18 months

3. Design Phase, Estimated Timeframe: 1-1.5 years

4. Construction Phase, Estimated Timeframe: 2-3 years

Design Limitations

A watershed structure is considered only if:

1. Engineering analyses determine that construction of a watershed structure is feasible for the site (soils, geology, topography, etc.)

2. The structure will protect public safety.

3. The structure is the most effective flood control alternative with a positive benefit:cost ratio.

4. Projects usually have design limitations due to adjacent structures and roads.

Conservation Works Joint Venture (CWJV)

NRCS has engaged the services of CWJV for planning and engineering support.

CWJV is a multi-disciplinary team of professionals experienced in watershed planning, environmental compliance, and engineering.

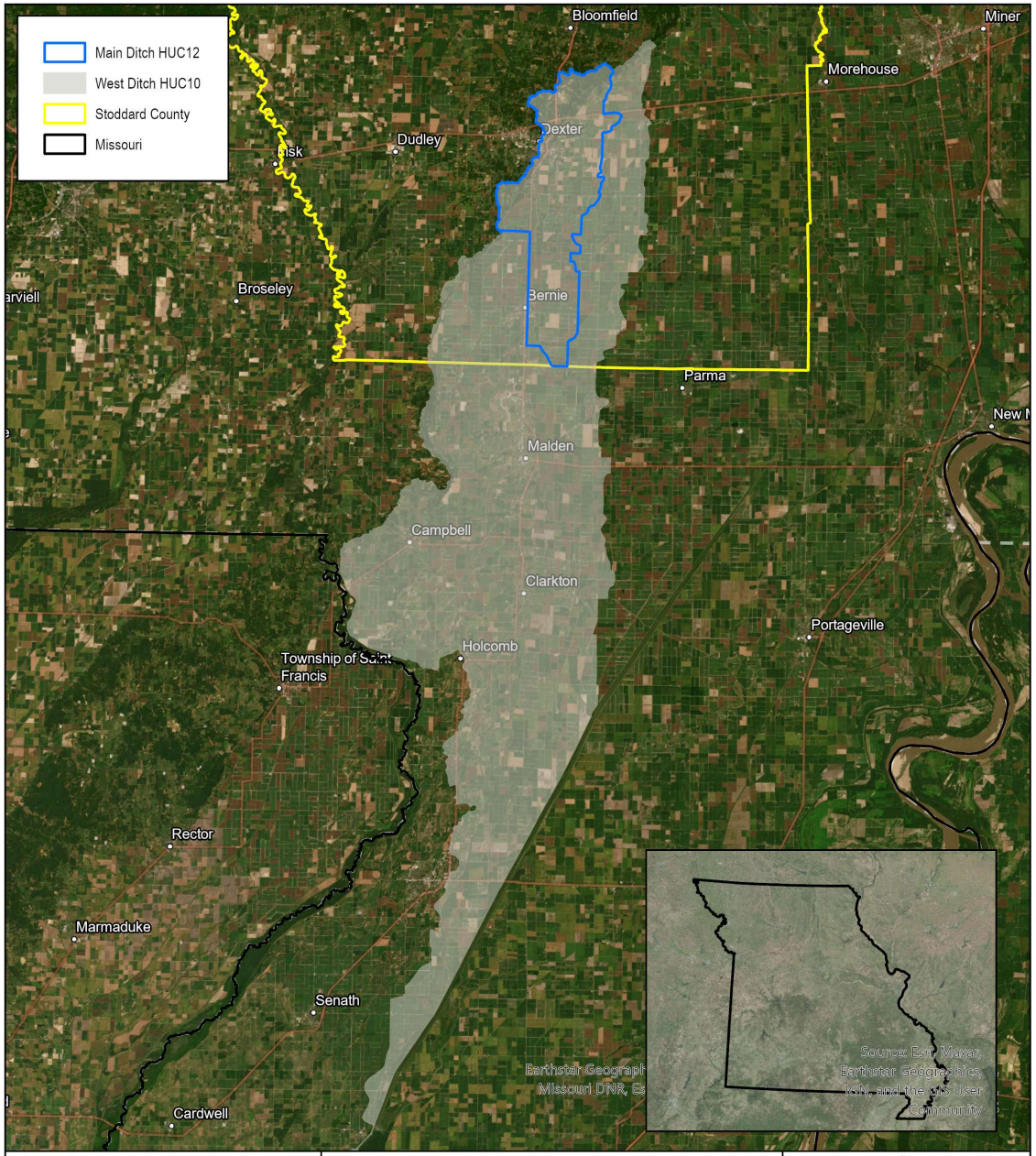
NRCS welcomes and appreciates their expertise and assistance in developing the Main Ditch Watershed Plan and Environmental Assessment.

Project Purpose and Need

The proposed project meets the General Purpose of Public Law 83-566 by preventing damage from erosion, floodwater, and sediment. Further, the sponsor and NRCS have identified agricultural water management as the main authorized purpose. In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The water management infrastructure is approximately 100 years old and in need of attention. Without flood protection and drainage water management, the area remains vulnerable to excessive water, prevented planted acres, harvest interruptions and loss of farm income.

Project Map

Watershed Overview



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Project Goals

Main Ditch

- Combat canal bank erosion in the drainage system in the most vulnerable locations
- Provide native grass buffers to filter pollutants and provide wildlife habitat
- Redistribute stream bank spoil where appropriate
- Enhance the ability to transfer excessive surface water to the outlet of the watershed

Streambank Erosion

Main Ditch

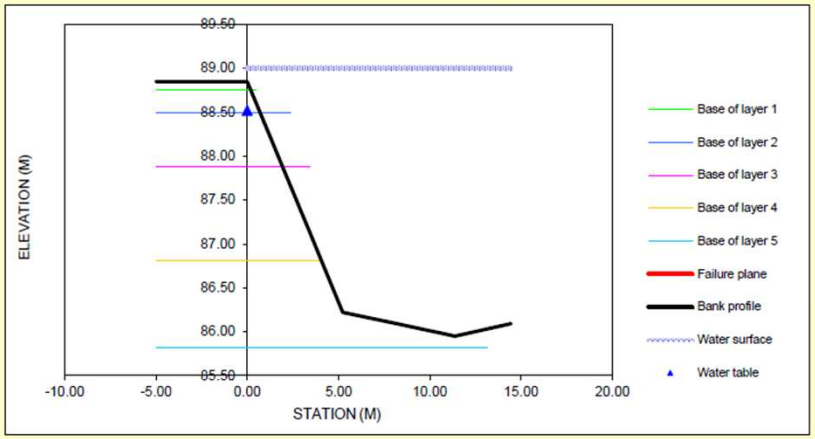
Bank Stability Model

Bank model output

Verify the bank material and bank and bank-toe protection information entered in the "Bank Material" and "Bank Vegetation and Protection" worksheets. Once you are satisfied that you have completed all necessary inputs, hit the "Run Bank-Stability Model" button.

Bank Material Properties

Layer 1	Layer 2	Layer 3	Layer 4	Layer 5
Silt	Soft Clay	Soft Clay	Soft Clay	Soft Clay



Water table depth (m) below bank top: 0.33

(•) Use water table
( ) Input own pore pressures (kPa)

Own Pore Pressures	kPa	Pore Pressure From Water Table
	Layer 1	-2.75
	Layer 2	-1.63
	Layer 3	868.12
	Layer 4	868.12
		868.12

Factor of Safety: #DIV/0! #DIV/0!

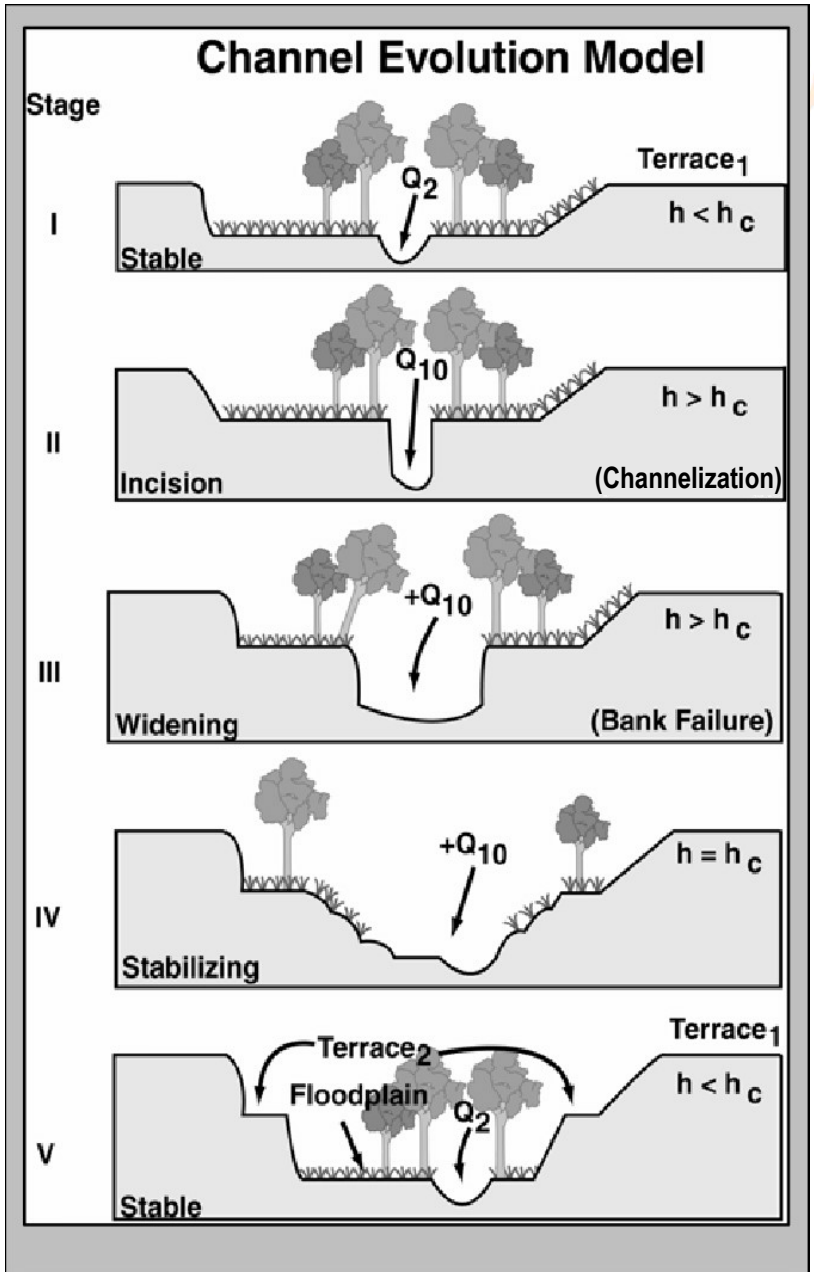
Run Bank-Stability Model

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Streambank Erosion

Main Ditch

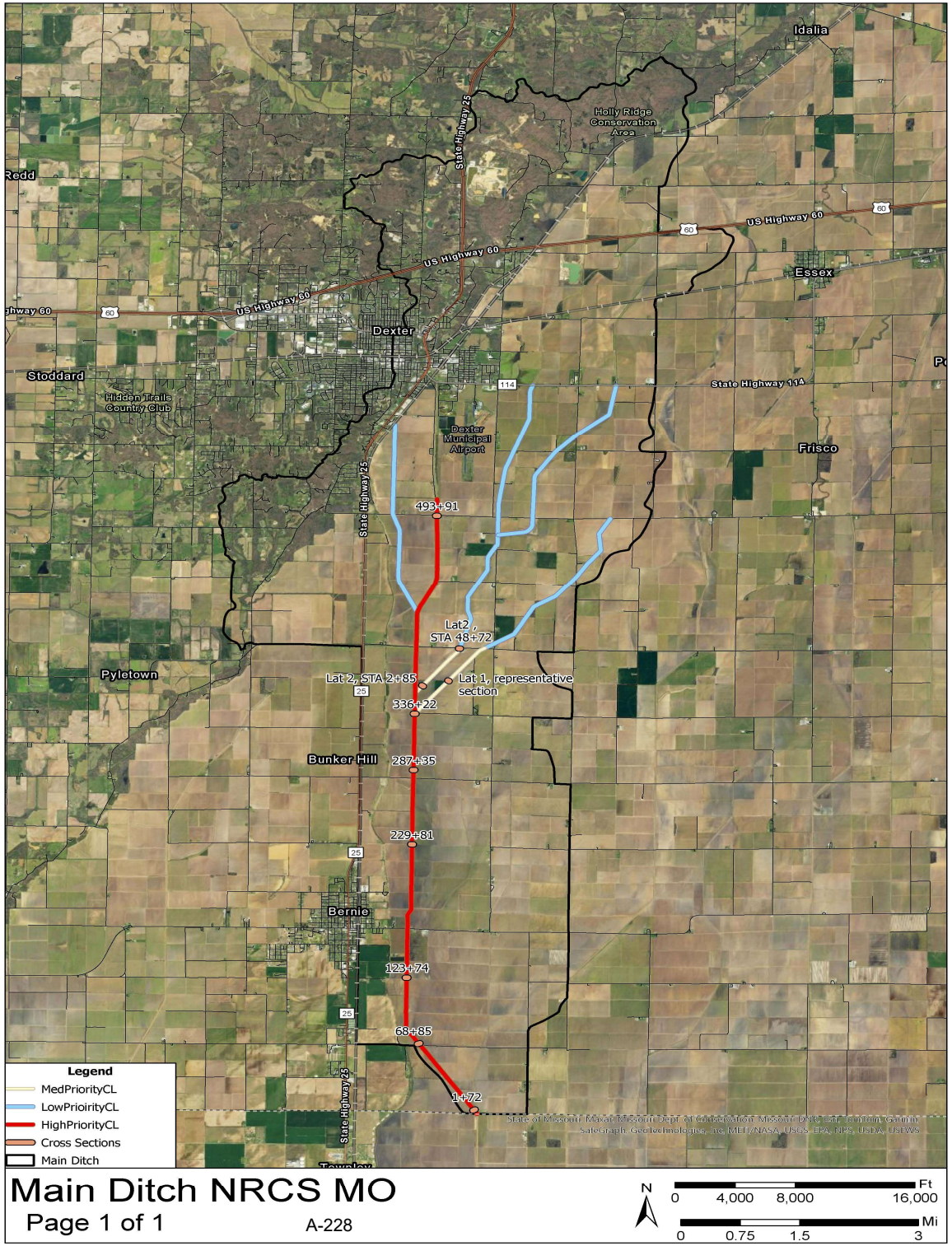


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United States Department of Agriculture

Project Map

Cross Sections – Main Ditch



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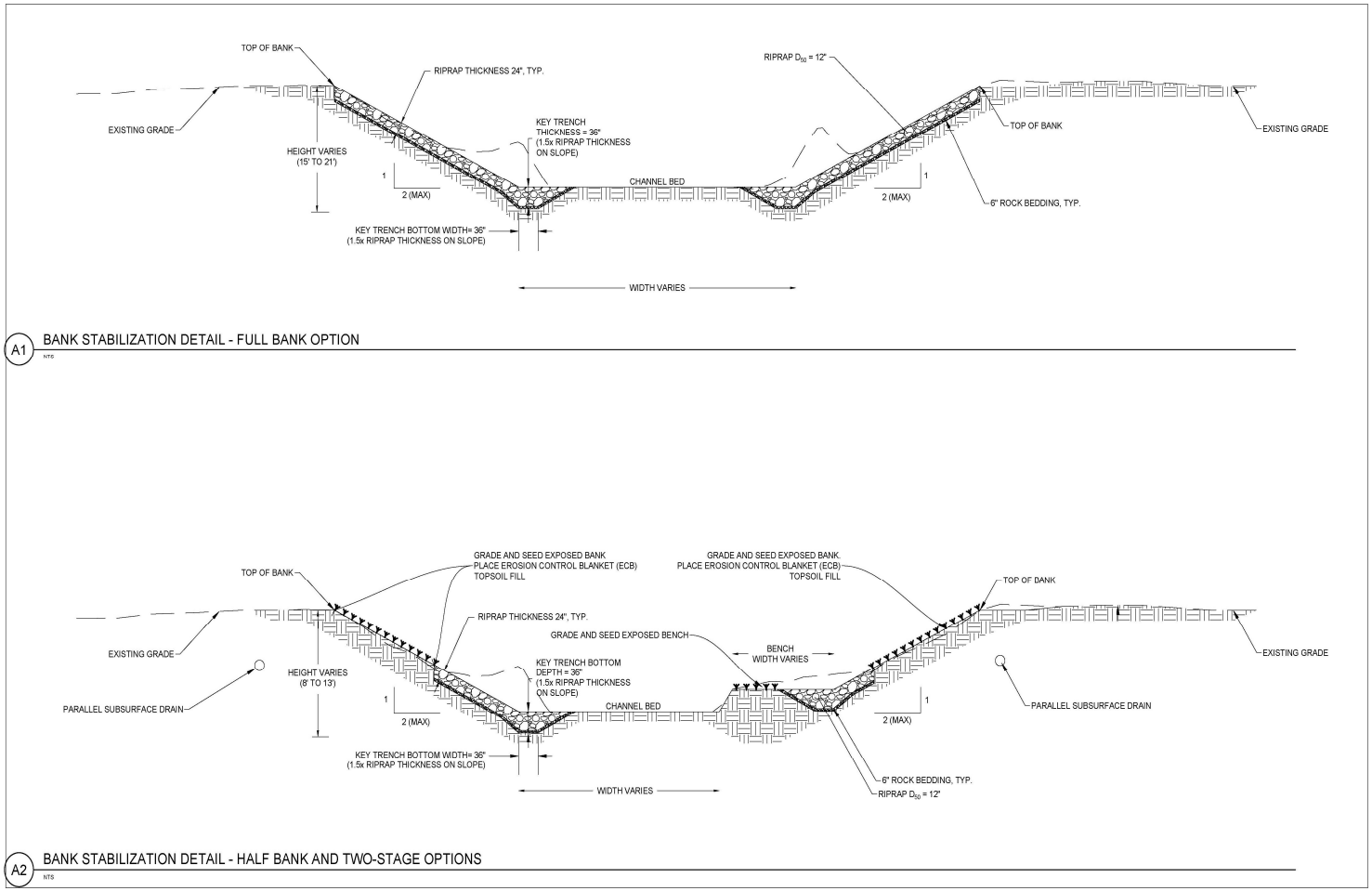
Project Alternatives

Main Ditch

- **Potential Alternatives Preferred:**
  1. No Action, Future Without Project
  2. Establish native warm season grasses on canal banks on 40% of construction areas.
  3. Assess the drainage system and armor the most vulnerable spots with rock not to exceed 10% of the drainage canal system
  4. Assess the feasibility to install underground tile drain along the drainage canal, not to exceed 90 miles
  5. Studying two stage ditch construction to reduce the amount of sediment extraction needed.

Project Plans

Main Ditch

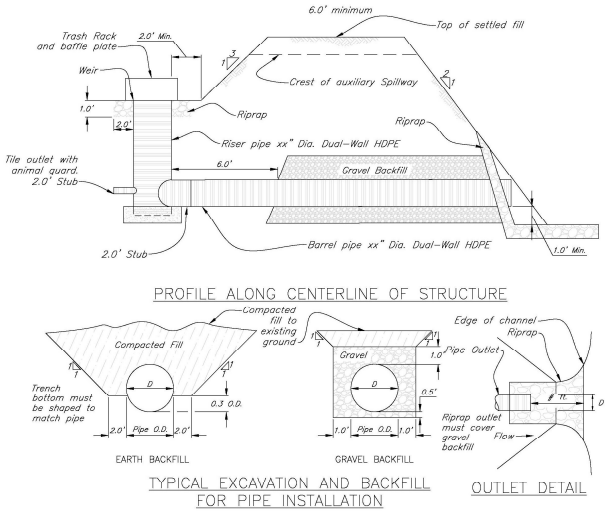


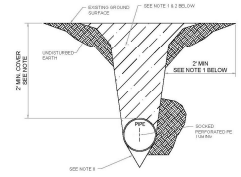
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Project Plans

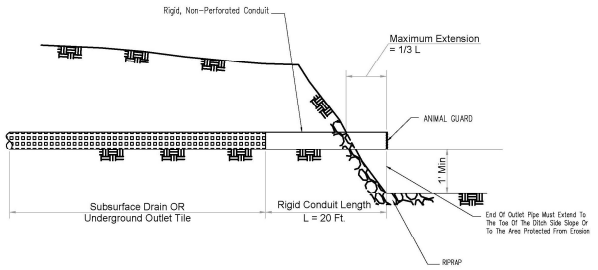
Main Ditch





NARROW TRENCH PIPE INSTALLATION DETAIL

TILE FLOW INSTALLATION NOTES:
1. THIS DETAIL SHALL APPLY TO THE INSTALLATION OF PROPOSED PIPE 12" DIA. AND SMALLER ONLY.
2. INSTALLATION OF THE THERMOPLASTIC PIPE BY A TILE PLOW WITH PIPE GROOVING SHOE SHALL BE CONSIDERED AN ACCEPTABLE CONSTRUCTION METHODOLOGY FOR PIPE WHOSE HORIZONTAL ALIGNMENTS MEET THE CONDITIONS OF THIS DETAIL.
3. AGGREGATE 2" OR SMALLER MEETING IDOT GRADATION 10, 30, OR 31 SHOULD BE USED FOR BEDDING AND BACKFILLING WITHIN 2 FT. UNDER A STRUCTURE.
4. A HAND-HELD COMPACTOR SHALL BE UTILIZED TO COMPACT THE N/A AND AGGREGATE WHEN WITHIN 2 FT. UNDER A STRUCTURE.
5. EXCAVATED MATERIAL MAY BE USED FOR BACKFILLING MEETING THE INSTALLATION REQUIREMENTS OF THIS STANDARD DETAIL.
6. MINIMUM COVER SHALL BE 3' OR DEEPER AS NEEDED TO PROTECT AGAINST FREEZING WHEN OUTLET DOES NOT FREELY DRAIN.
7. COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF THE PERMIT NOTES.
8. TRENCH BOTTOM SHALL BE SEMI-CIRCULAR OR "V" SHAPED TO CLOSELY FIT THE PIPE. TRENCH WIDTH @ THE PIPE SIDLINE SHALL NOT EXCEED THE PIPE DIAMETER BY MORE THAN 10IN.



PIPE OUTLET PROTECTION

Natural Resources Conservation Service

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NRCS Project and Local Contacts

Chris Hamilton
Assistant State Conservationist
Water Resources and Easements
USDA-NRCS, Parkade Center, Suite 250
601 Business Loop 70 West, Columbia, MO 65203-2546
Email: chris.hamilton@mo.usda.gov

Steve Hefner
USDA-NRCS Natural Resources Specialist
Water Resources & Easements Staff
Butler County USDA Service Center
4327 Highway 67 North, Poplar Bluff, MO 63901
Email: steven.hefner@usda.gov

USDA

United States Department of Agriculture

Find your local USDA-NRCS Service Center at:
www.nrcs.usda.gov

Helping People Help the Land

Iowa
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Natural Resources Conservation Service

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USDA
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, S.W.
Washington, D.C. 20250-9410

Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer and lender.

Persons with disabilities who require alternative means for communication of program information (e.g., Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Natural Resources Conservation Service

nrcs.usda.gov/

Questions, Comments, Concerns?

Iowa
Natural Resources Conservation Service



Main Ditch Watershed Project, HUC 10: 0802020405
Stoddard County, Missouri
Initial Public Participation Scoping Meeting, August 21, 2024
Attendance

Name	Landowner/Affiliation	Contact Information (Email/Phone)
Scott Hobart	CWJV-MSI	srhobart@mstutz.com
DAVE COUR	ATHENA	dcour@athenaee.com
Steve Hefner	USDA-NRCS	steven.hefner@usda.gov
Allen Rowland	Land owner	arowlandfarms@gmail.com
CHRIS ROWLAND	FARM BUREAU	CROWLANDFARMS@GMAIL.COM
Roger Mayberry	Dist 37	Roger.Mayberry at Yahoo.com
John Robinson	Dist 37	j1502@yahoo.com

FACILITY ID	REMEDIATION ID	FACILITY NAME	ADDRESS	CITY	ZIP	COUNTY	STATUS	FACILITY TYPE	SUMMARY	CLOSURE GUIDANE	CONTAM USE LIMITS	UTMEAST	UTMNOR	HDATUM	HCOLLCO	HACCURA	HACCURL	PDOP	SOURCESCAL
ST0003721	R007076 Inactive	HUDSON FOODS, INC PRO	1001 E STODDARD	DEXTER	63841	STODDARD	Administrative Closure	Former Underground Storage Tank Facilities	This site was administratively closed by the Tanks Section for one of the following reasons: 1) Another part of the agency is addressing the petroleum release and has not completed the process, 2) The Tanks Section does not have the regulatory authority to issue a 'No Further Action' letter for the release, 3) A release was not confirmed, 4) Sufficient data has not and cannot be collected to issue a 'No Further Action' letter, or 5) other reasons as determined by the Department of Natural Resources. For more information regarding this site please review the Department of Natural Resources file.	1996 CGD	Petroleum constituents	772653.4	4076297	NAD83	I2		12.2 Meters		24000
ST0019875		225 PACKAGE	HWY 25 N	DEXTER	63841	STODDARD	Other Reported Petroleum Facilities with No Known Release	Other Known Petroleum Facilities	An AST facility as defined by Section 319.100 RSMo or other petroleum facility was reported to the Department of Natural Resources located at this location. The Department of Natural Resources is not aware of a release from this facility.			772673.5	4077624	NAD83	I2		12.2 Meters		24000
ST0021046		JACKS GAS INC	HWY 25 AND STODDARD	DEXTER	63841	STODDARD	Other Reported Petroleum Facilities with No Known Release	Other Known Petroleum Facilities	An AST facility as defined by Section 319.100 RSMo or other petroleum facility was reported to the Department of Natural Resources located at this location. The Department of Natural Resources is not aware of a release from this facility.			771834	4075608	NAD83	I2		12.2 Meters		24000
ST0021862		USA #3	402 BUS HWY 60 EAST	DEXTER	63841	STODDARD	Operating UST Facilities with No Known Release	All Operating Underground Storage Tank Facilities	An operating UST facility as defined by Section 319.100 RSMo is located at this location. The Department of Natural Resources is not aware of a release from this facility.			771974.9	4076867	NAD83	I2		12.2 Meters		24000
ST0021687		SOUTHEAST COOP SERVIC	11500 STATE HWY 25 SOUT	DEXTER	63841	STODDARD	Operating UST Facilities with No Known Release	All Operating Underground Storage Tank Facilities	An operating UST facility as defined by Section 319.100 RSMo is located at this location. The Department of Natural Resources is not aware of a release from this facility.			771588.8	4074974	NAD83	I2		12.2 Meters		24000
ST0002867		DEXTER MUNICIPAL AIRPO	301 E STODDARD ST / AIRPI	DEXTER	63841	STODDARD	No Further Action Letter Issued without Restriction	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	2004 MRBCA	Petroleum constituents	773168.9	4075073	NAD83	I2		12.2 Meters		24000
ST0003872		GISI AMOCO SERVICE CEN	202 N WALNUT	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	771468.7	4076427	NAD83	I2		12.2 Meters		24000
ST0010392	R002333 Inactive	BOOTHEEL PETROLEUM CI	HWY 25 N	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	772106.1	4077014	NAD83	I2		12.2 Meters		24000
ST0000910		CITY OF DEXTER	301 E STODDARD ST	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	771857.3	4076266	NAD83	I2		12.2 Meters		24000
ST0000894		DEXTER MUNICIPAL AIRPO	AIRPORT RD	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	773188	4075189	NAD83	I2		12.2 Meters		24000
ST0000895		BUD SHELL FORD, INC	HWY 25 N	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	Other	Petroleum constituents	772022	4077015	NAD83	I2		12.2 Meters		24000
ST0000897	R002634 Inactive	STITES CONCRETE, INC	HWY 60 E PO BOX 38	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1996 CGD	Petroleum constituents	773530	4079121	NAD83	I2		12.2 Meters		24000
ST0000899		ALLEN CHRISTIAN BUICK O	BUS 60 W	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1992 CGD	Petroleum constituents	771563.7	4076946	NAD83	I2		12.2 Meters		24000
ST0000912		BROWN SAND & GRAVEL CI	HWY 25 N	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	Other	Petroleum constituents	773112	4081031	NAD83	I2		12.2 Meters		24000
ST0000903		FERRARA'S SER STA	106 E MCCOLLUM ST	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	771601.3	4076935	NAD83	I2		12.2 Meters		24000
ST0000947		BREHMER FERTILIZER INC	PO BOX 346 RT 1	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1990 CGD	Petroleum constituents	771606.5	4074967	NAD83	I2		12.2 Meters		24000
ST0000948	R006264 Inactive	MFA OIL CO	20 E N MAIN	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1996 CGD	Petroleum constituents	771523.4	4076386	NAD83	I2		12.2 Meters		24000

ST0010584		CHRISMAN OIL	STODDARD AND MAIN ST	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	Other	Petroleum constituents	771588	4076219	NAD83	I2	12.2 Meters	24000
ST0019947		WINDY HILL PET FOOD	200 CLEMENTS AVE	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	1996 CGD	Petroleum constituents	772510.5	4076033	NAD83	I2	12.2 Meters	24000
ST0009671		SS 5212	24 N WALNUT	DEXTER	63841	STODDARD	Facility Closed Prior to Implementation of 2004 Tanks RBCA	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment. Please review the Department of Natural Resources site file for more information.	No Data	Petroleum constituents	771462.6	4076268	NAD83	I2	12.2 Meters	24000
ST0002658	R008404 Inactive	MIDLAND GAS	410 W MCCOLLUM ST, BUS	DEXTER	63841	STODDARD	No Further Action Letter Issued without Restriction	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment provided that Activity & Use Limitations applied to this property remain in place. Please review the Department of Natural Resources site file for more information.	2004 MRBCA	Petroleum constituents	775209.9	4071605	NAD83	I2	12.2 Meters	24000
ST0011427	R008708 Inactive	MIDTOWN CONVENIENCE	208 W MCCULLUM (BUS Hy	DEXTER	63841	STODDARD	No Further Action Letter Issued without Restriction	Former Underground Storage Tank Facilities	A petroleum or hazardous substance storage tank closure or regulated release was addressed under the Missouri Risk-Based Corrective Action Guidance for Petroleum Storage Tanks. Evaluation of environmental media found that concentrations of any remaining contaminants, if present, do not pose an unacceptable risk to human health or the environment provided that Activity & Use Limitations applied to this property remain in place. Please review the Department of Natural Resources site file for more information.	2004 MRBCA	Petroleum constituents	771470.6	4076565	NAD83	I2	12.2 Meters	24000

SITENAME	SITEALIAS	ADDRESS	CITY	ZIP	COUNTY	SITE STATUS	SITE HISTORY	CLEANUP SUMMARY	CONTAMINANTS	USE LIMI	PROGRAI	HDATUM	HCOLLCO	HACCURL	SOURCES	UTMEAST	UTMNOR	PDOP	HACCURACY
Dexter Auxiliary Field #1	Dexter Municipal Airport	1972 Harry Bennet Dr	Dexter	63841	Stoddard	Completed	The Department of Defense (DOD) acquired 950 acres in 1943 for use as an auxiliary airfield for training fighter pilots at Malden Army Air Field. Two asphalt runways and taxiways were constructed. One of the runways is still in use. The city of Dexter acquired 835 acres in 1948. At that time there were no buildings on site. A private individual acquired the remaining 115 acres. Refueling facilities, hangars, and an air terminal were later constructed by the city of Dexter. Interviews with the chairman of the airport board and a business owner at the airport indicate that the field was only used for takeoff/landing training during DOD use.	The Corps performed an "No DOD Action Indicated" review and Missouri Department of Natural Resources/Hazardous Waste Program/Federal Facilities Section staff concurred with the No Further Defense Action Indicated determination on Jun 7, 2006.		DNR/Envir	NAD83	I2	Meters	24000	773198.1	4075251		12.2
IKL Manufacturing Co., Inc.		817 East S. Main	Dexter	63841-132	Stoddard	Long-Term Stewardsh	The site has been used since 1956 for the manufacturing of wooden tool handles. Prior to 1956 there was no known manufacturing, commercial or other operations at the site. Historically lacquers, paint thinner and other solvent-based materials have been used on-site. The constituents of concern are barium, toluene, methylene chloride and chloromethane.	Initial site assessments revealed four air compressors located in the compressor room of the lathe/ash building and a discharge blow-down onto the soil on the east side of the building. Total extractable hydrocarbons were detected in the soil. The contractor performed excavation of the contaminated soil to remediate the chemicals of concern in accordance with a Missouri Department of Natural Resources-approved Risk Management Plan.	Soil: SVOCs, Total petroleum hydrocarbons (TPH); Subsurface Soil: SVOCs, Total petroleum hydrocarbons (TPH)	Non-Resid	DNR/Envir	NAD83	I2	Meters	24000	772510.4	4076385		12.2
IKL Manufacturing-Bernie North Plant		206 East Hunts Road	Bernie	63822-814	Stoddard	Long-Term Stewardsh	This site currently houses a hickory tool handle manufacturing plant. Former uses include auto salvage, cattle sales and agriculture. Parts per billion levels of methylene chloride were detected in groundwater, presumably from the auto salvage operation.	Initial site assessments revealed four air compressors located in the compressor room of the lathe/ash building and a discharge of blow-down onto the soil on the east side of the building. Total extractable hydrocarbons as motor oil were detected in the soil. The contractor performed excavation of the contaminated soil to remediate the chemicals of concern in accordance with the Missouri Department of Natural Resources-approved Risk Management Plan.	Soil: SVOCs, Total petroleum hydrocarbons (TPH); Subsurface Soil: SVOCs, Total petroleum hydrocarbons (TPH)	Non-Resid	DNR/Envir	NAD83	I2	Meters	24000	771150	4063459		12.2
Dexter Rifle Range Army National Guard	NDNOD	Highway 60	Dexter		Stoddard	Active	In 2009 the Army National Guard (ARNG) completed an inventory of Non-Department of Defense Non-Operational Sites (NDNODS) in Missouri (Environmental Assessment, 2009). Through research conducted in support of this inventory, a preliminary assessment report was developed that identified eighteen ARNG munitions response sites (MRSs) within Missouri, including the Dexter Rifle Range. This six acre site, located in Dexter, Stoddard County, Missouri, was used by Company C, 140th Engineer Battalion of the Missouri ARNG during the 1930s and 1940s for small arms training. The Dexter Rifle Range is currently located on private property and is used for industrial purposes as an automobile salvage yard. Due to right of entry (ROE) refusal by the current landowner, fieldwork could not be conducted and the Army cannot take any additional action without landowner coordination. The MRS will be included in a 5-year review cycle by the ARNG. Every 5 years, the ARNG will contact the landowner and request ROE in order to complete the site investigation fieldwork.	Due to right of entry (ROE) refusal by the current landowner, fieldwork could not be conducted and the Army cannot take any additional action without landowner coordination. The MRS will be included in a 5-year review cycle by the ARNG. Every 5 years, the ARNG will contact the landowner and request ROE in order to complete the site investigation fieldwork.		DNR/Envir	NAD83	I2	Meters	24000	773642.3	4079186		12.2

Main Ditch Watershed Plan - Public Comment Opportunity

A watershed plan containing details about a proposed multi-purpose project for the Main Ditch Watershed is being prepared. An Environmental Document will determine the public benefits in comparison with environmental impacts.

This scoping meeting provides the opportunity for public input early in the project timeline. Comments may be provided:

a) in person to a USDA-NRCS representative during the open house event at the USDA Service Center, 18450 Ridgeview Lane, Dexter, MO 63841 from 6:30p.m. - 8:00p.m. on August 21, 2024.

b) or in writing by mail or email to Chris Hamilton, Assistant State Conservationist, USDA Natural Resources Conservation Service, Parkade Center Suite 250, 601 Business Loop 70 West, Columbia, Missouri 65203-2585, or Chris.Hamilton@mo.usda.gov.

Substantive comments received will be addressed and incorporated into the Environmental Document. Once completed, the document will then be provided to the public for review and comment.

Provide statement below ----------

The City of Dexter supports the investment of funds to improve drainage and stabilize the banks of DD 37.

Name: (print) DAVID WYMAN Address: 301 E Stoddard

Date: 8-21-2024 Dexter MO 63841

Signature

Main Ditch Interagency Meeting August 21st, 2024

3:00pm – 4:00 pm at Stoddard County USDA Service Center, 18450 Ridgeview Ln, Dexter, MO 63841

In-person sign-in attached. Online attendees – Teams attendance report attached.

Meeting Minutes

1. Presentation by NRCS (~30min), see attached Power Point slides.
2. Questions
    a. Q: What are these slopes? A: Scott Hobart: We are showing 2:1 side slopes, we are not final on that but we are modeling it.
    b. Q: What are existing slopes? A: Andrew Pursifull:They have a wide range, some 1:1, some are 2:1 and 3:1. Scott - In order to make it stable, we are showing a parallel tile drain and an outlet pipe every so often (don't know frequency yet), and grading and seeding with toe riprap to protect the bottom of the banks. It's going to have a multistage multi treatment approach that is not the same everywhere. Use perforated tile pipe to collect and outlet the groundwater.
    c. Q: A problem I see in the future with this is these pipe outlets will have to be permanently marked as when they start mowing they are going to destroy these outlets. A: Andrew: There was another typical detail not included with the presentation, typically if we do a tile outlet I recommend Riprap below it to keep it from eroding the banks out. This is one way to identify it. Could also detail a post marker (6" min diameter) by end of pipes that can be seen by the mower.
    d. Q: When you put these parallel drainage pipes, how far away from the ditch are they? A: Steve Hefner - They have to be in our easement. Andrew - They need to be as close to the bank as possible. Too far away the water can go under and come back up. It also needs to be far enough away for equipment. Most likely between 5-10ft from top of bank.
    e. Q: How do they figure out improvement to the public? A: Dave Cour - It's based off the design lifespan and storm frequency levels. There is a possibility that the benefit to cost ratio is under 1 and still be approved based on ecosystem services. It's not just dollar benefit/cost that makes the decision under PR&G.
    f. Q: What is the lifespan of underground tile? A: Scott – Based on experience it can be as much as 50 years. Larry Sample – Boils down to the material used, thicker walled HDPE or PVC can last longer. Scott – Will plan on the materials proposed to last the design life of the project.
    g. Q: What about the need to remove sediment again in future years? A: Dave – That's one of the things we are planning for is to move sediment through the system at a natural rate to reduce future sediment settlement. Scott - Could also include intentional places for the sediment to settle, sediment collection areas/sediment traps.

Main Ditch Watershed Project, HUC 10: 0802020405
Stoddard County, Missouri
Interagency Participation Scoping Meeting, August 21, 2024
Attendance

Name	Agency/Affiliation	Contact Information (Email/Phone)
Kara Tompkins	MDC	~~KARA [illegible]~~ KARA.TOMPKINS@MDC.MO.GOV
Roger Mayberry	Dis 37	Roger.Mayberry at Yahoo.com
DAVE COUR	ATHENA	dcour@athenaee.com
[illegible]	District 37	1502@YAHOO.com
Steven Heffner	USDA - NRCS	Poplar Bluff steven.heffner@usda.gov
Scott Hobart	CWJV - MSI	skhobart@mstatz.com
DAVID WYMAN	City of Dexter	david.wyman@cityofdexter.org

1. Summary

Meeting title	Main Ditch- DD37 Interagency Meeting
Attended participants	4
Start time	8/21/24, 2:47:20 PM
End time	8/21/24, 4:02:42 PM
Meeting duration	1h 15m 21s
Average attendance time	1h 2m 8s

2. Participants

Name	First Join	Last Leave	In-Meeting Durati	Email
Scott R. Hobart	8/21/24, 2:47:23 PM	8/21/24, 4:02:42 PM	1h 15m 18s	srhobart@mstutz.com
Andrew M Pursifull	8/21/24, 2:47:36 PM	8/21/24, 3:50:50 PM	53m 31s	ampursifull@mstutz.com
Hefner, Steven - FPAC-NRCS, MO	8/21/24, 2:52:36 PM	8/21/24, 4:02:38 PM	1h 10m 1s	steven.hefner@usda.gov
Sample, Larry	8/21/24, 3:12:55 PM	8/21/24, 4:02:39 PM	49m 43s	larry.sample@wsp.com

3. In-Meeting Activities

Name	Join Time	Leave Time	Duration	Email
Scott R. Hobart	8/21/24, 2:47:23 PM	8/21/24, 4:02:42 PM	1h 15m 18s	srhobart@mstutz.com
Andrew M Pursifull	8/21/24, 2:47:36 PM	8/21/24, 2:47:40 PM	4s	ampursifull@mstutz.com
Andrew M Pursifull	8/21/24, 2:57:23 PM	8/21/24, 3:50:50 PM	53m 27s	ampursifull@mstutz.com
Hefner, Steven - FPAC-NRCS, MO	8/21/24, 2:52:36 PM	8/21/24, 4:02:38 PM	1h 10m 1s	steven.hefner@usda.gov
Sample, Larry	8/21/24, 3:12:55 PM	8/21/24, 4:02:39 PM	49m 43s	larry.sample@wsp.com

Main Ditch Watershed Plan - Public Comment Opportunity

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Date: 8-21-2024 Dexter MO 63841

Signature

USDA

United States Department of Agriculture

Main Ditch Watershed Project

HUC 10: 0802020405
HUC12: 080202040502

Stoddard County, Missouri
Sponsor – Drainage District 37

Initial Public Meeting
August 21, 2024





Steve Hefner
Natural Resources Specialist
Natural Resource Conservation Service, Columbia, MO

Natural Resources Conservation Service

nrcs.usda.gov/

Overview of Presentation Topics

1. Basic information about the NRCS and the Watershed Program
2. An explanation of the Watershed and Flood Prevention Program (WFPO)
3. The purpose and requirements of WFPO.
4. The NRCS goals and objectives for the Main Ditch Watershed Plan/Environmental Assessment (Plan-EA).

The NRCS Agency Mission



NRCS provides technical and financial assistance to address natural resource and watershed concerns.

NRCS also helps to plan, build, and/or improve infrastructure that prevents flooding, saves lives, and protects property.

NRCS offers programs that focus on the conservation of soil and water resources throughout the project watershed.

Natural Resources Conservation Service

nrcs.usda.gov/

The NRCS Watershed Program

NRCS Watershed planning is:

a. Science-based

b. Identifies 1 or more resource concerns

c. Evaluates feasible options

d. Emphasizes a desired outcome (such as reduced flooding)

2. Integrates social, economic, and natural resource concerns
3. Ensures conservation of resources and wise stewardship decisions
4. Protects both natural and cultural resources

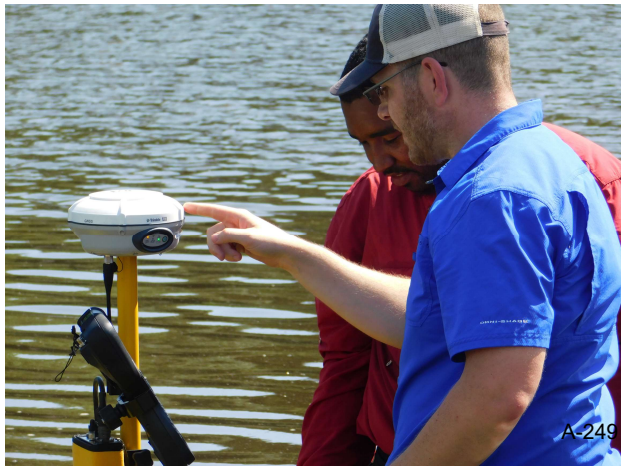
Natural Resources Conservation Service

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WFPO Authorized Purposes

1. Flood prevention (Flood damage reduction)
2. Watershed Protection (sediment reduction)
3. Public Recreation/ Public Fish and Wildlife
4. Agricultural Water Management
5. Municipal Water / Water Quality Protection
6. Watershed Structure Rehabilitation (aging dams)







Natural Resources Conservation Service

nrcs.usda.gov/

A Partnership Effort for a Community Goal

The NRCS Watershed and Flood Prevention Program (WFPO) is dependent upon local sponsor involvement.

A project cannot be planned or installed without having a local entity (City, Township, County, Conservation District, Drainage District, etc.) serve as the project sponsor.





Natural Resources Conservation Service

nrcs.usda.gov/

Main Ditch PL 83-566 Project

Drainage District 37 of Stoddard County

Tim Mayberry, President

Natural Resources Conservation Service

nrcs.usda.gov/

Responsibilities of the Sponsor

The Sponsor must agree to:

1. Provide local leadership
2. Acquire necessary permits and licenses
3. Have the authority to levy taxes (if needed)

Taxing authority provides assurance that the federal investment of building a structure will be maintained for the life of the project.

Responsibilities of the Sponsor

1. Implement zoning and acquire land if needed
2. Commit financially to cost-share amounts (if required)
3. Support the project planning public participation (meetings, outreach documents, website, etc.)
4. Support NRCS conservation practice implementation within the project watershed

WFPO Project Benefits and Limitations

WFPO planning projects are limited to watersheds of 250,000 acres or less.

Projects over $25 million require the development of an Environmental Impact Statement and Congressional approval.

WFPO pays for 100% of the Engineering and Planning Technical Assistance for flood prevention.

WFPO pays for 100% of installation and construction of flood prevention works of improvement.

WFPO Project Benefits and Limitations

WFPO pays for 100% of the planning and technical assistance for related public recreation works of improvement.

WFPO pays for up to 50% of the installation and construction of related public recreation works of improvement.

WFPO can not pay for real property rights.

WFPO pays a percentage (not to exceed 50%) for conservation easements or floodplain easements.

Works of Improvement -Structural

WFPO planning projects may include structural components such as construction of a new watershed structure and/or substantial upgrades in stormwater management infrastructure.





Watershed Operations Program Cost Share

Federal Cost Share	Planning/ Engineering/ TA	Installation/ construction	Real Property Rights
Flood Prevention	100%	100%	0%
Watershed protection - Flood control, sedimentation, water quality, water conservation, wildlife, etc.	100%	variable	0%
Public Recreation	100%	Not to exceed 50%	Not to exceed 50%
Public Fish and Wildlife	100%	Not to exceed 50%	No to exceed 50%
Agricultural Water Management - Drainage, Irrigation, Ground water discharge, etc.	Up to 100%	Up to 75%	0%
Municipal and Industrial Water Supply - Reservoir Structure	0%	Not to exceed 50%	0%
Water Quality Management - Reservoir Structure	Up to 100%	TBD	0%

Natural Resources Conservation Service

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Works of Improvement – Nonstructural



WFPO projects may include nonstructural components:

1. Wetland restoration
2. Wetland creation
3. Conservation easements



NRCS Watershed Program Timelines

1. Investigation Phase:
   Preliminary Investigation Feasibility Study or PIFR
   (completed in 2023)

2. Planning Phase:
   Watershed Plan/Environmental Document (initiated in 2024)
   Estimated timeframe: 18 months

3. Design Phase, Estimated Timeframe: 1-1.5 years

4. Construction Phase, Estimated Timeframe: 2-3 years

Design Limitations

A watershed structure is considered only if:

1. Engineering analyses determine that construction of a watershed structure is feasible for the site (soils, geology, topography, etc.)

2. The structure will protect public safety.

3. The structure is the most effective flood control alternative with a positive benefit:cost ratio.

4. Projects usually have design limitations due to adjacent structures and roads.

Conservation Works Joint Venture (CWJV)

NRCS has engaged the services of CWJV for planning and engineering support.

CWJV is a multi-disciplinary team of professionals experienced in watershed planning, environmental compliance, and engineering.

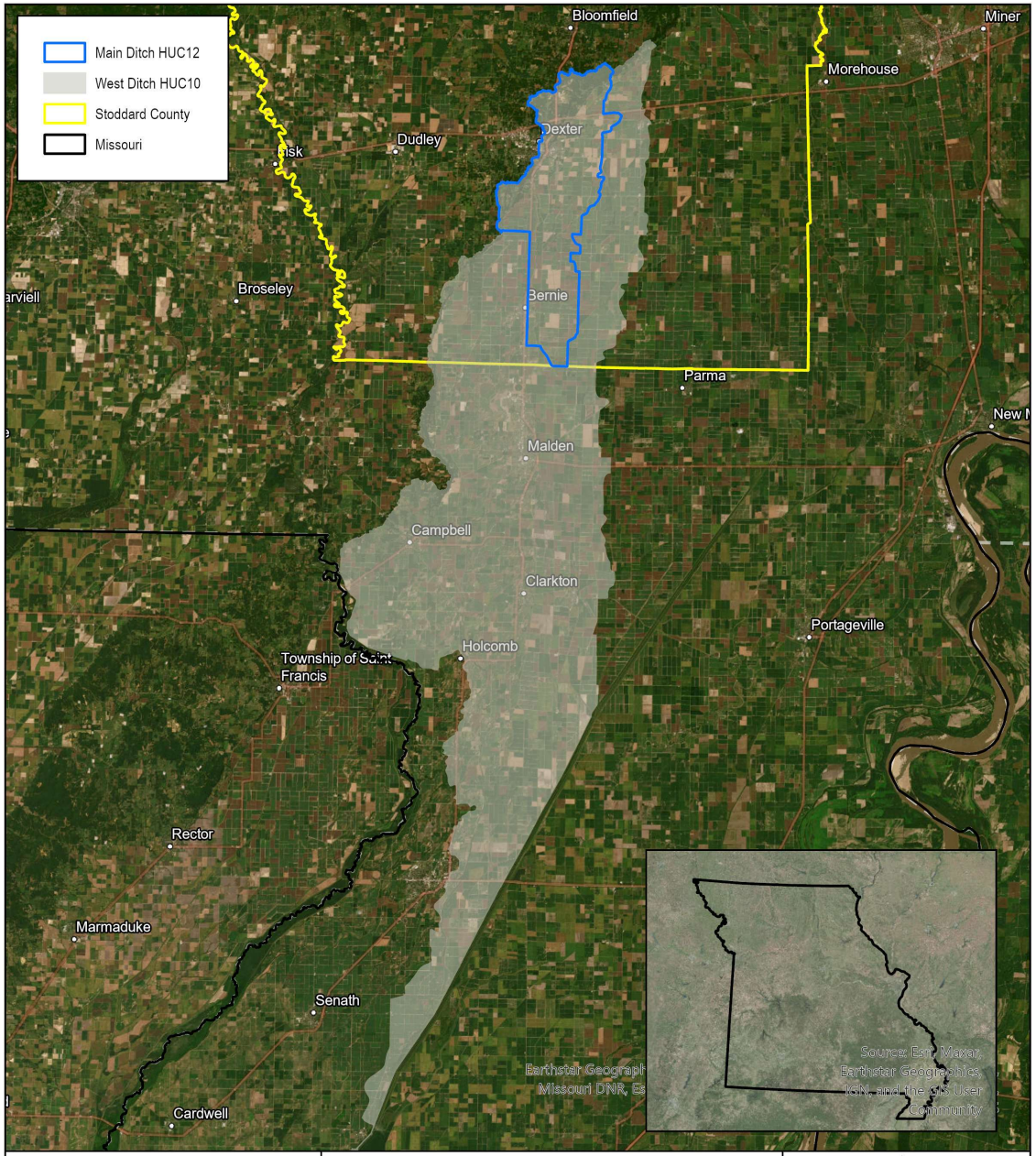
NRCS welcomes and appreciates their expertise and assistance in developing the Main Ditch Watershed Plan and Environmental Assessment.

Project Purpose and Need

The proposed project meets the General Purpose of Public Law 83-566 by preventing damage from erosion, floodwater, and sediment. Further, the sponsor and NRCS have identified agricultural water management as the main authorized purpose. In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The water management infrastructure is approximately 100 years old and in need of attention. Without flood protection and drainage water management, the area remains vulnerable to excessive water, prevented planted acres, harvest interruptions and loss of farm income.

Project Map

Watershed Overview



Natural Resources Conservation Service

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Project Goals

Main Ditch

- Combat canal bank erosion in the drainage system in the most vulnerable locations
- Provide native grass buffers to filter pollutants and provide wildlife habitat
- Redistribute stream bank spoil where appropriate
- Enhance the ability to transfer excessive surface water to the outlet of the watershed

Streambank Erosion

Main Ditch

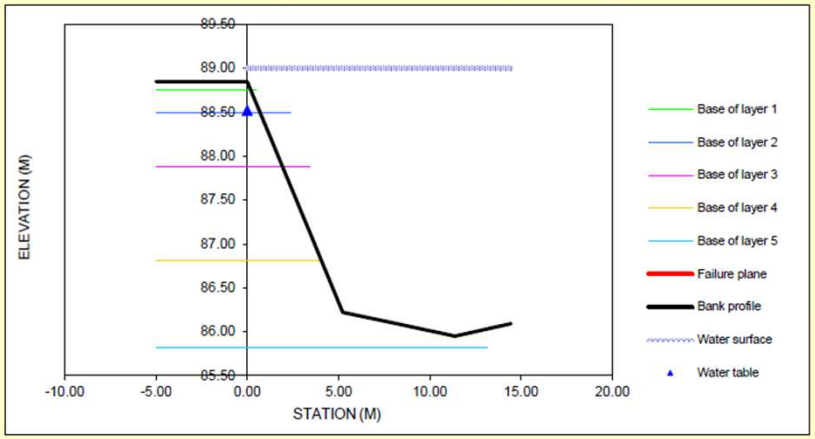
Bank Stability Model

Bank model output

Verify the bank material and bank and bank-toe protection information entered in the "Bank Material" and "Bank Vegetation and Protection" worksheets. Once you are satisfied that you have completed all necessary inputs, hit the "Run Bank-Stability Model" button.

Bank Material Properties

Layer 1	Layer 2	Layer 3	Layer 4	Layer 5
Silt	Soft Clay	Soft Clay	Soft Clay	Soft Clay



Water table depth (m) below bank top: 0.33

(•) Use water table

( ) Input own pore pressures (kPa)

Own Pore Pressures	kPa	Pore Pressure From Water Table
	Layer 1	-2.75
	Layer 2	-1.63
	Layer 3	868.12
	Layer 4	868.12
		868.12

Factor of Safety

#DIV/0! #DIV/0!

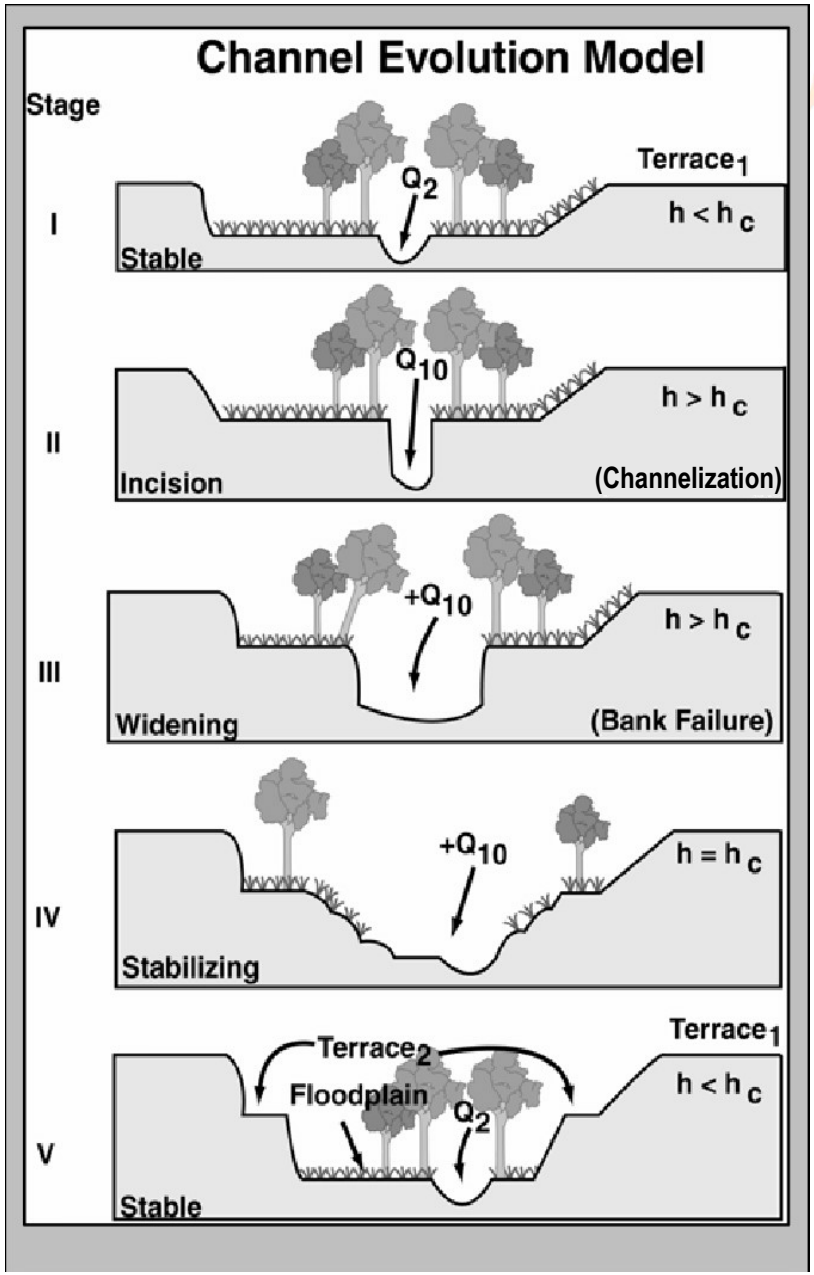
Run Bank-Stability Model

Natural Resources Conservation Service

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Streambank Erosion

Main Ditch

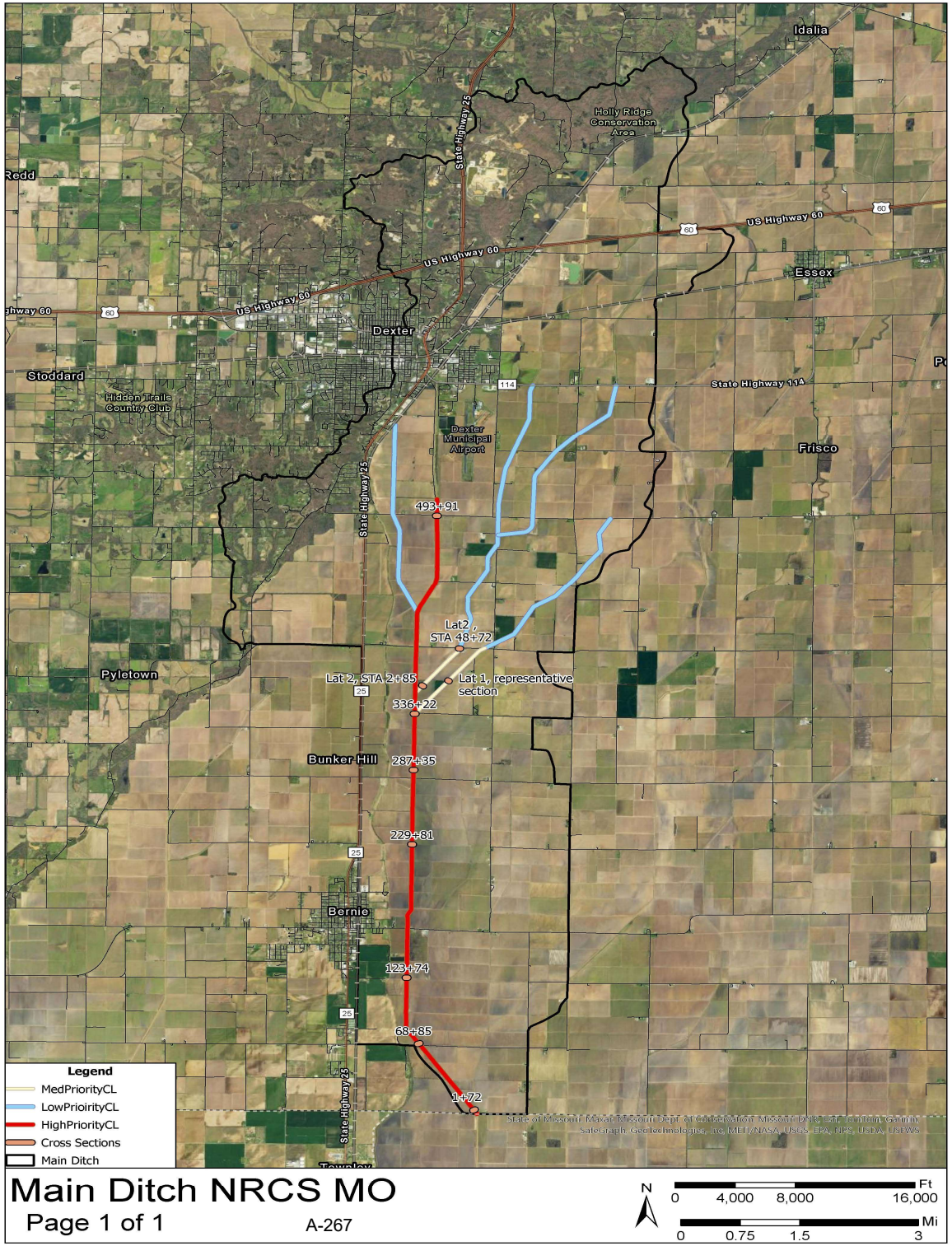


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Project Map

Cross Sections – Main Ditch



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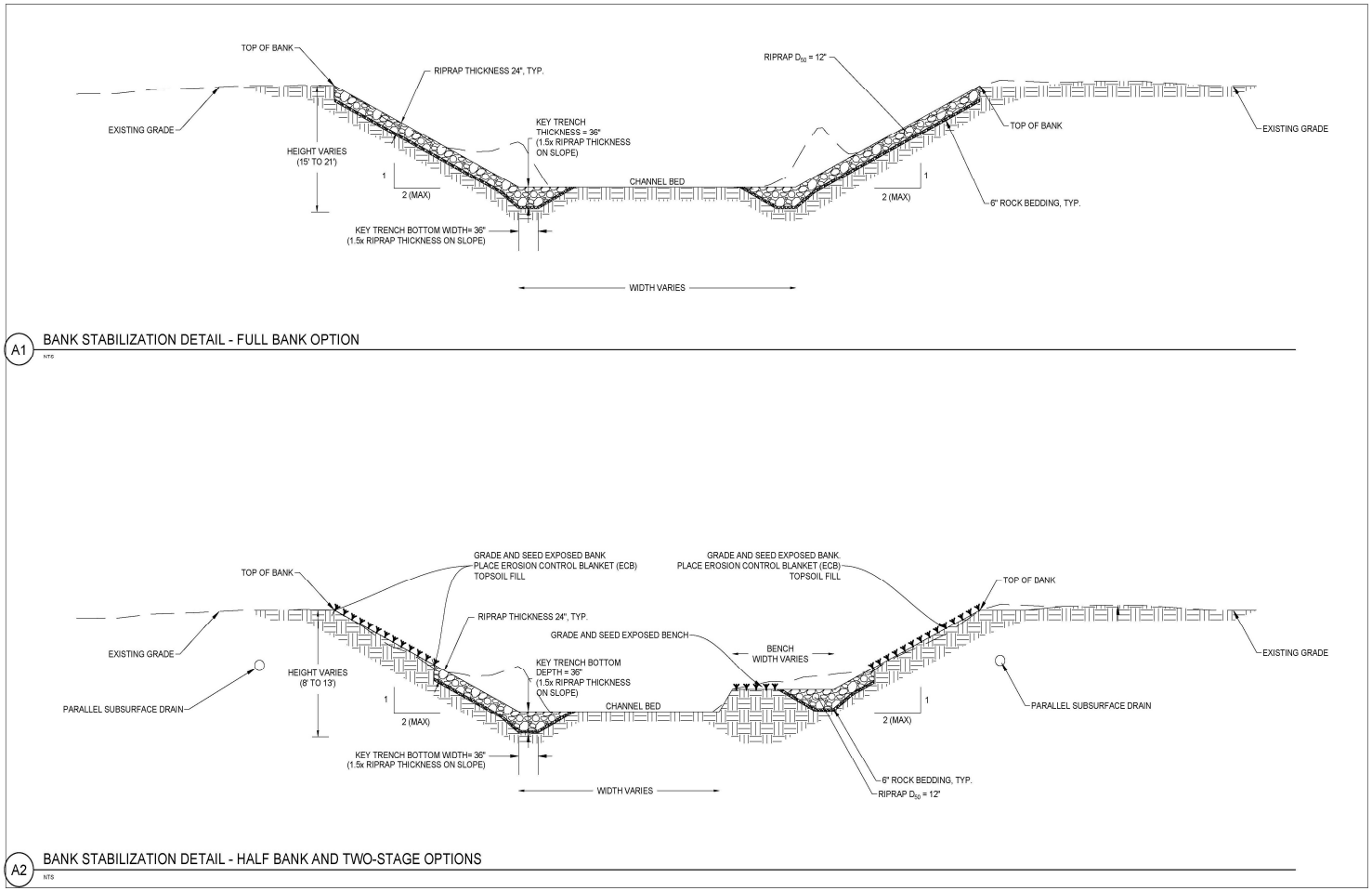
Project Alternatives

Main Ditch

- **Potential Alternatives Preferred:**
  1. No Action, Future Without Project
  2. Establish native warm season grasses on canal banks on 40% of construction areas.
  3. Assess the drainage system and armor the most vulnerable spots with rock not to exceed 10% of the drainage canal system
  4. Assess the feasibility to install underground tile drain along the drainage canal, not to exceed 90 miles
  5. Studying two stage ditch construction to reduce the amount of sediment extraction needed.

Project Plans

Main Ditch

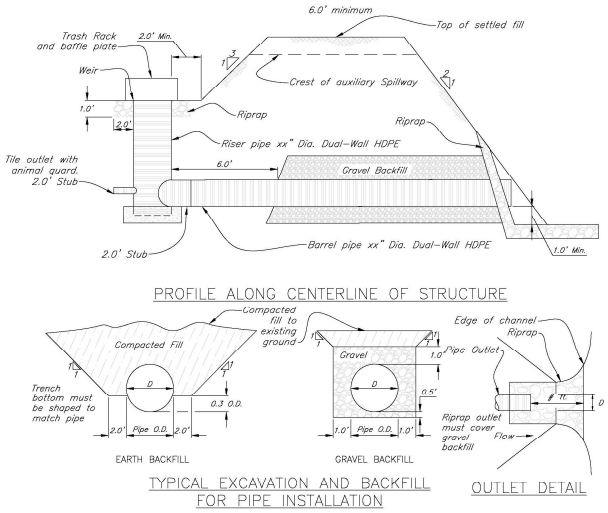


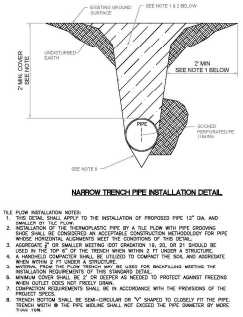
Natural Resources Conservation Service

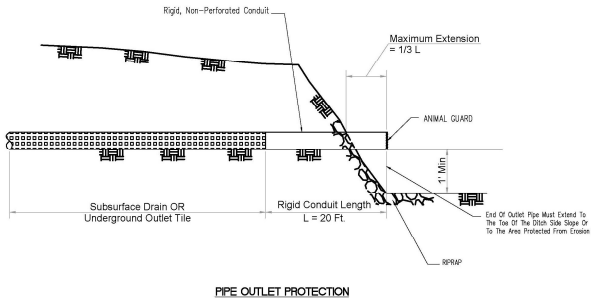
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Project Plans

Main Ditch







Natural Resources Conservation Service

nrcs.usda.gov/

NRCS Project and Local Contacts

Chris Hamilton
Assistant State Conservationist
Water Resources and Easements
USDA-NRCS, Parkade Center, Suite 250
601 Business Loop 70 West, Columbia, MO 65203-2546
Email: chris.hamilton@mo.usda.gov

Steve Hefner
USDA-NRCS Natural Resources Specialist
Water Resources & Easements Staff
Butler County USDA Service Center
4327 Highway 67 North, Poplar Bluff, MO 63901
Email: steven.hefner@usda.gov

USDA

United States Department of Agriculture

Find your local USDA-NRCS Service Center at:
www.nrcs.usda.gov

Helping People Help the Land

Iowa
Natural Resources Conservation Service



Natural Resources Conservation Service

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To file a complaint of discrimination, complete, sign and mail a program discrimination complaint form, available at any USDA office location or online at www.ascr.usda.gov, or write to:

USDA
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, S.W.
Washington, D.C. 20250-9410

Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer and lender.

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Natural Resources Conservation Service

nrcs.usda.gov/

Questions, Comments, Concerns?

Iowa
Natural Resources Conservation Service



Main Ditch Watershed Project, HUC 10: 0802020405
Stoddard County, Missouri
Interagency Participation Scoping Meeting, August 21, 2024
Attendance

Name	Agency/Affiliation	Contact Information (Email/Phone)
Kara Tompkins	MDC	~~KARA [illegible]~~ KARA.TOMPKINS@MDC.MO.GOV
Roger Mayberry	Dis 37	Roger.Mayberry at Yahoo.com
DAVE COUR	ATHENA	dcour@athenaee.com
[illegible]	District 37	1502@YAHOO.com
Steven Hefner	USDA - NRCS	Poplar Bluff steven.hefner@usda.gov
Scott Hobart	CWJV - MSI	skhobart@mstatz.com
DAVID WYNIAN	City of Dexter	david.wynian@cityofdexter.org

United States Department of Agriculture

July 15, 2024

Absentee-Shawnee Tribe of Indians of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, OK 74801

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

To Whom It May Concern,

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As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

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Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

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cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

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Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

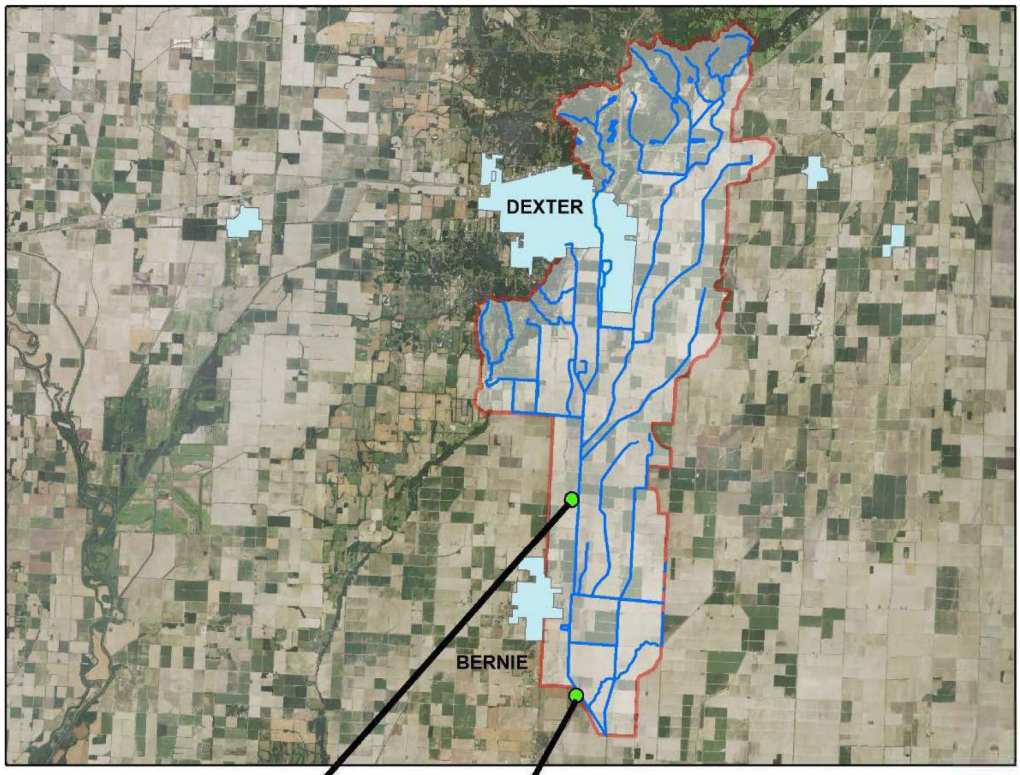
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Eastern Shawnee Tribe of Oklahoma
70500 E. 128 Road
Wyandotte, OK 74370

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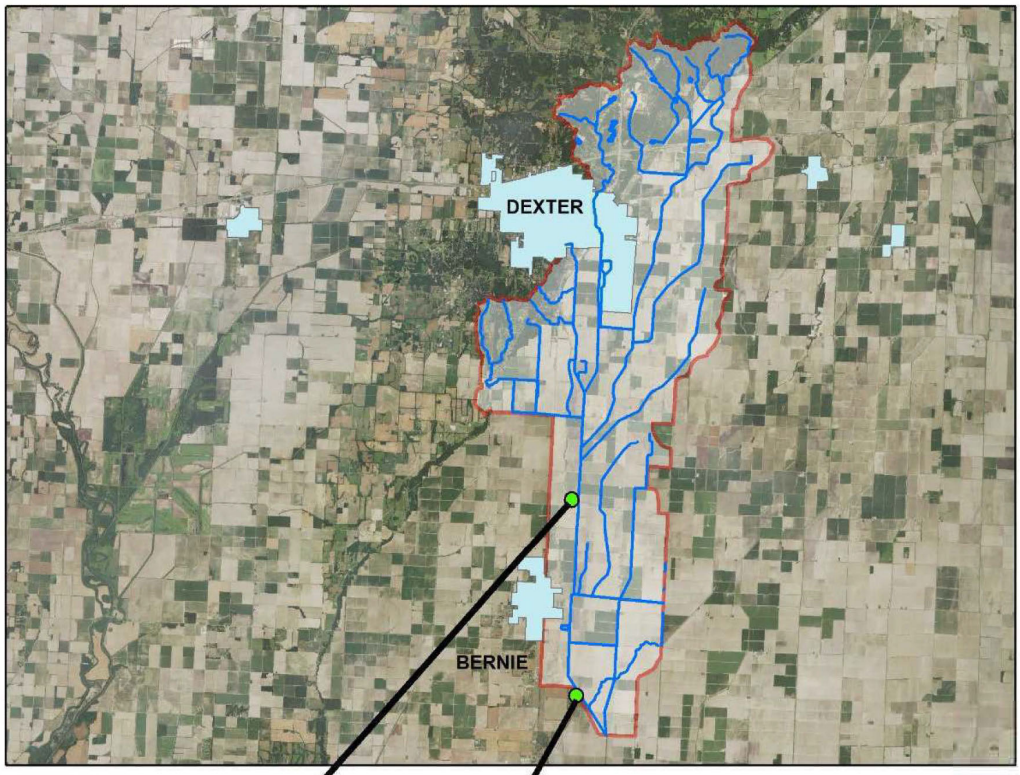
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0 2.5 5 Miles





0 125 250 Miles

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COLUMBIA, MISSOURI
JANUARY, 2023

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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Osage Nation
627 Grandview Avenue
Pawhuska, OK 74056

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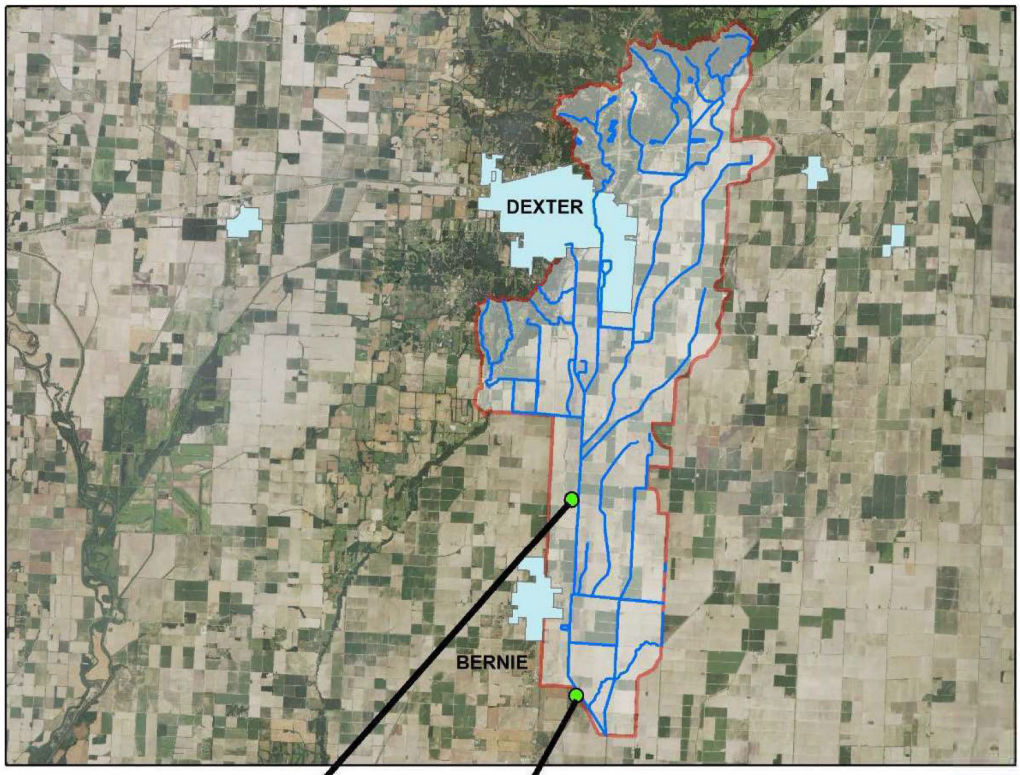
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Quapaw Tribe of Oklahoma
5681 S. 630 Road
Quapaw, OK 74363-0765

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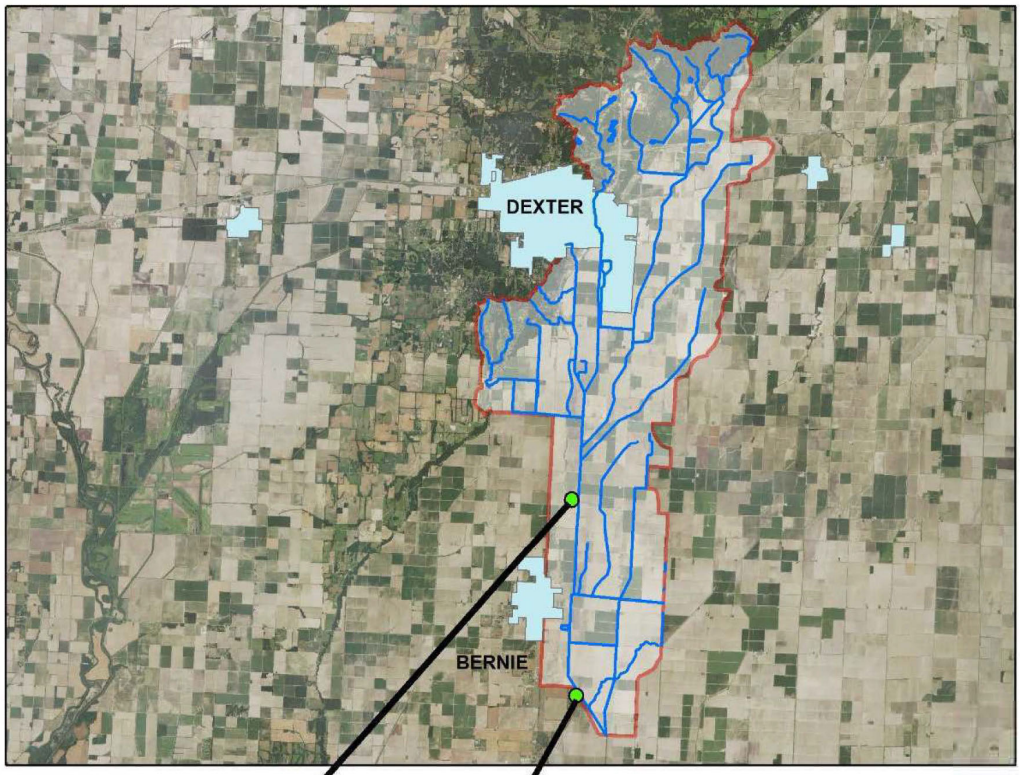
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UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Shawnee Tribe
29 S. Highway 69A
Miami, OK 74354

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

To Whom It May Concern,

The Missouri Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), is developing a Watershed Plan – Environmental Document for the Main Ditch Watershed in Stoddard County, Missouri (see **Attachment 1** including potential areas where the work will be conducted).

As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

We request your comments, concerns, and/or suggestions early in the planning process, and ask that your comments are received within 30 days after receipt of this letter. To facilitate NEPA cumulative impact analysis, we would also appreciate identification of any major projects in the vicinity that may contribute to cumulative effects. In your communication, please refer to "Main Ditch Watershed Project."

Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

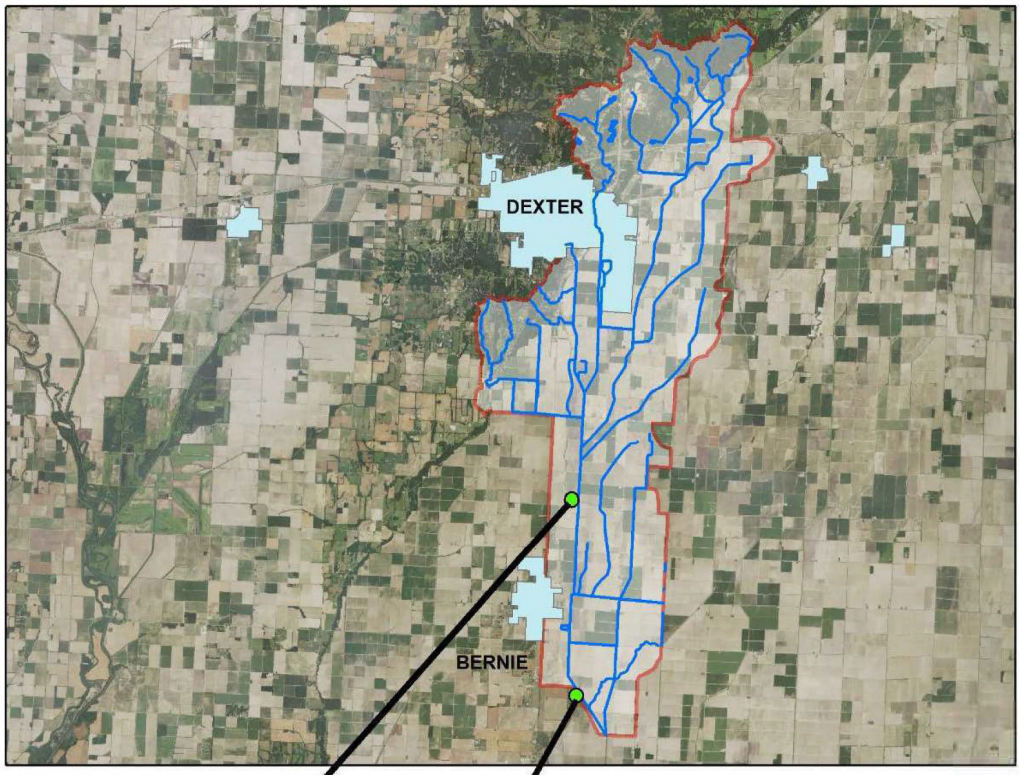
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In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

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NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

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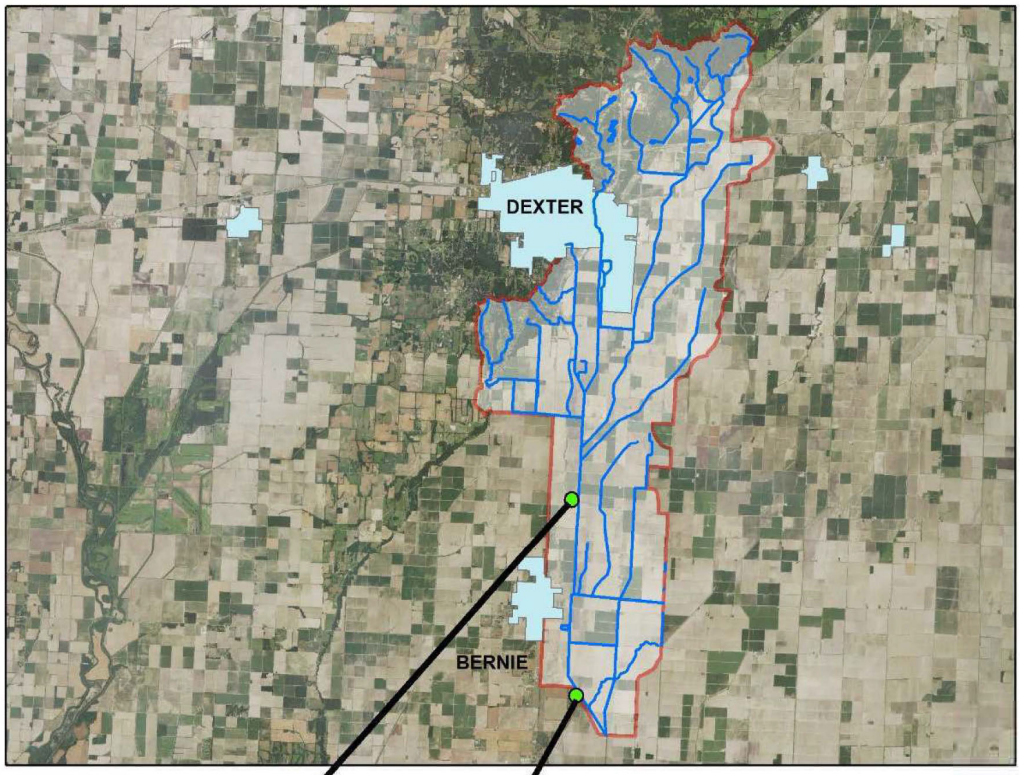
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





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July 15, 2024

Mr. Roger S. Allan
U.S. Army Corps of Engineers, Memphis District
Deputy Chief, Regulatory Division

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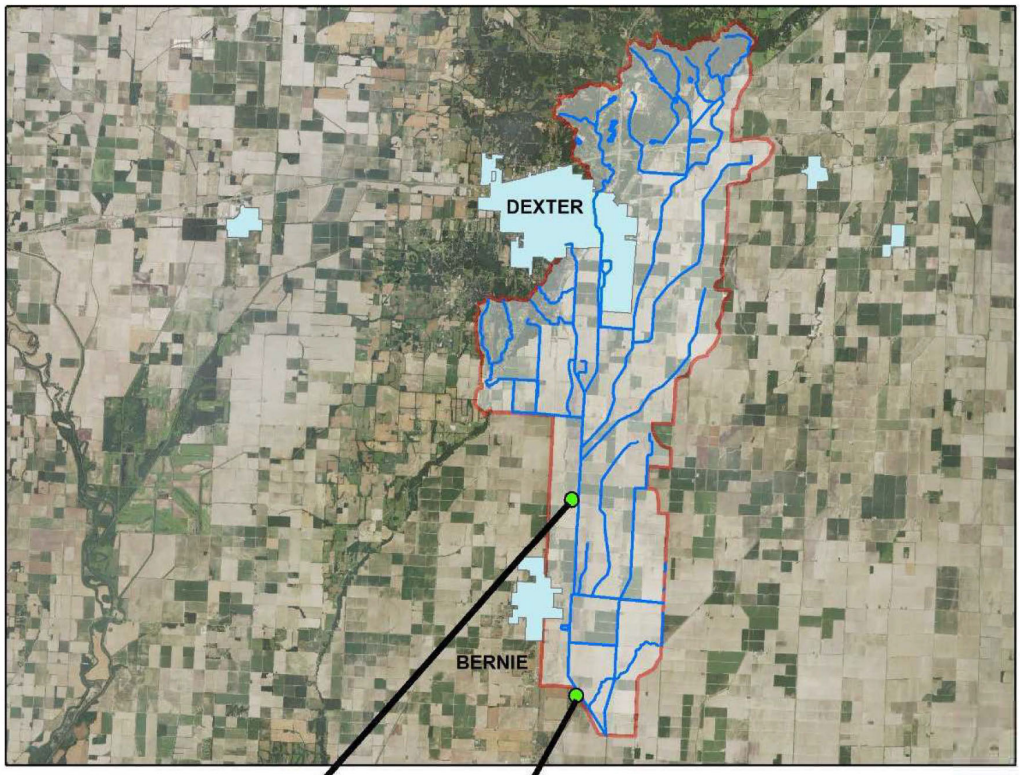
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





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July 15, 2024

Ms. Meg McCollister
U.S. Environmental Protection Agency
Region 7 Administrator
11201 Renner Boulevard
Lenexa, KS 66219

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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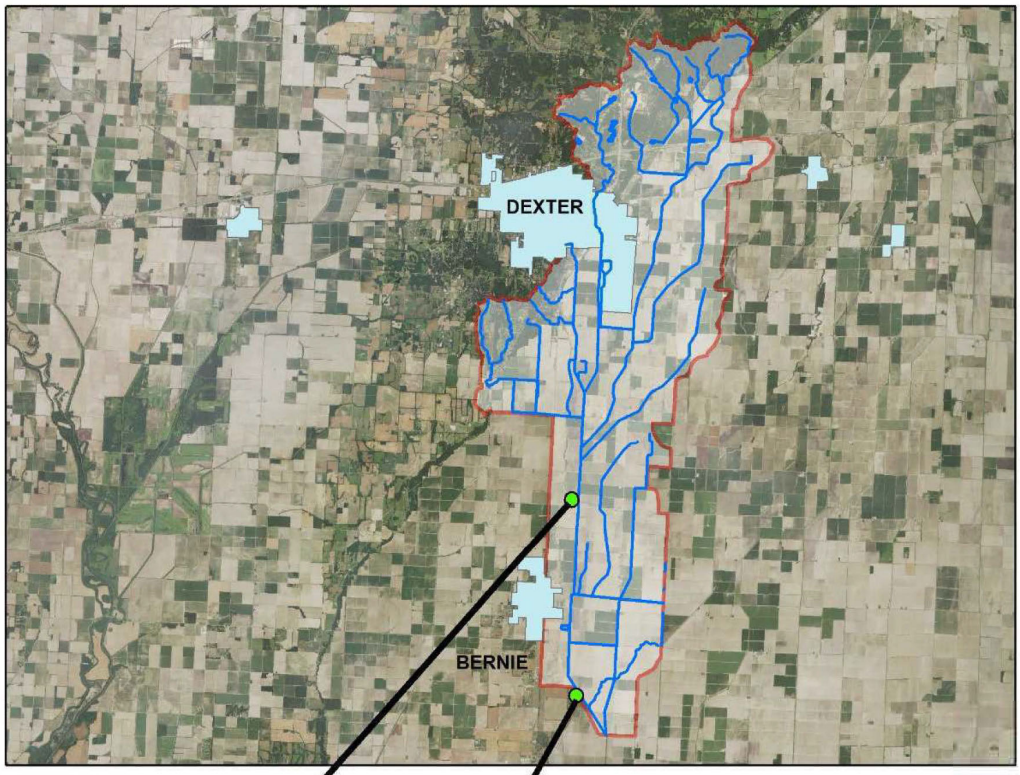
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



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United States Department of Agriculture

July 15, 2024

Ms. Andrea Spillars
Federal Emergency Management Agency
Region 7 Administrator

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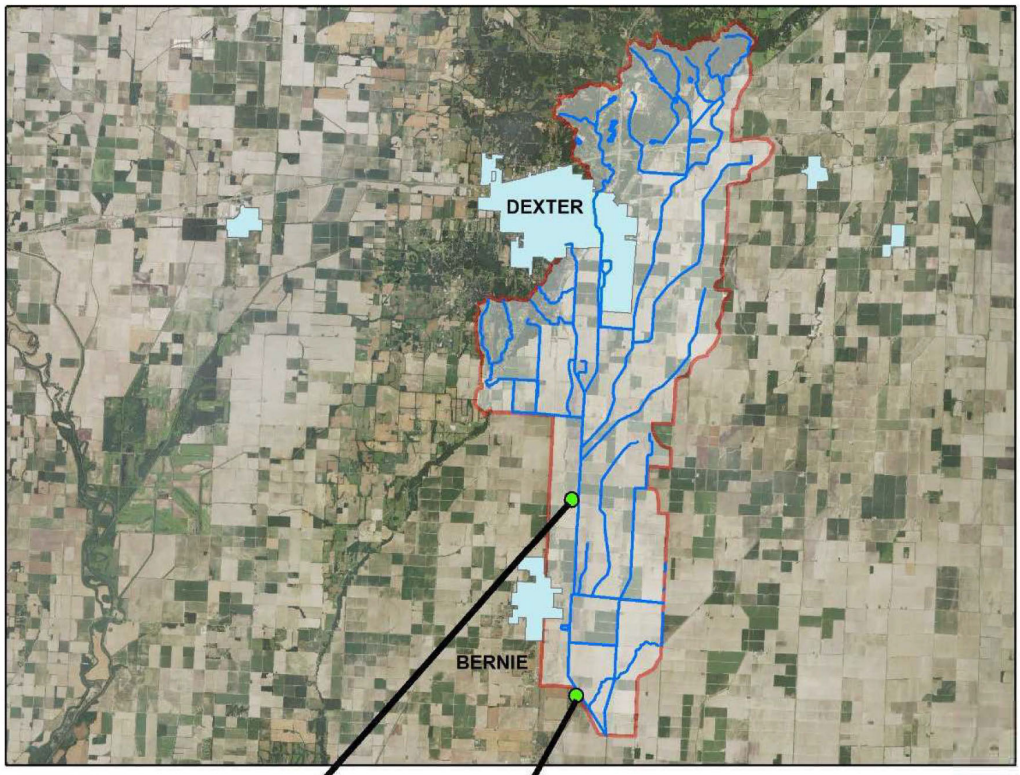
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July 15, 2024

U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park Deville Drive Suite A
Columbia, MO 65203

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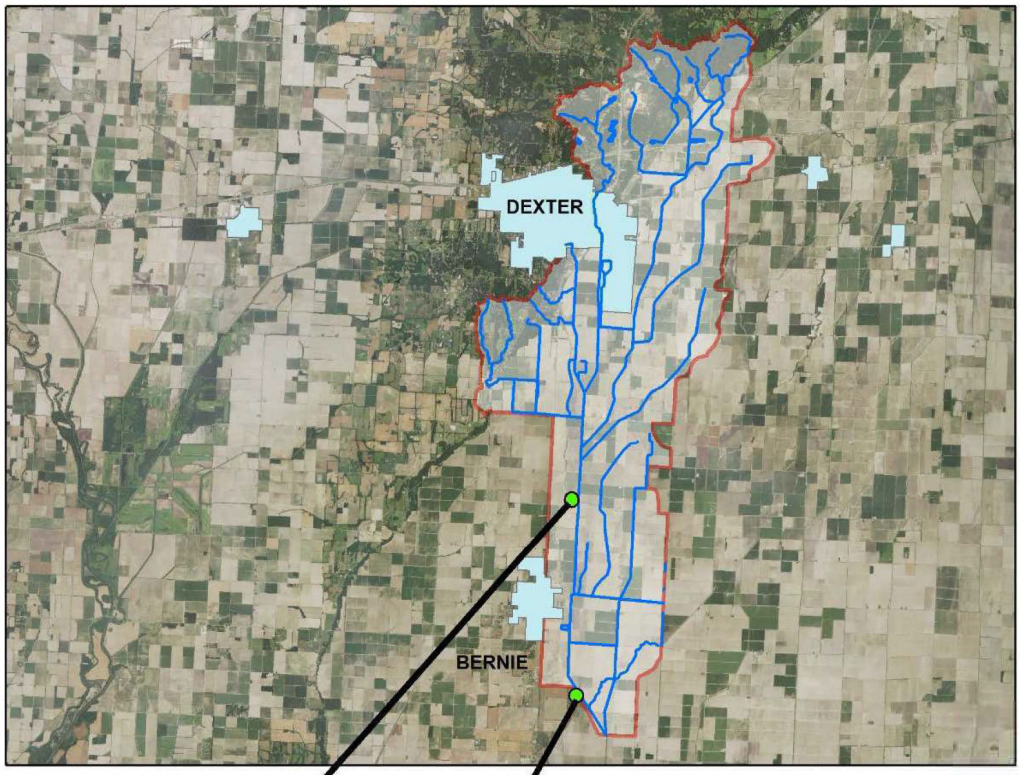
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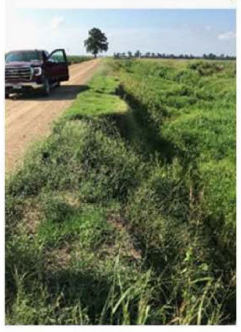
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As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

We request your comments, concerns, and/or suggestions early in the planning process, and ask that your comments are received within 30 days after receipt of this letter. To facilitate NEPA cumulative impact analysis, we would also appreciate identification of any major projects in the vicinity that may contribute to cumulative effects. In your communication, please refer to “Main Ditch Watershed Project.”

Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

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As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

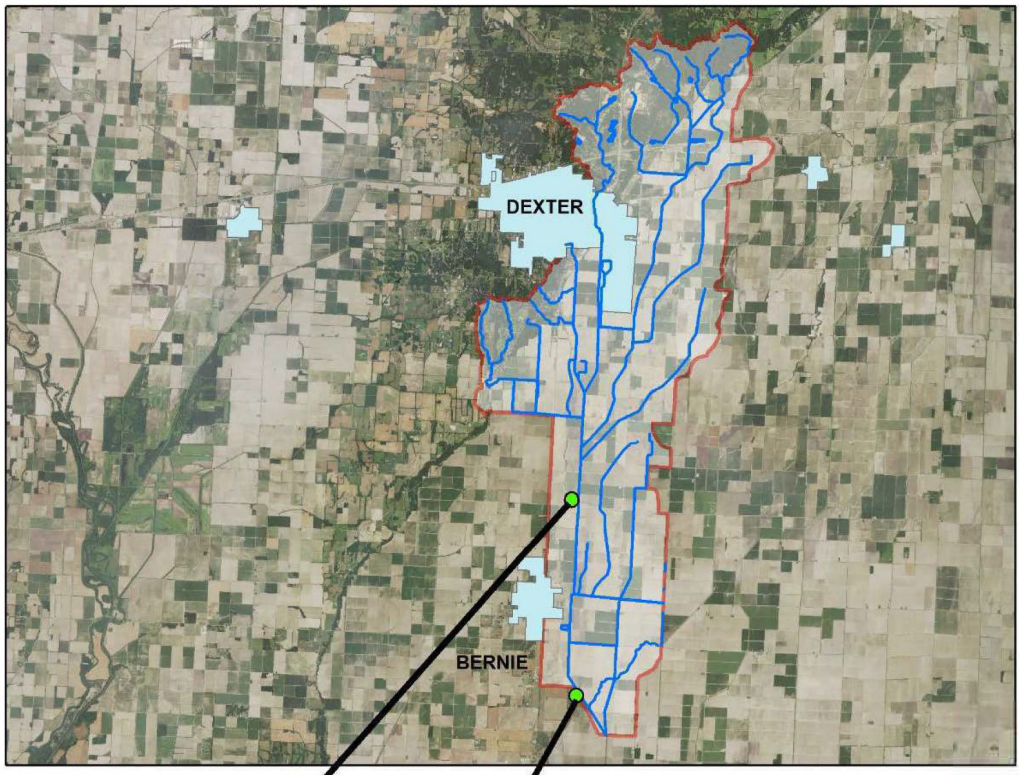
DD37's project proposal includes drainage canals from one HUC-12 watershed. The Main Ditch Watershed receives runoff in the headwaters from Crowley's Ridge and transfers it to the Little River Drainage District Floodway Canals. Eighty-eight percent (28,125 acres) of the project area has soils classified as Prime Farmland, Prime Farmland if drained, or Farmland of Statewide Importance. This watershed currently has a TMDL in place for sediment.

In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Josh Hawley
U.S. Congress
Senate
555 Independence Street #1600
Cape Girardeau, MO 63703

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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Assistant State Conservationist for Water Resources and Easements

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Natural Resources Conservation Service
601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
An Equal Opportunity Provider, Employer, and Lender

Project Overview

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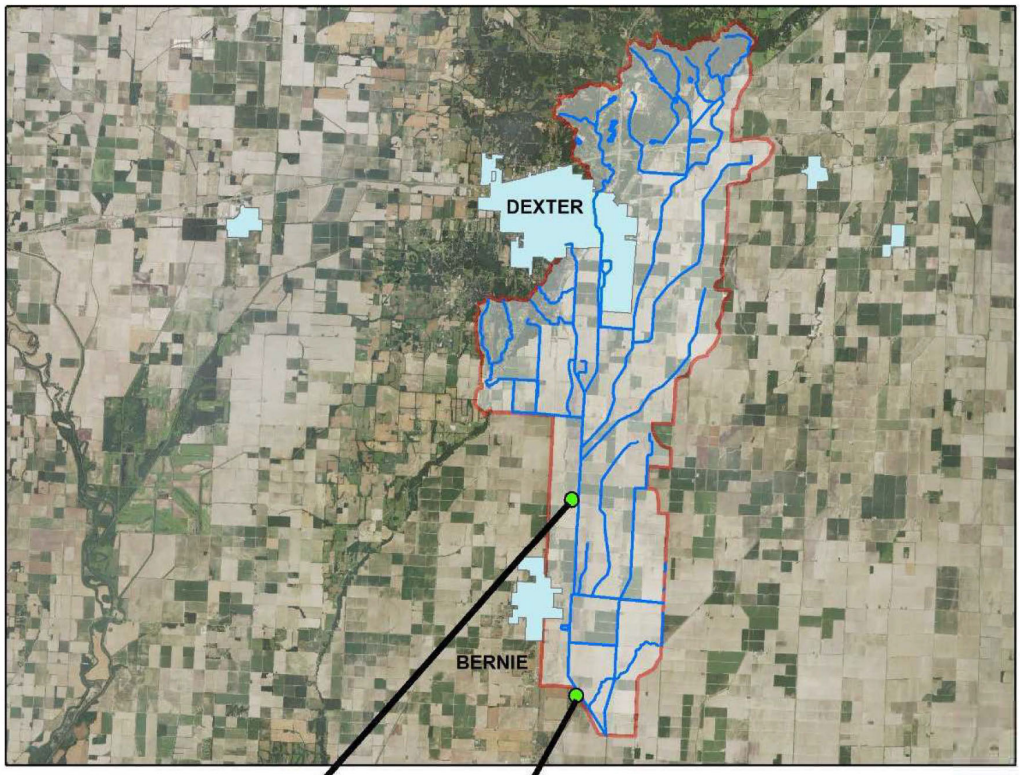
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Eric Schmitt
U.S. Congress
Senate
111 S. 10th Street Suite 23.305
St. Louis, MO 63102

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

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601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
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Project Overview

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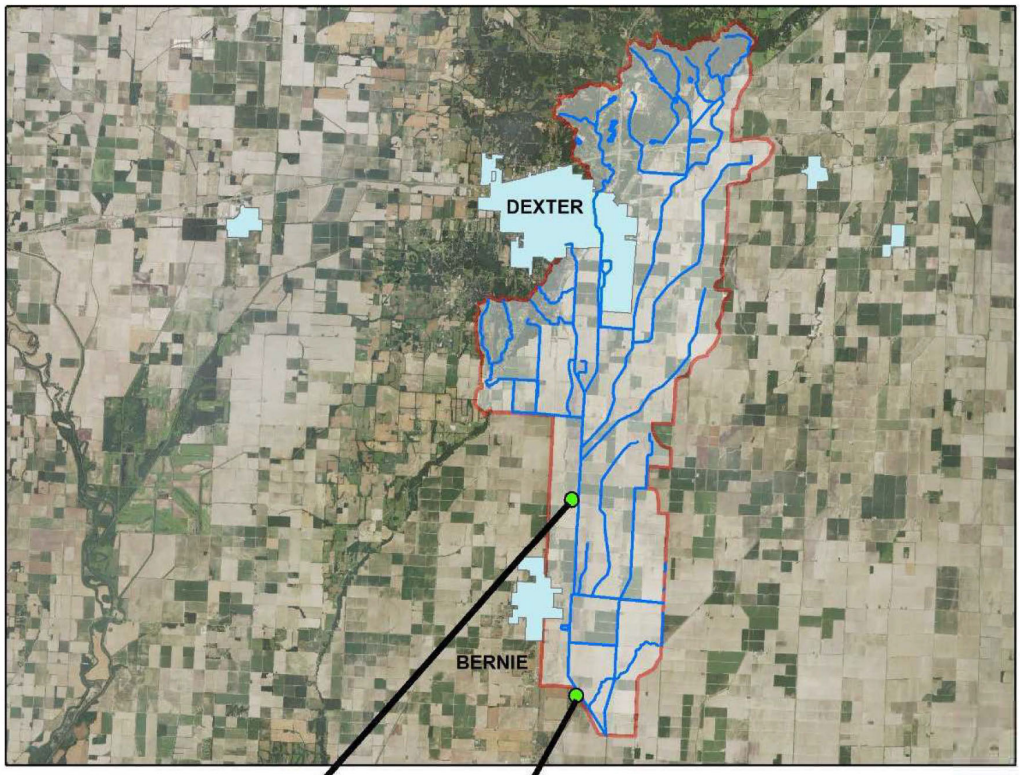
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Jason Smith
U.S. Congress
House - 8th Congressional District
2502 Tanner Drive Suite 205
Cape Girardeau, MO 63703

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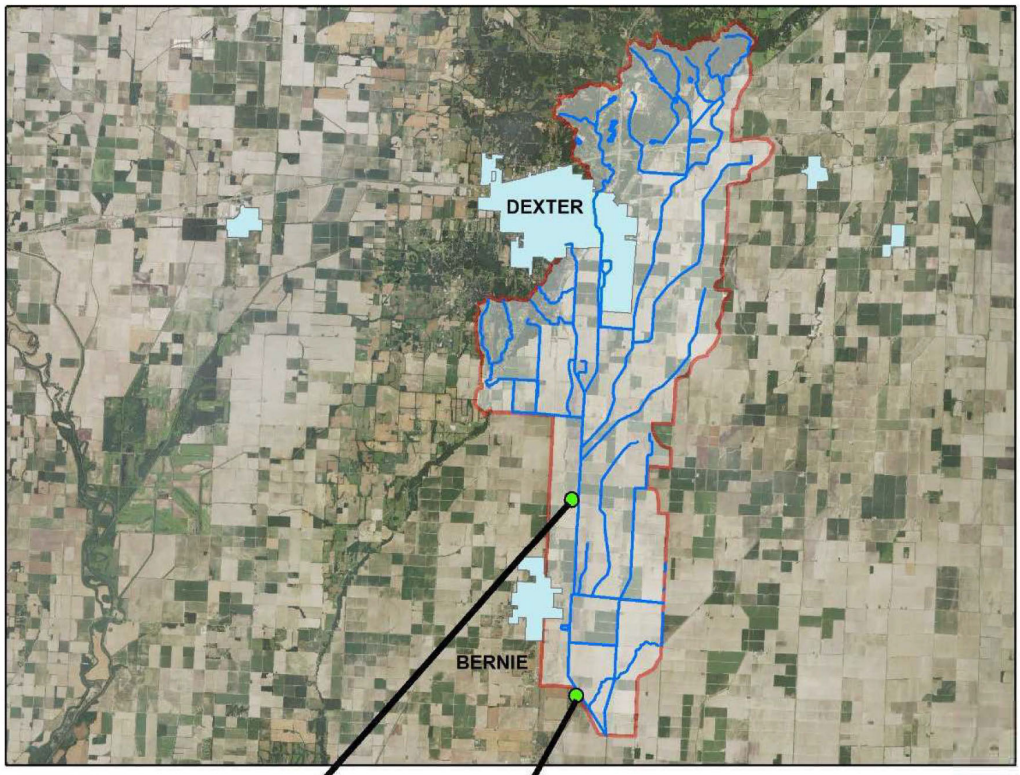
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Main Ditch Watershed Project

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0 2.5 5 Miles





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NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

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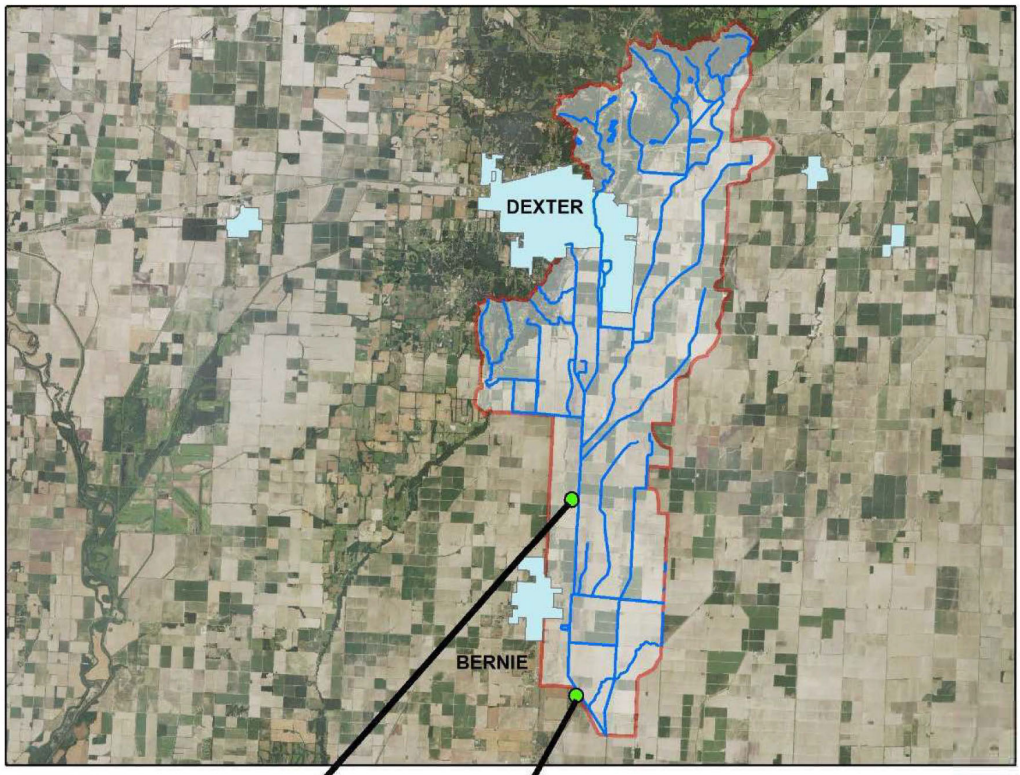
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Brent Summers
USDA Rural Development
Area 4 Director

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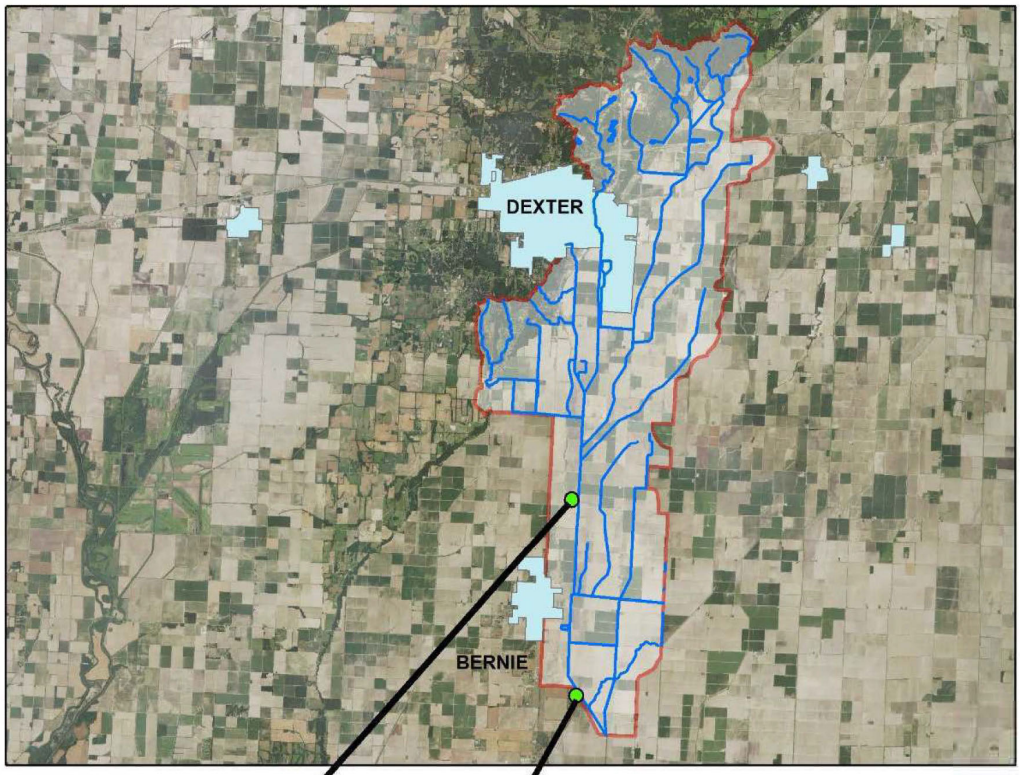
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United States Department of Agriculture

July 15, 2024

Mr. Kyle Wilkens
USDA Rural Development
State Director
601 Business Loop 70 West Suite 235
Columbia, MO 65203

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As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

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Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Natural Resources Conservation Service
601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
An Equal Opportunity Provider, Employer, and Lender

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

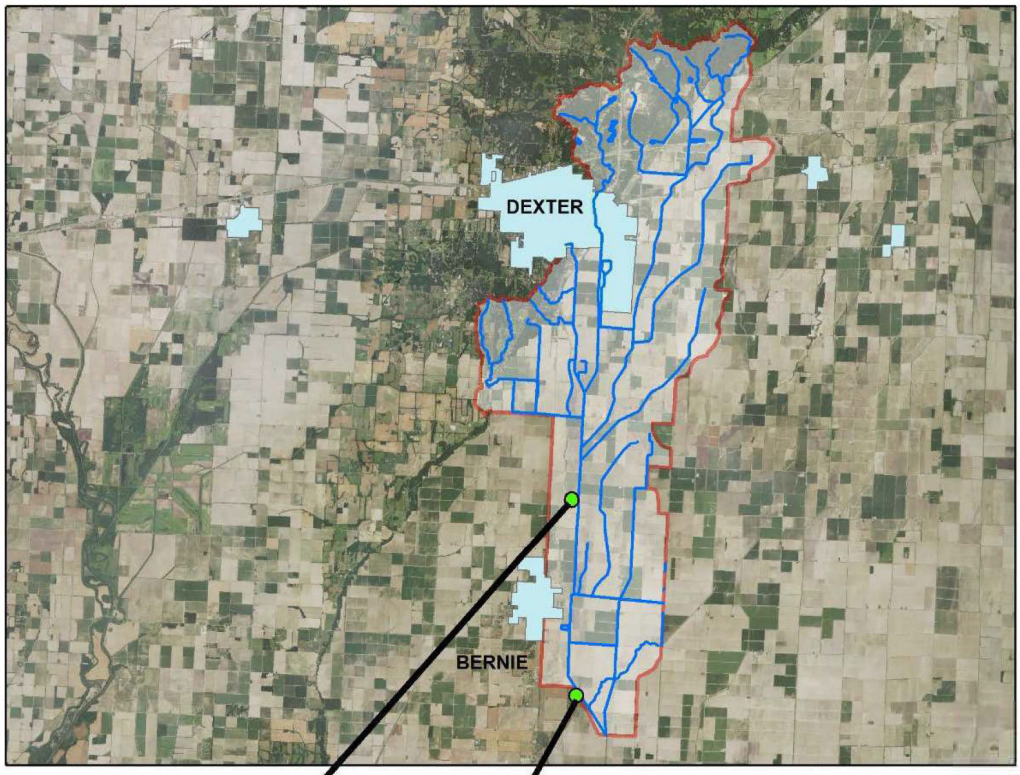
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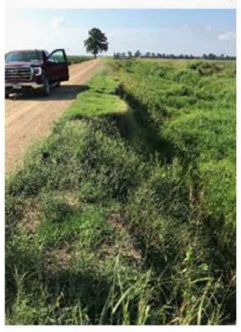
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles







0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Joe Aull
USDA Farm Service Agency
State Executive Director
601 Business Loop 70 West Suite 225
Columbia, MO 65203

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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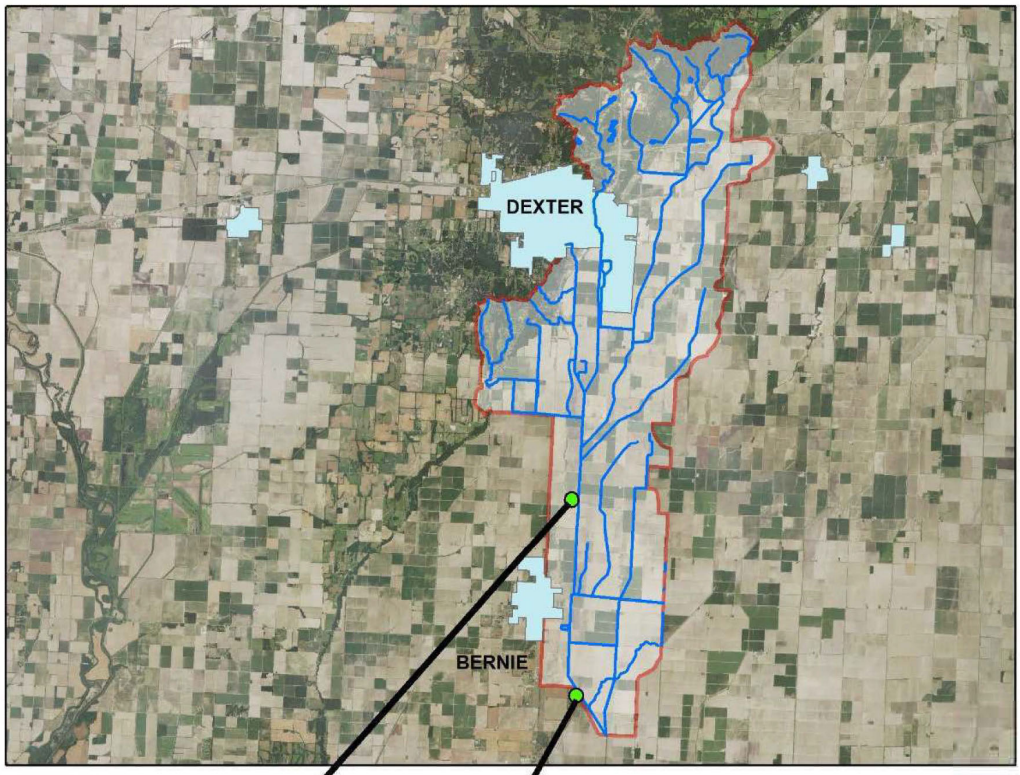
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Garrett Hawkins
Missouri Farm Bureau
President
St. Clair County, MO

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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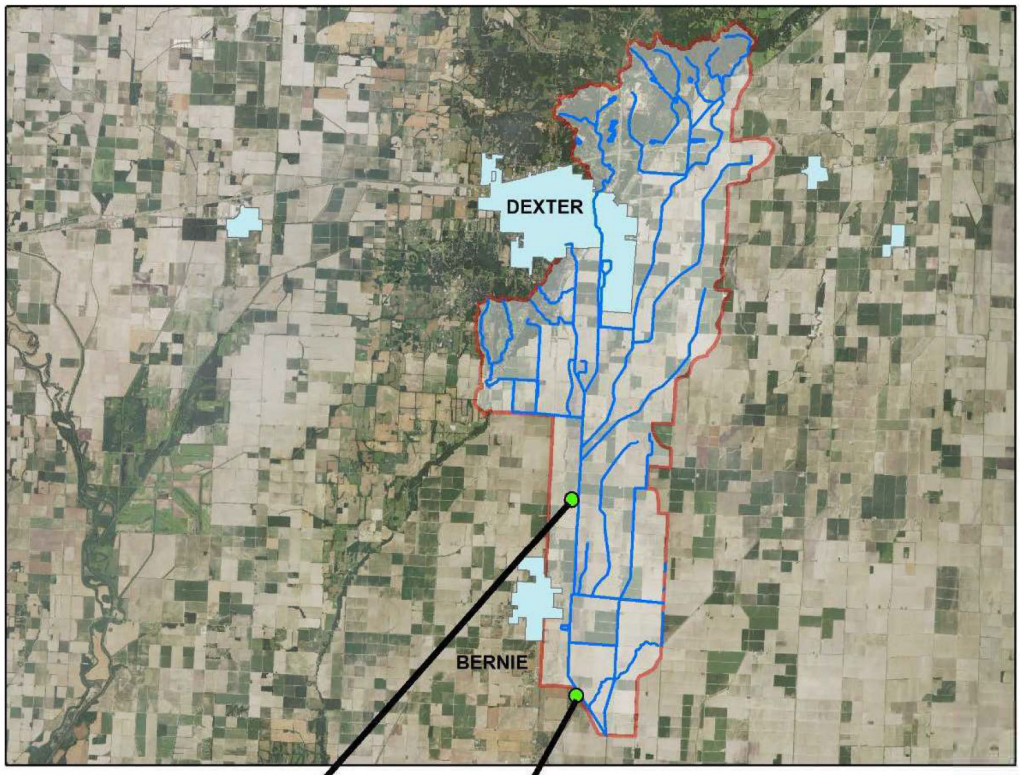
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0 2.5 5 Miles





0 125 250 Miles

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COLUMBIA, MISSOURI
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Missouri Department of Conservation - Southeast Regional Office
2302 County Park Drive
Cape Girardeau, MO 63701

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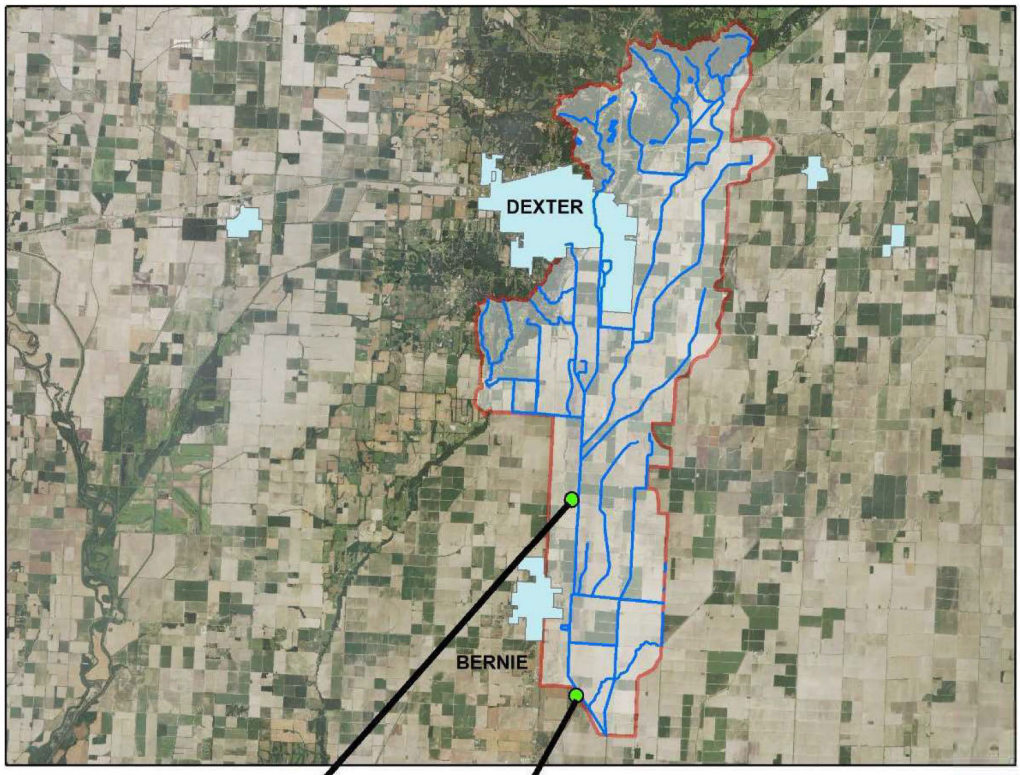
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0 2.5 5 Miles





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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Ms. Kara Tompkins
Missouri Department of Conservation
Private Land Conservationist
18450 Ridgeview Lane
Dexter, MO 63841

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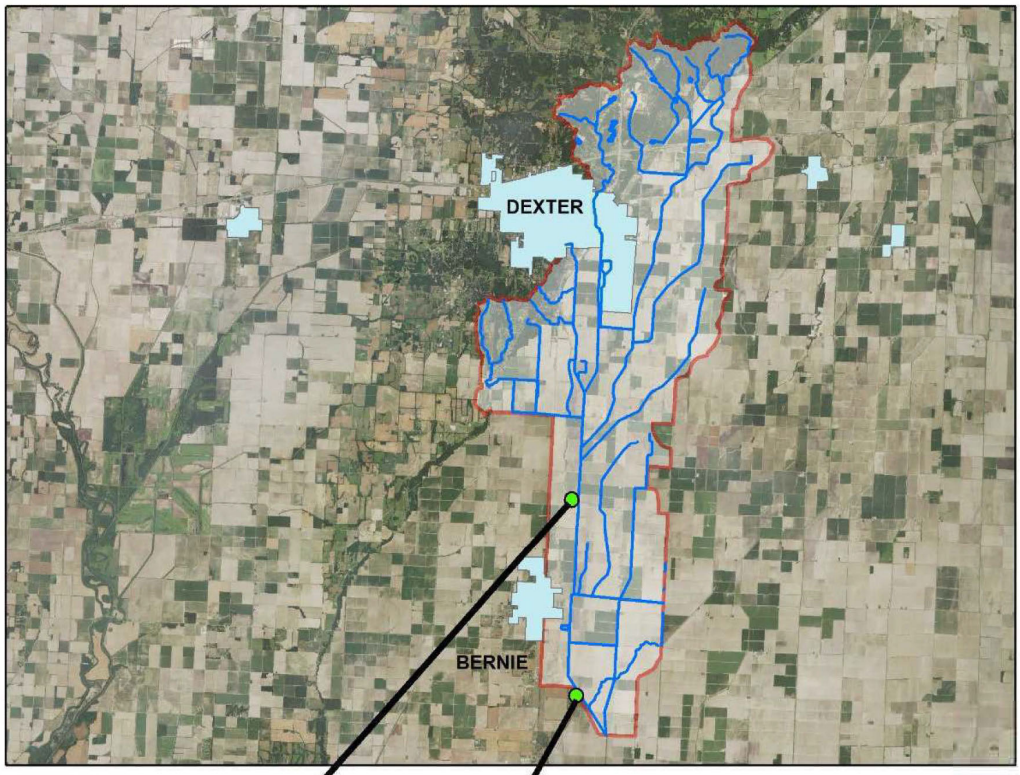
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Missouri Department of Natural Resources- Water Protection Program
Division of Environmental Quality
PO Box 176
Jefferson City, MO 65102-0176

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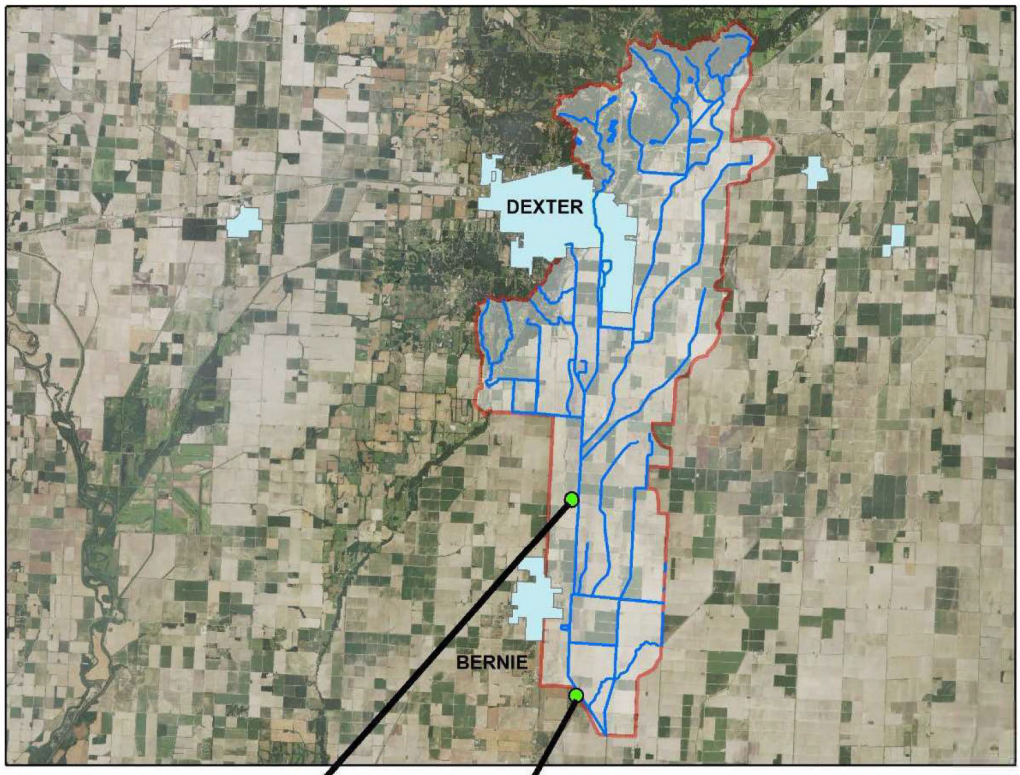
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USDA IS AN EQUAL OPPORTUNITY PROVIDER,
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United States Department of Agriculture

July 15, 2024

Missouri Department of Natural Resources- State Historic Preservation Office
Missouri State Parks
PO Box 176
Jefferson City, MO 65102-0176

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

To Whom It May Concern,

The Missouri Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), is developing a Watershed Plan – Environmental Document for the Main Ditch Watershed in Stoddard County, Missouri (see **Attachment 1** including potential areas where the work will be conducted).

As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

We request your comments, concerns, and/or suggestions early in the planning process, and ask that your comments are received within 30 days after receipt of this letter. To facilitate NEPA cumulative impact analysis, we would also appreciate identification of any major projects in the vicinity that may contribute to cumulative effects. In your communication, please refer to “Main Ditch Watershed Project.”

Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

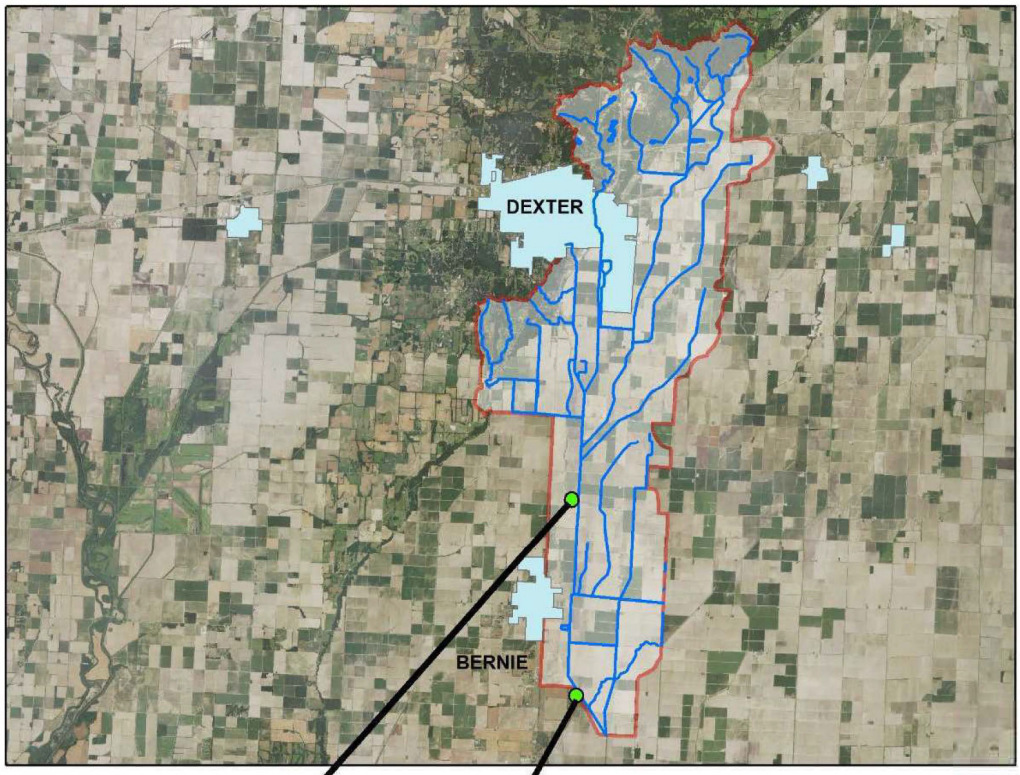
DD37's project proposal includes drainage canals from one HUC-12 watershed. The Main Ditch Watershed receives runoff in the headwaters from Crowley's Ridge and transfers it to the Little River Drainage District Floodway Canals. Eighty-eight percent (28,125 acres) of the project area has soils classified as Prime Farmland, Prime Farmland if drained, or Farmland of Statewide Importance. This watershed currently has a TMDL in place for sediment.

In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Jason Bean
Missouri State Senate
Senate District 25
201 W. Capitol Avenue Room 321
Jefferson City, MO 65101

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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Natural Resources Conservation Service
601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
An Equal Opportunity Provider, Employer, and Lender

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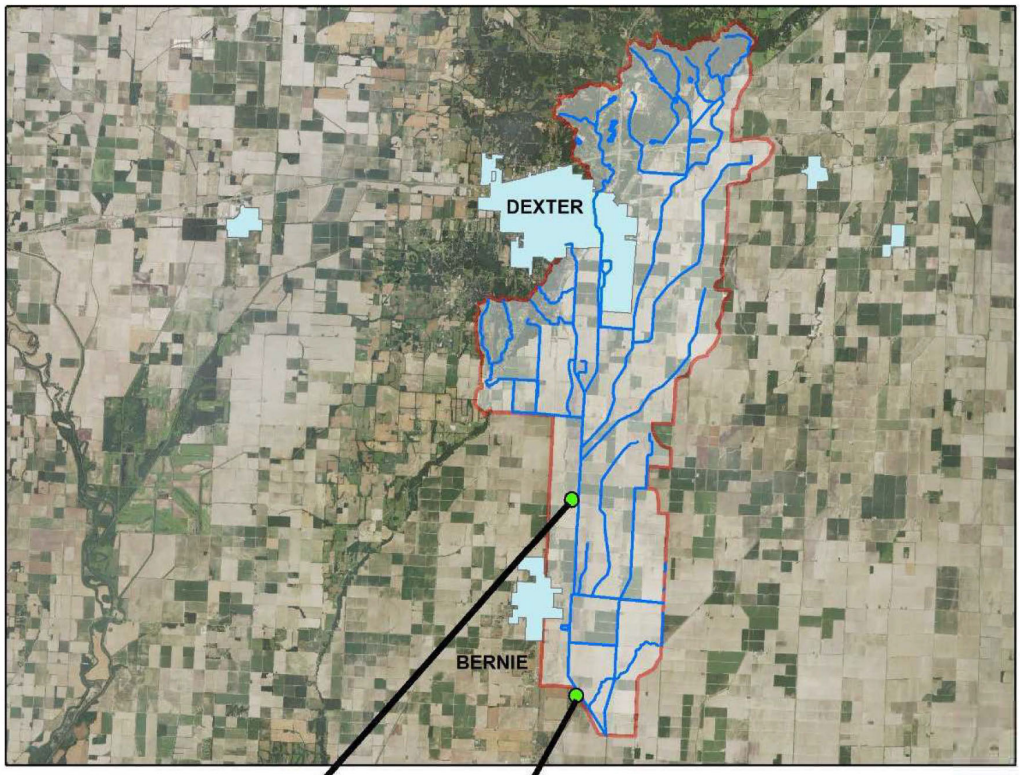
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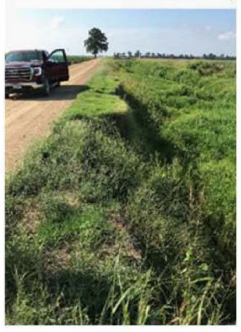
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles







0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Herman Morse
Missouri State Representative
House District 151
201 W. Capitol Avenue Room 135
Jefferson City, MO 65101

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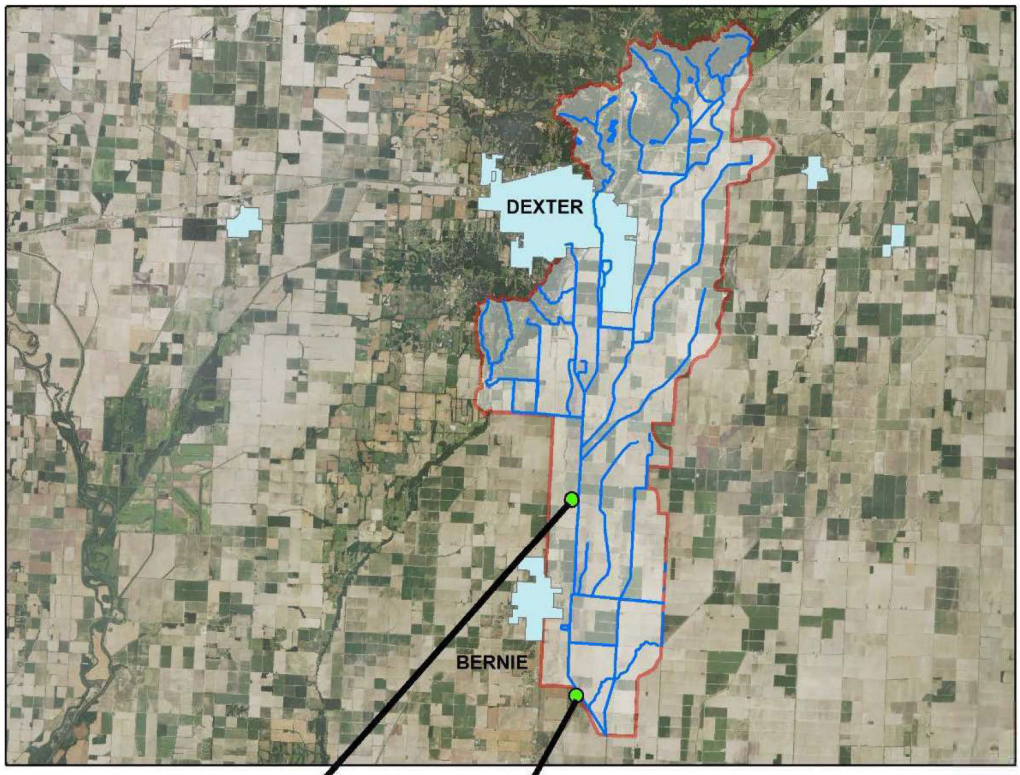
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
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COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Scott Edwards
NRCS Missouri
State Conservationist
601 Business Loop 70 West Suite 250
Columbia, MO 65203

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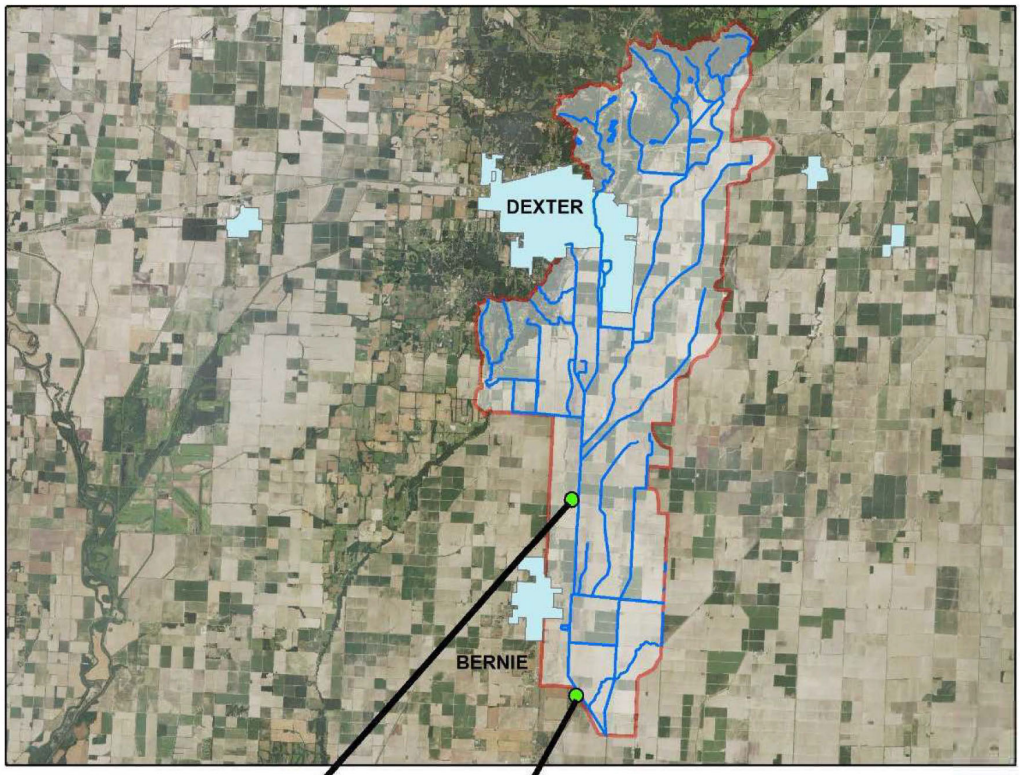
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

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NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Chris Hamilton
NRCS Missouri
Assistant State Conservationist for Water Resources and Easements
601 Business Loop 70 West Suite 250
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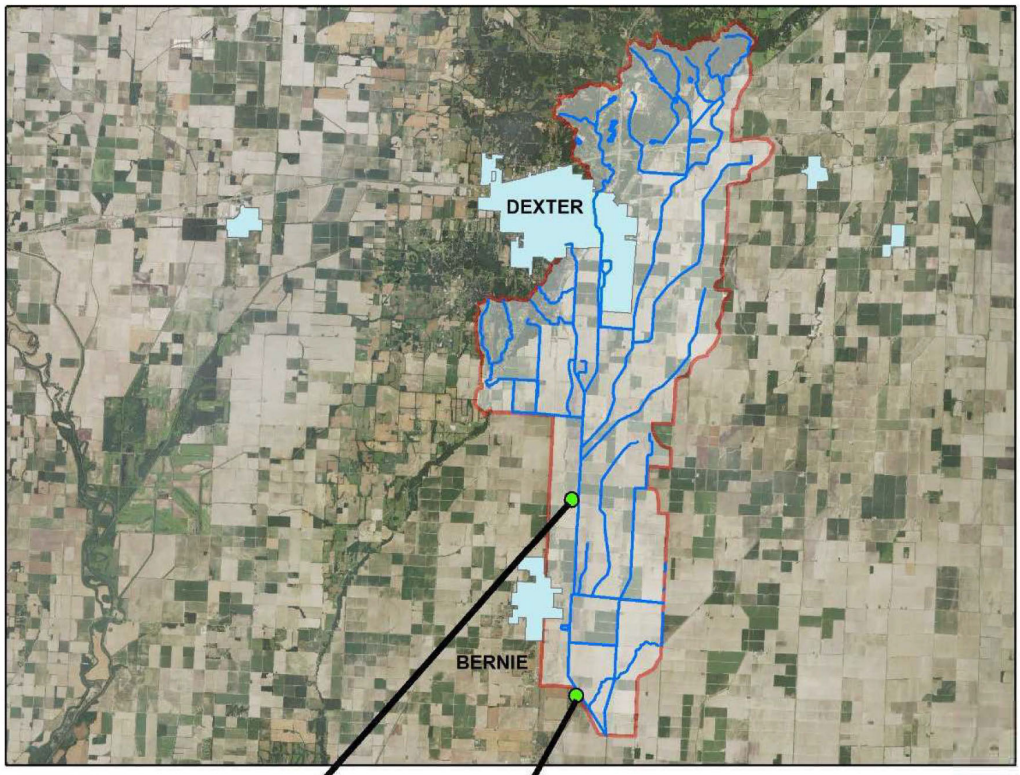
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0 2.5 5 Miles





0 125 250 Miles

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NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

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United States Department of Agriculture

July 15, 2024

Mr. Andrew Bohnert
Missouri State Emergency Management Agency
Emergency Coordinator (Stoddard County)
601 W Business 60
Dexter, MO 63841

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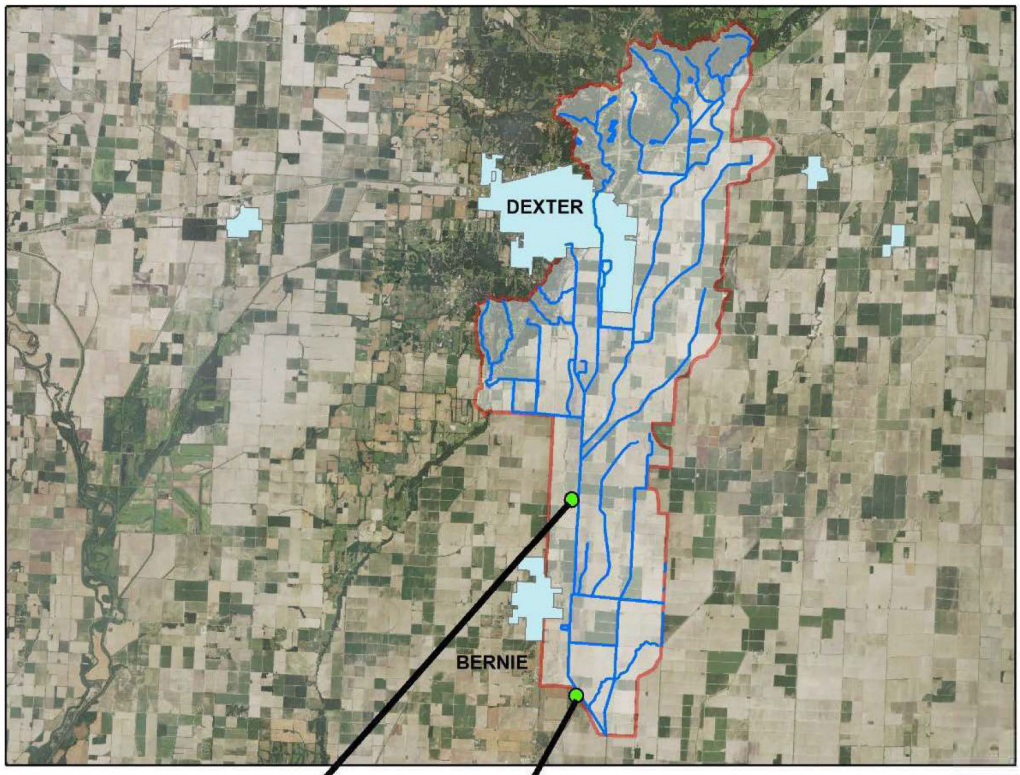
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COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Beau Bishop
Missouri State Floodplain Administrators
Floodplain Administrator (Stoddard County)
501 W. Business 60 PO Box 680
Dexter, MO 63841

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

To Whom It May Concern,

The Missouri Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), is developing a Watershed Plan – Environmental Document for the Main Ditch Watershed in Stoddard County, Missouri (see **Attachment 1** including potential areas where the work will be conducted).

As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

We request your comments, concerns, and/or suggestions early in the planning process, and ask that your comments are received within 30 days after receipt of this letter. To facilitate NEPA cumulative impact analysis, we would also appreciate identification of any major projects in the vicinity that may contribute to cumulative effects. In your communication, please refer to "Main Ditch Watershed Project."

Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Natural Resources Conservation Service
601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
An Equal Opportunity Provider, Employer, and Lender

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

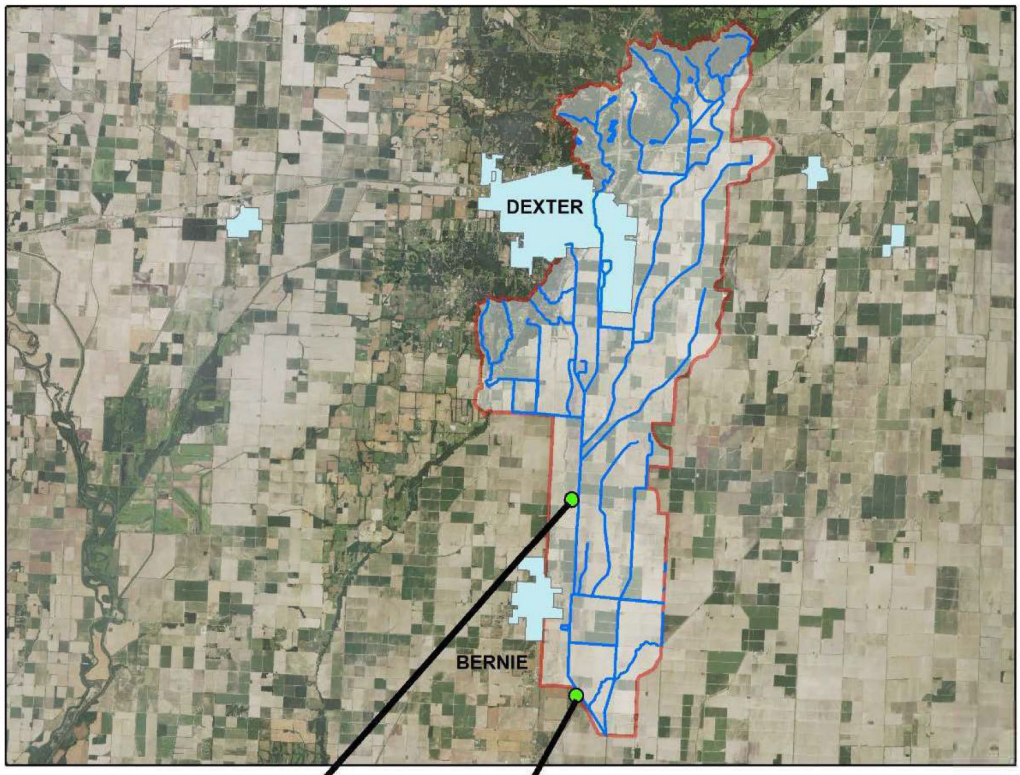
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In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Missouri Department of Agriculture
1616 Missouri Boulevard PO Box 630
Jefferson City, MO 65102

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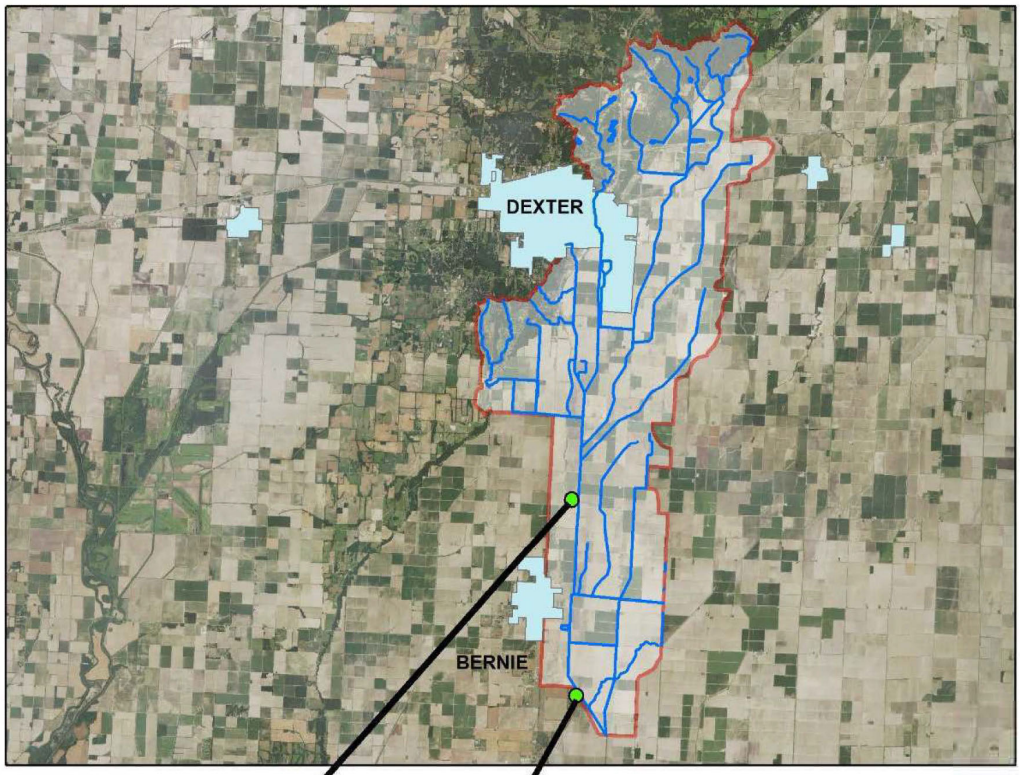
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0 2.5 5 Miles





0 125 250 Miles

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NATURAL RESOURCES CONSERVATION SERVICE
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July 15, 2024

Missouri Department of Transportation - Southeast District
2675 N. Main Street
Sikeston, MO 63801

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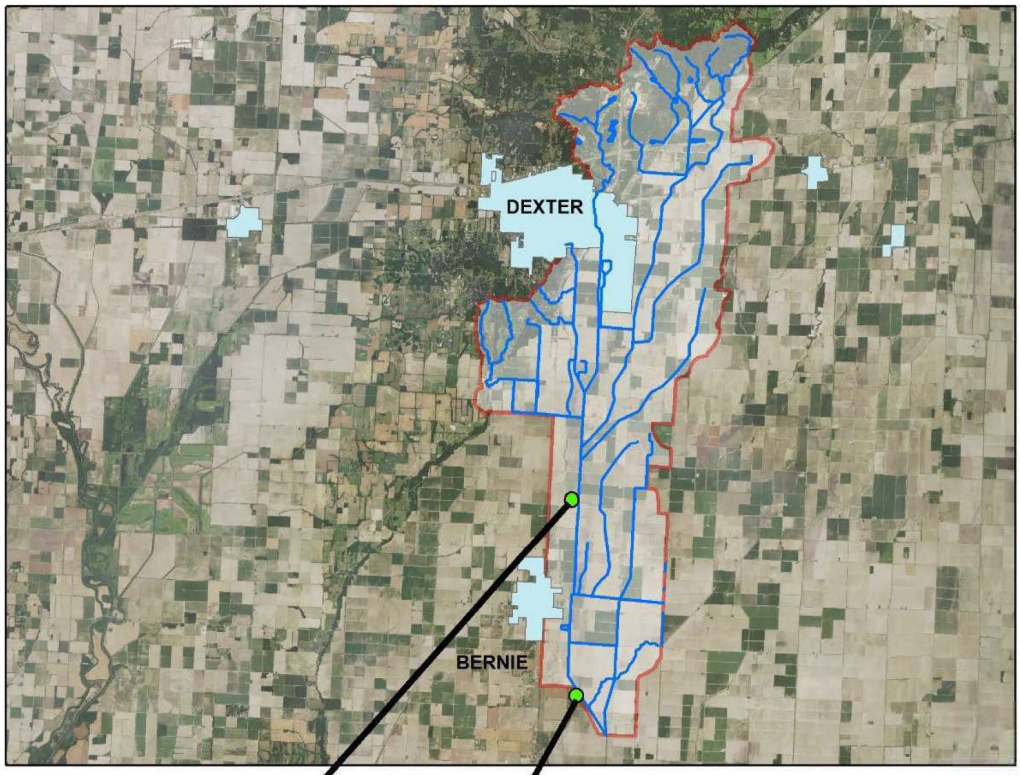
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Honorable Mike Parson
Governor of Missouri
Governor
PO Box 720
Jefferson City, MO 65102

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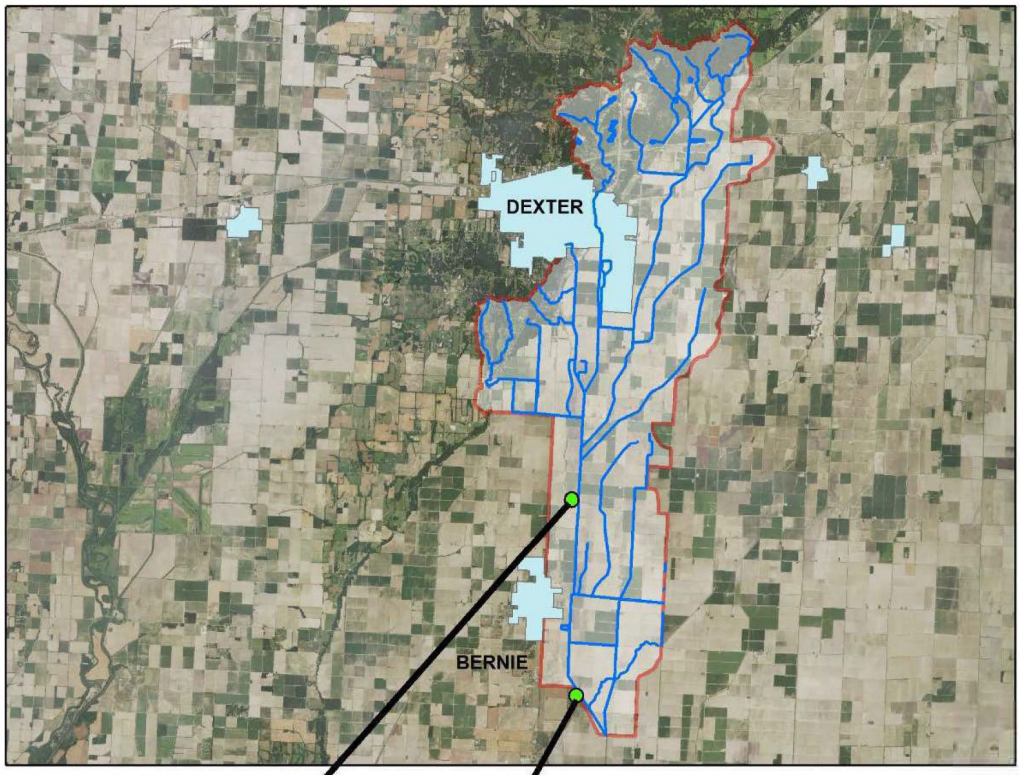
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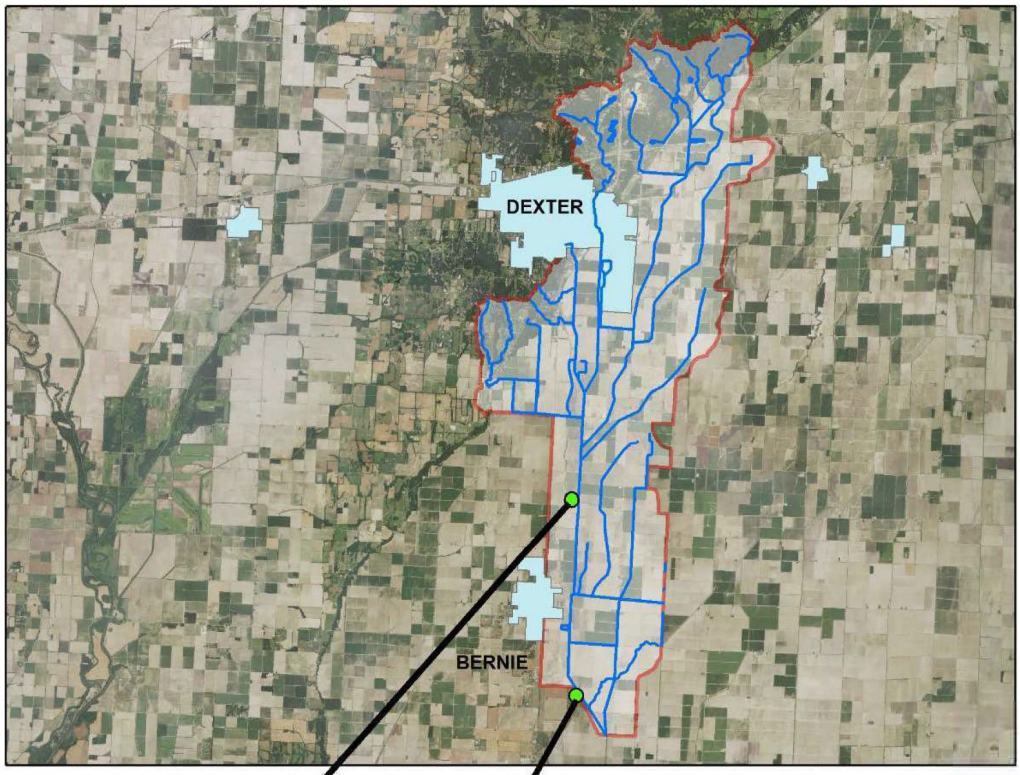
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Mr. Greg Mathis
Stoddard County Commission
Presiding Commissioner
PO Box 110
Bloomfield, MO 63825-0110

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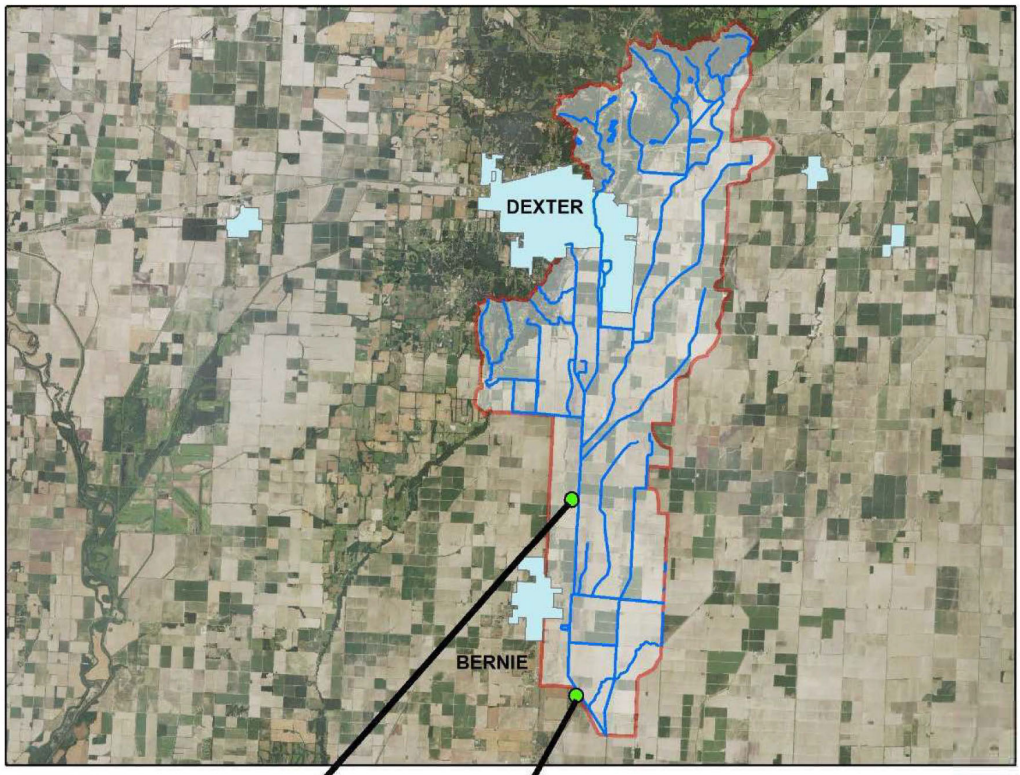
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Ms. Janet Johns
Stoddard County Soil and Water Conservation District
District Manager
18450 Ridgeview Lane
Dexter, MO 63841

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As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

As the local sponsor, Drainage District 37 proposes Watershed and Flood Prevention Operations Program (WFPO) projects in the Main Ditch Watershed. The project goals are to provide flood control alternatives to reduce reoccurring agricultural flooding and to improve aged drainage infrastructure.

We request your comments, concerns, and/or suggestions early in the planning process, and ask that your comments are received within 30 days after receipt of this letter. To facilitate NEPA cumulative impact analysis, we would also appreciate identification of any major projects in the vicinity that may contribute to cumulative effects. In your communication, please refer to “Main Ditch Watershed Project.”

Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Natural Resources Conservation Service
601 Business Loop 70 West, Parkade Center Suite 250, Columbia, Missouri 65203
Telephone: (573) 876-0909 Fax: (855) 830-0683
An Equal Opportunity Provider, Employer, and Lender

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

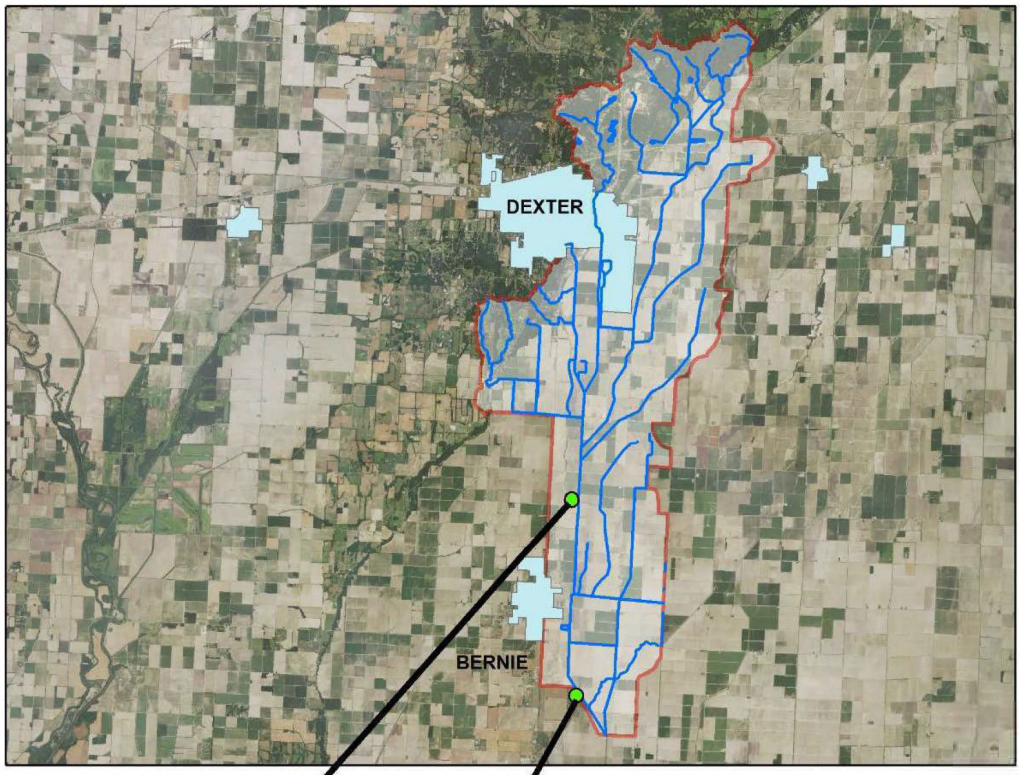
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In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

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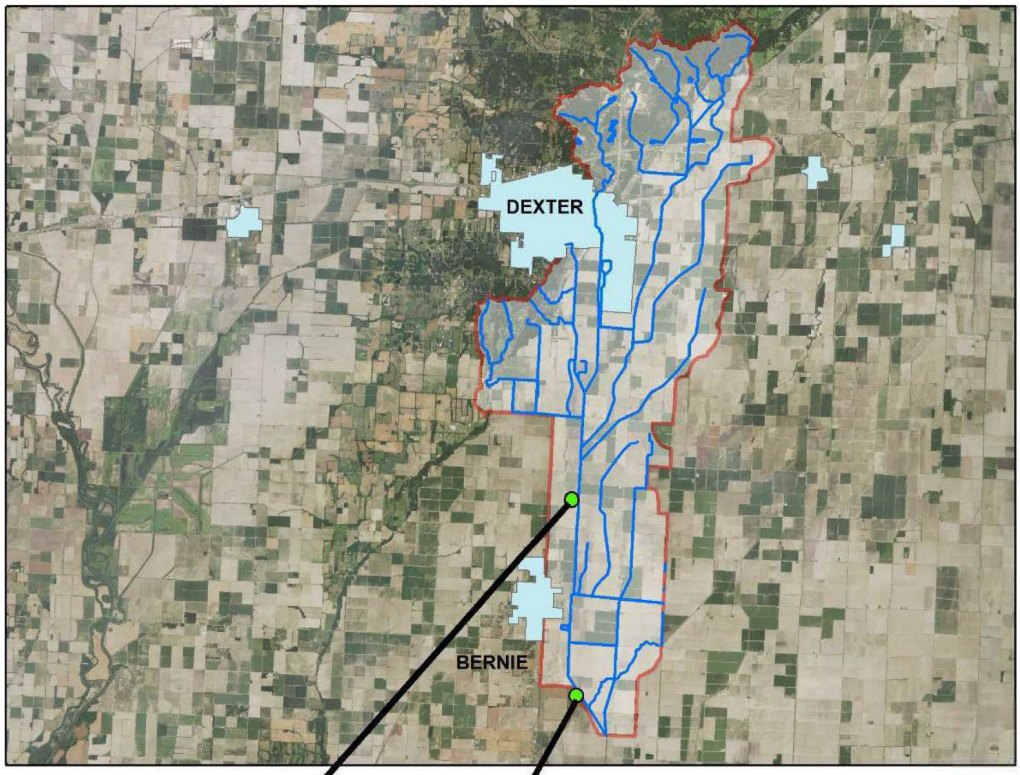
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NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable James Tilmon
City of Bernie
Mayor
202 N Allen St PO Box 605
Bernie, MO 63822

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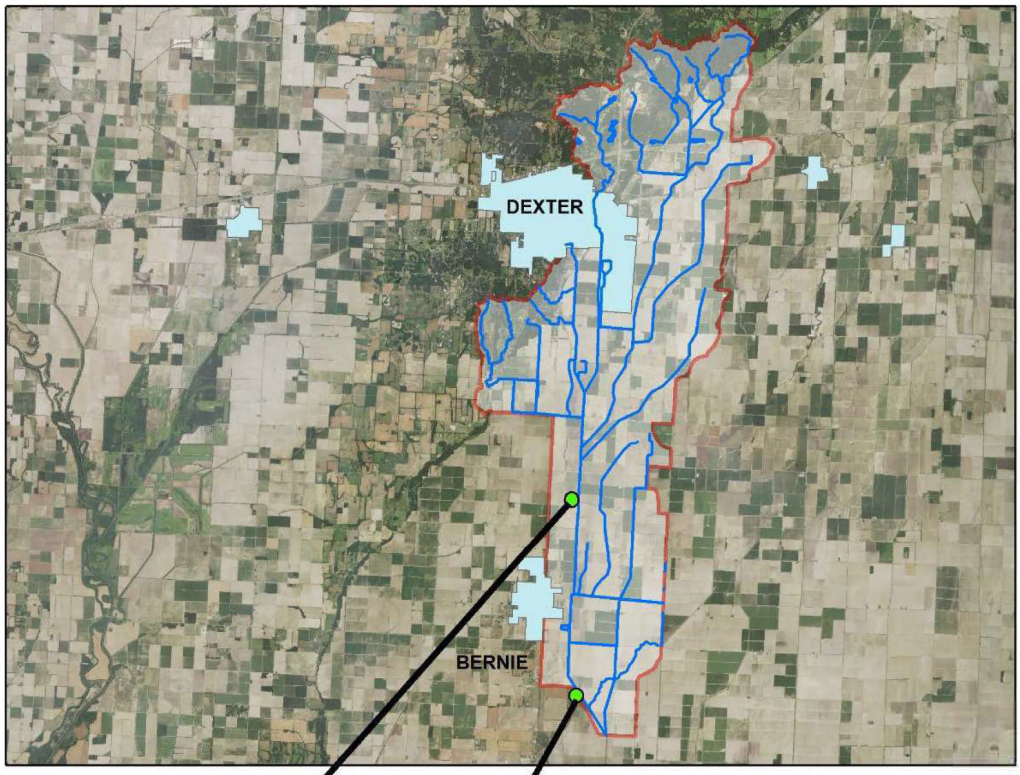
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Honorable Jason Banken
City of Dexter
Mayor
301 E. Stoddard
Dexter, MO 63841

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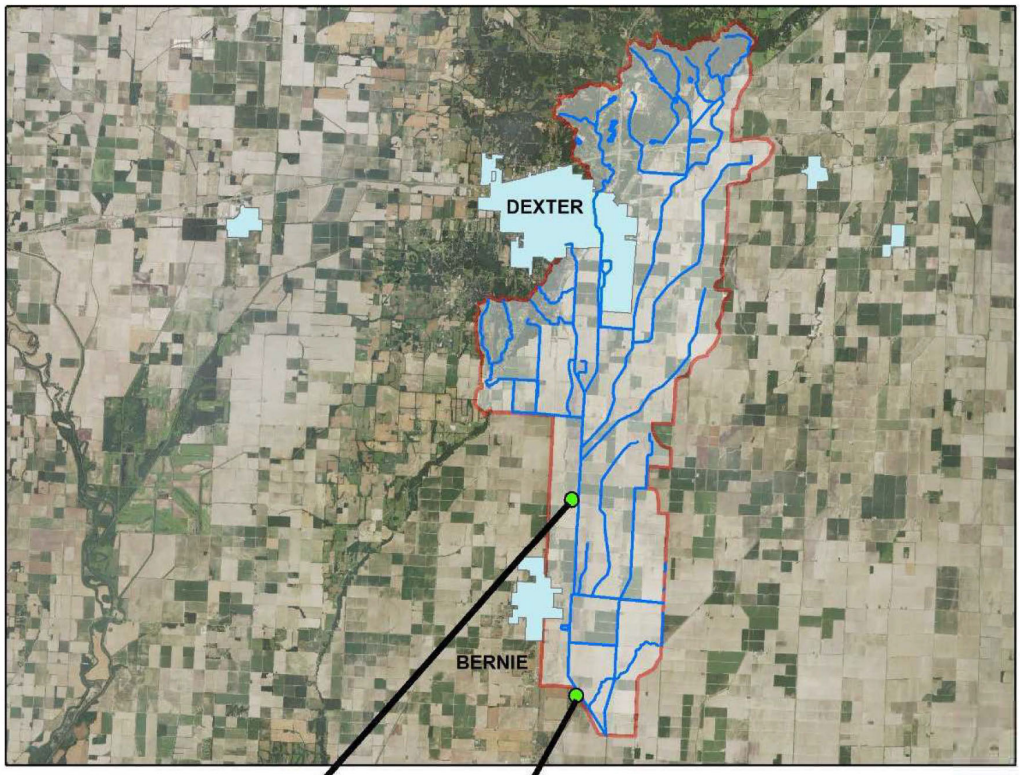
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. David Wyman
City of Dexter
City Administrator
301 E. Stoddard
Dexter, MO 63841

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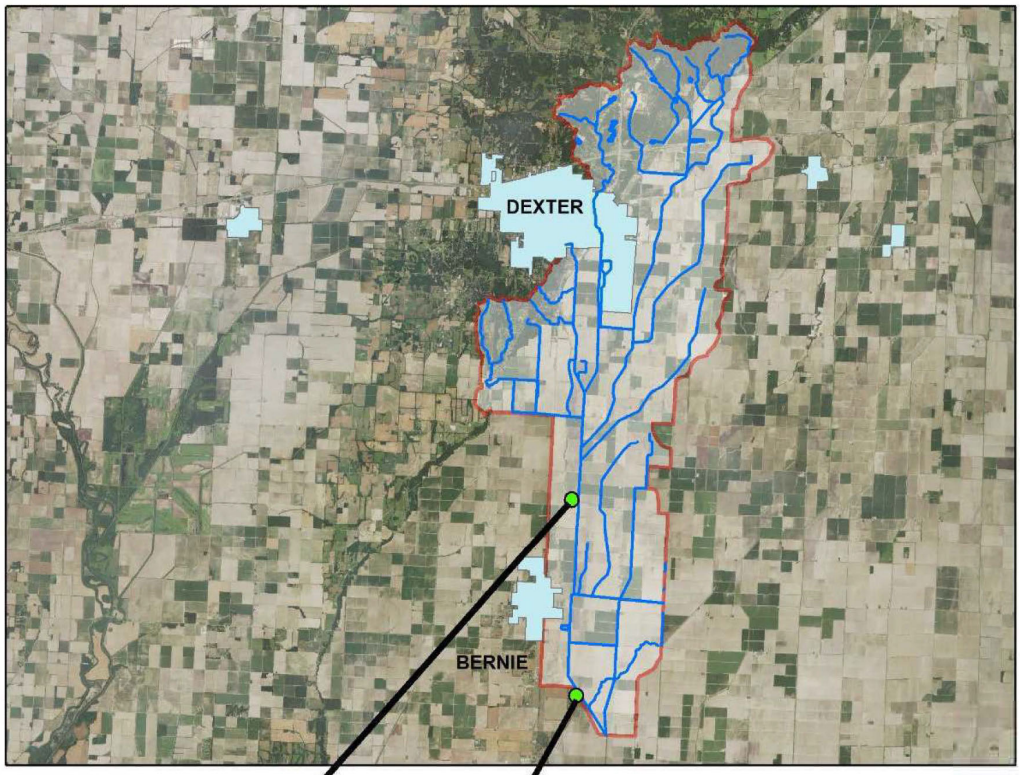
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

Mr. Tim Mayberry
Drainage District 37
President
6282 CO RD 717
Dexter, MO 63841

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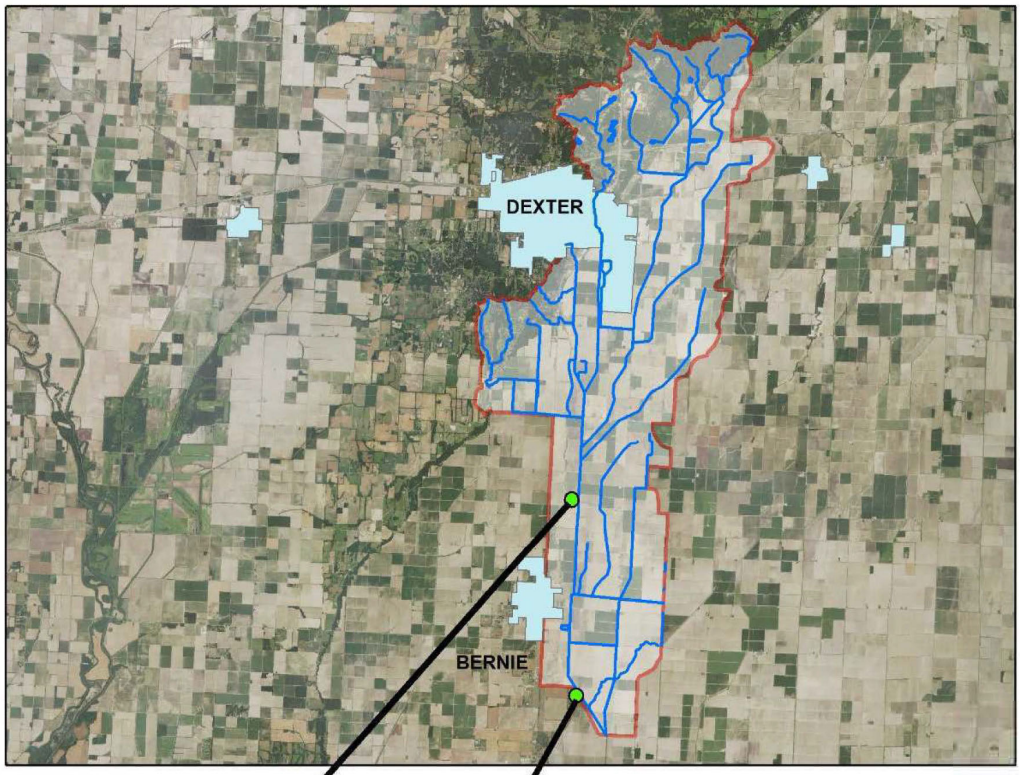
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Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

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As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

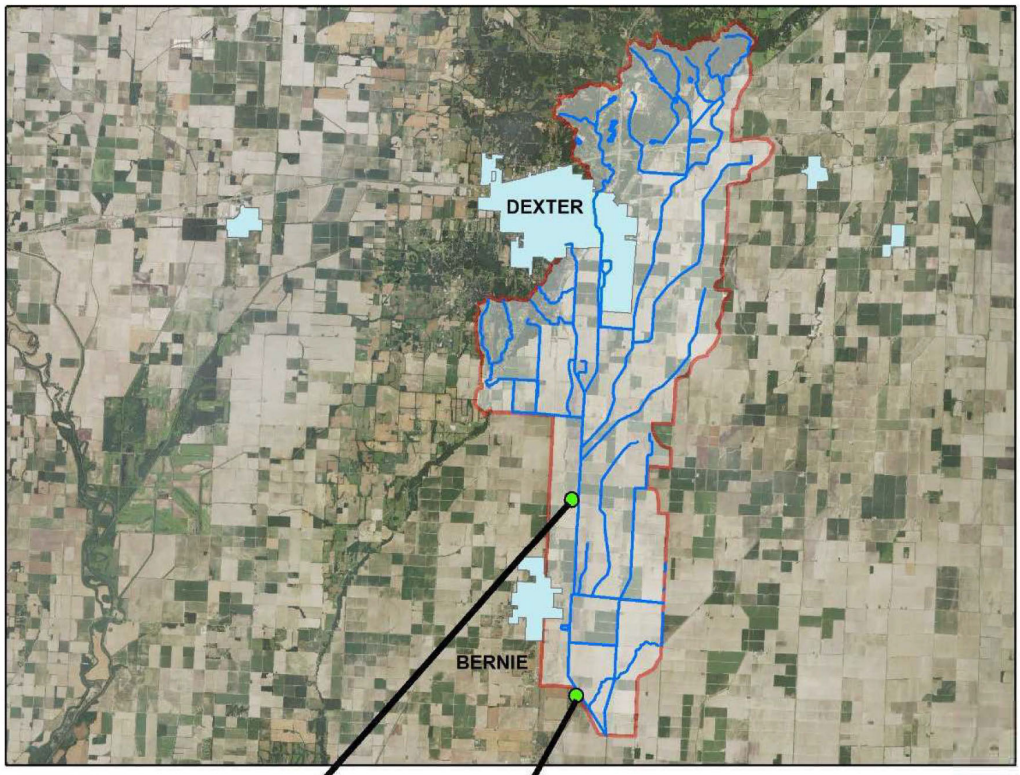
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Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

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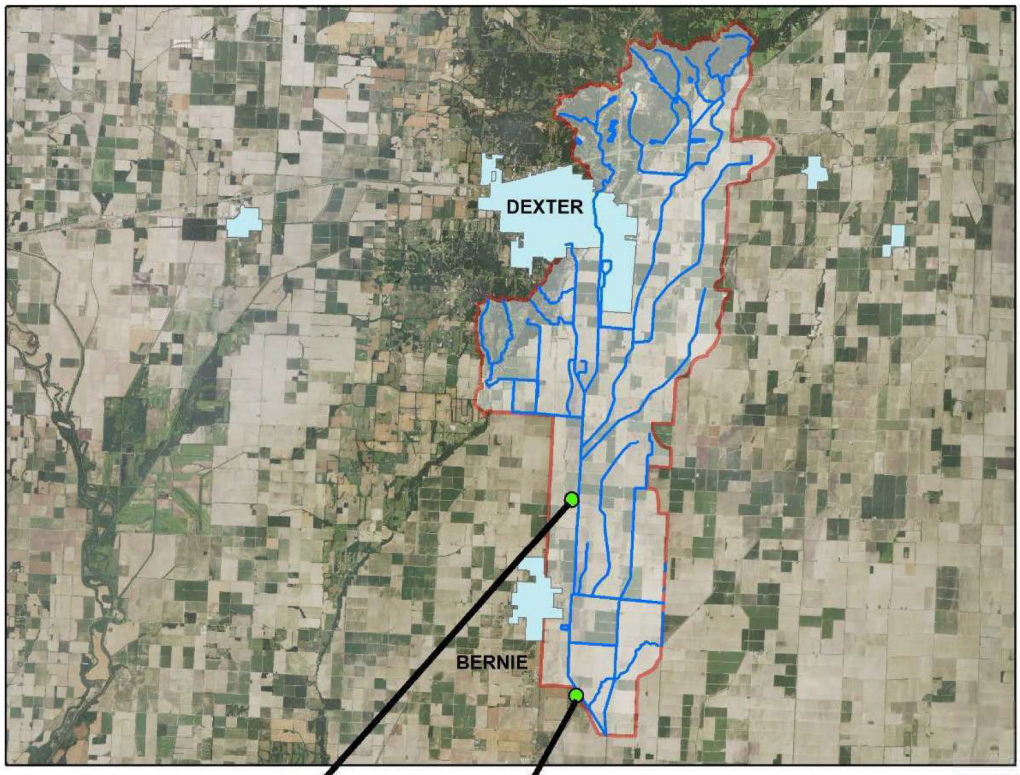
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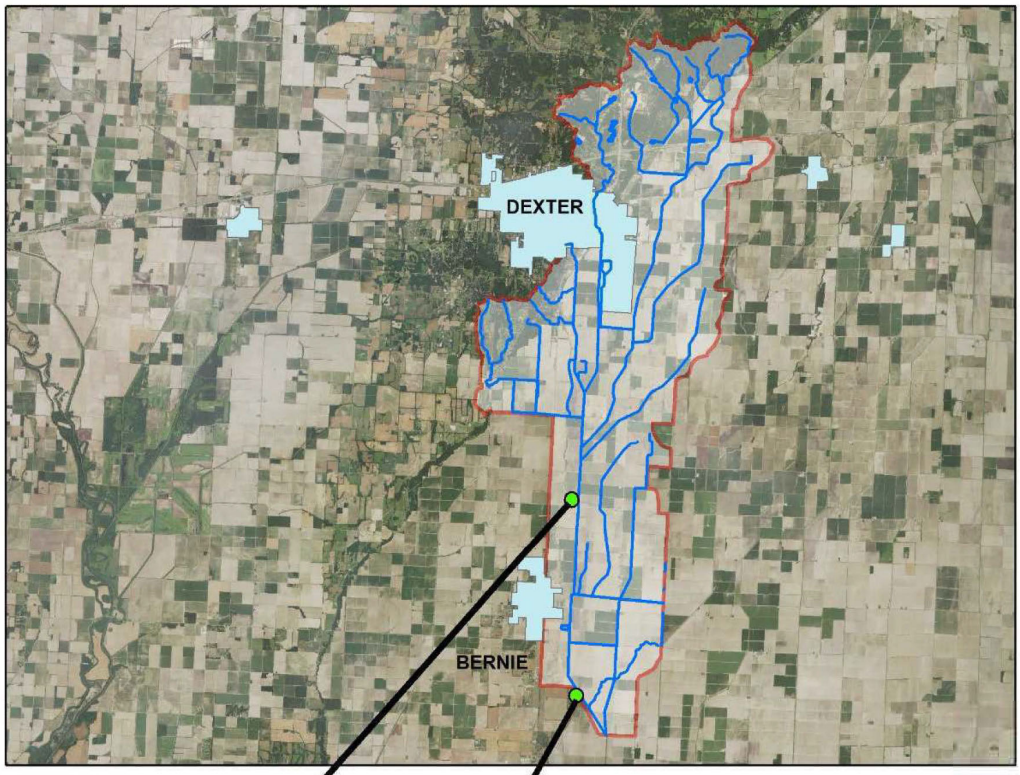
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United States Department of Agriculture

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Address 1 Address 2 City
Contact Name - First
Contact Name - Last
State Zip

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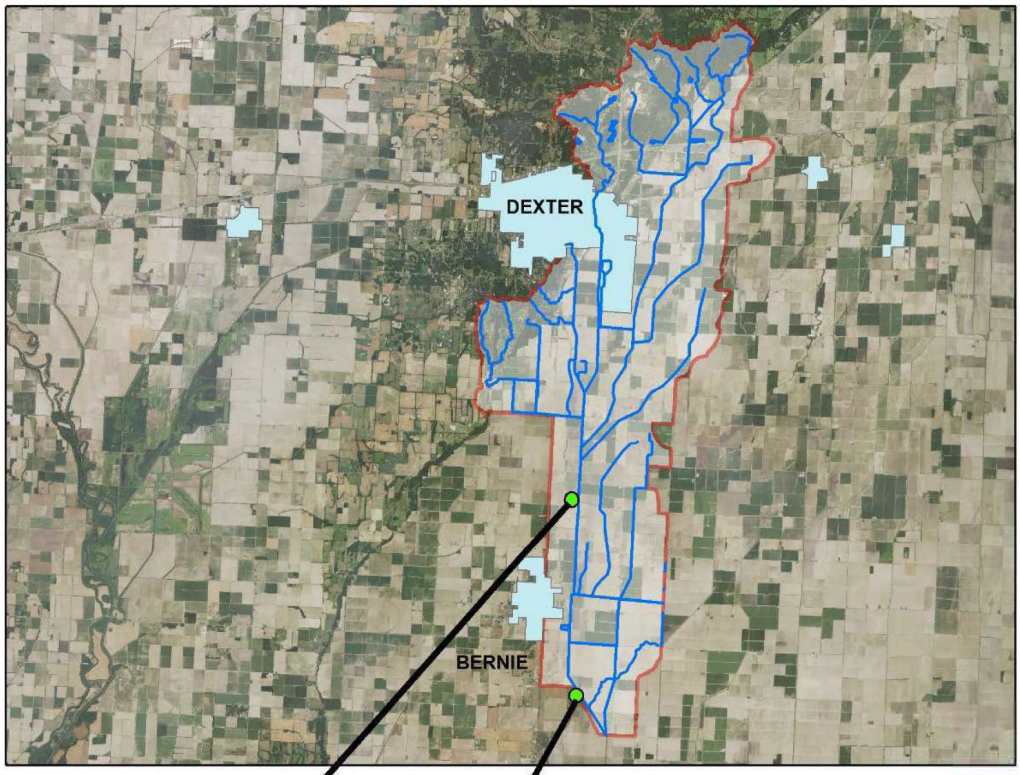
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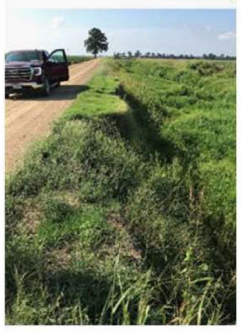
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Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles







0 125 250 Miles

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COLUMBIA, MISSOURI
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Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

July 15, 2024

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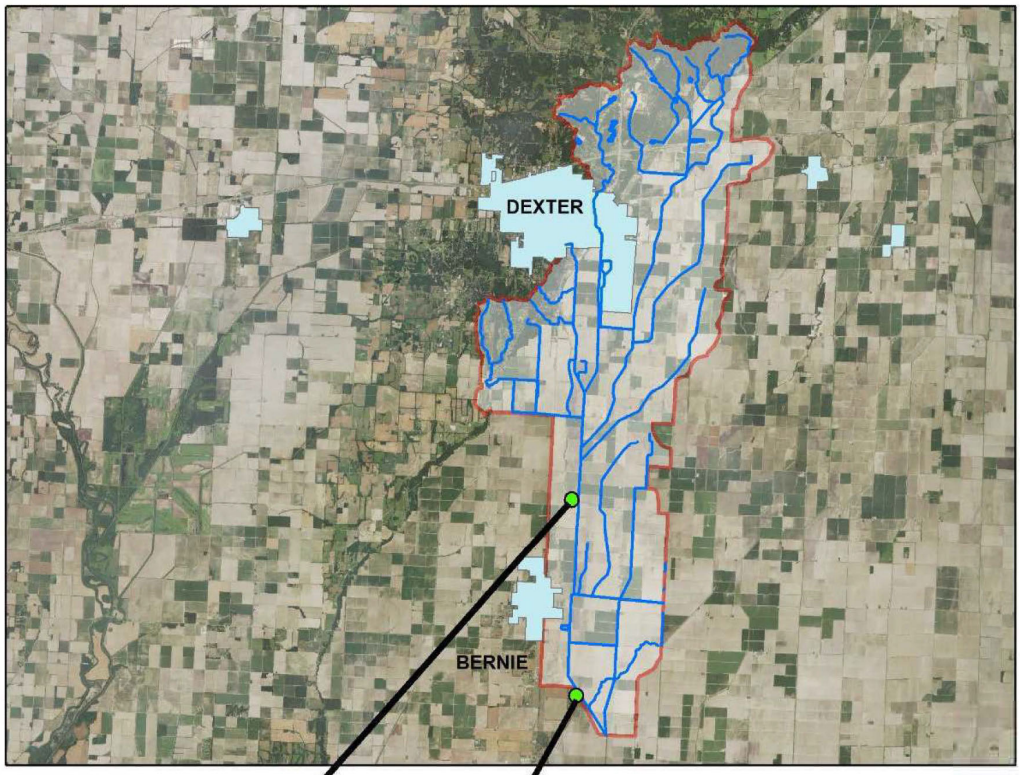
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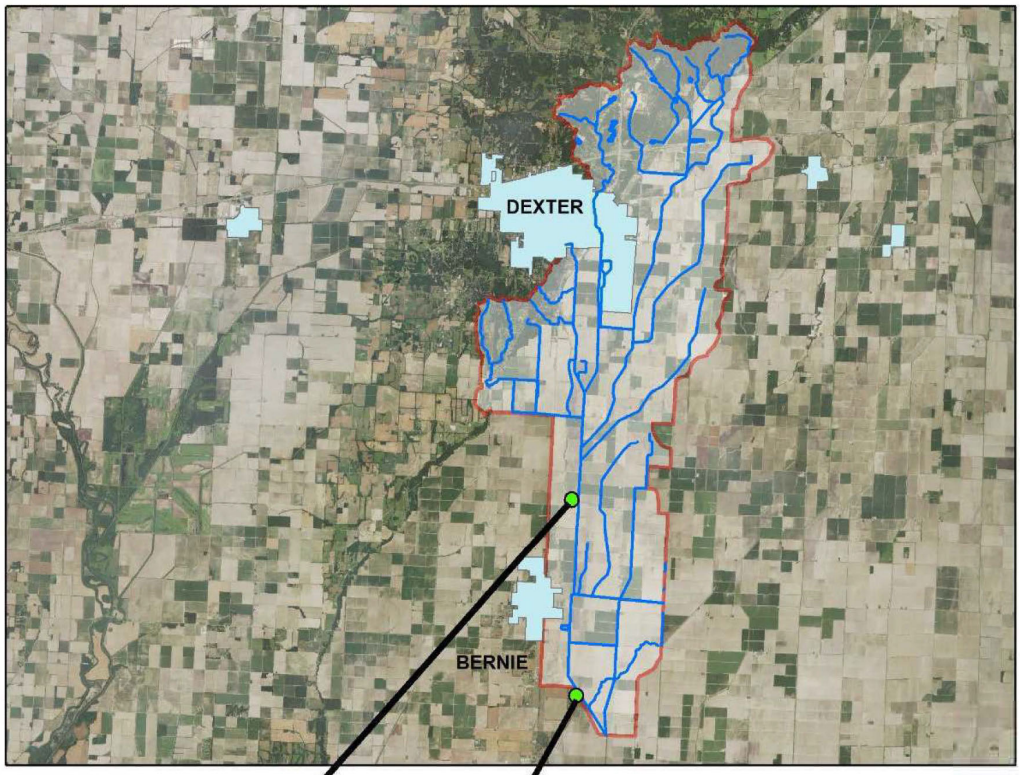
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Attached is a brief project overview. If you have an interest in the project, please submit a response in writing to Mr. Steven Hefner at the Butler County USDA Service Center, 4327 Highway 67 North, Poplar Bluff, MO 63901 or by email at steven.hefner@usda.gov. We look forward to your participation in this NRCS watershed planning effort.

Sincerely,

Chris Hamilton
Assistant State Conservationist for Water Resources and Easements

Attachment 1: Watershed Boundary Map

cc: Steven Hefner, Natural Resources Specialist, NRCS, Poplar Bluff, MO

Project Overview

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §4321 *et seq*.); the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508); and Environmental Policy and Procedures (7 CFR Part 1970), the NRCS, an agency of the USDA, is preparing a Watershed Plan – Environmental Document (Plan-ED) to evaluate the environmental, cultural, and socioeconomic effects associated with the proposed project.

As project sponsor, the Drainage District 37 of Southeast Missouri (DD37) proposes a Watershed and Flood Prevention Operations (PL 83-566) project to address agricultural water management in Stoddard County, Missouri. The Main Ditch Watershed is 31,774 acres which includes approximately 47 farms in the project watershed.

Located in Stoddard County, Missouri DD37 was organized in 1919 and manages drainage canals that were built in the early 1900s, transforming nearly inhabitable land into a productive agricultural region. The watershed infrastructure in this region is approximately 100 years old, is the life blood of the region, and permits the production of commodities. The sponsor proposes to take measures to ensure the vitality of aging infrastructure, thus providing benefits to downstream watersheds, and ensuring landscape scale resilience.

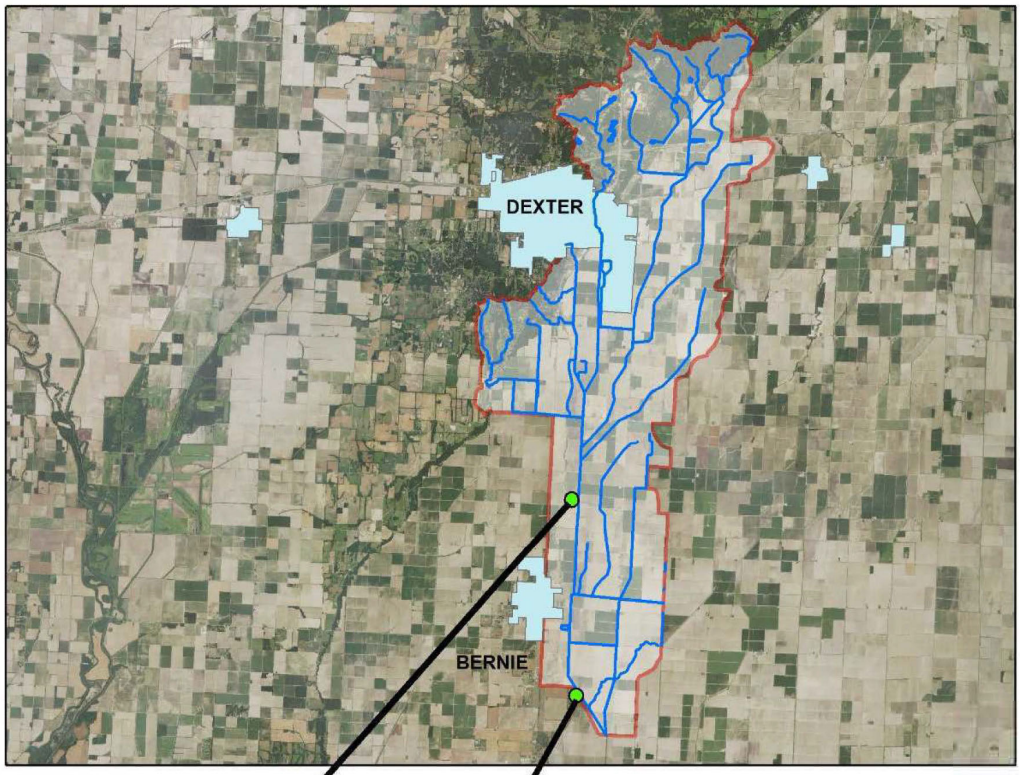
DD37's project proposal includes drainage canals from one HUC-12 watershed. The Main Ditch Watershed receives runoff in the headwaters from Crowley's Ridge and transfers it to the Little River Drainage District Floodway Canals. Eighty-eight percent (28,125 acres) of the project area has soils classified as Prime Farmland, Prime Farmland if drained, or Farmland of Statewide Importance. This watershed currently has a TMDL in place for sediment.

In this region, the economy is dependent upon agricultural crop production, which in turn is dependent upon adequate drainage. The main benefits of the project include a) reduced erosion from fields, b) enhanced protection of prime farmland lost from stream bank erosion, c) reduction in sediment introduced to waterways, d) improved risk management in agricultural production from timely planting and harvesting, e) improved growing conditions experienced by crops during the growing season from drainage, and f) increases in land values with better developed drainage. The main economic driver in the watershed is agricultural grain production. Land cover in the watershed is estimated at 72% cropland, 5% grassland, 11% forestland, and 9% urban or residential developed (USDA-NASS, 2022).

Attachment 1: Watershed Boundary Map

Main Ditch Watershed Project

Hydrologic Unit Code: 080202040502 31,744 acres



0 2.5 5 Miles





0 125 250 Miles

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
COLUMBIA, MISSOURI
JANUARY, 2023

USDA IS AN EQUAL OPPORTUNITY PROVIDER, EMPLOYER, AND LENDER

Preliminary Investigation Feasibility Report for a PL 83-566 Project for Potential Works of Improvement

United States Department of Agriculture

July 15, 2024

RE: Request for Stakeholder Participation, Main Ditch Watershed Project

To Whom It May Concern,

The Missouri Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), is developing a Watershed Plan – Environmental Document for the Main Ditch Watershed in Stoddard County, Missouri (see **Attachment 1** including potential areas where the work will be conducted).

As part of the National Environmental Policy Act (NEPA) process, the NRCS invites you to comment and/or participate as a stakeholder. Stakeholder meetings will be held on August 21st at 3:00 PM. Interested stakeholders can attend in person at the Stoddard County USDA Service Center 18450 Ridgeview Ln, Dexter, MO 63841to evaluate the environmental, cultural, and socioeconomic effects associated with a proposed action(s).

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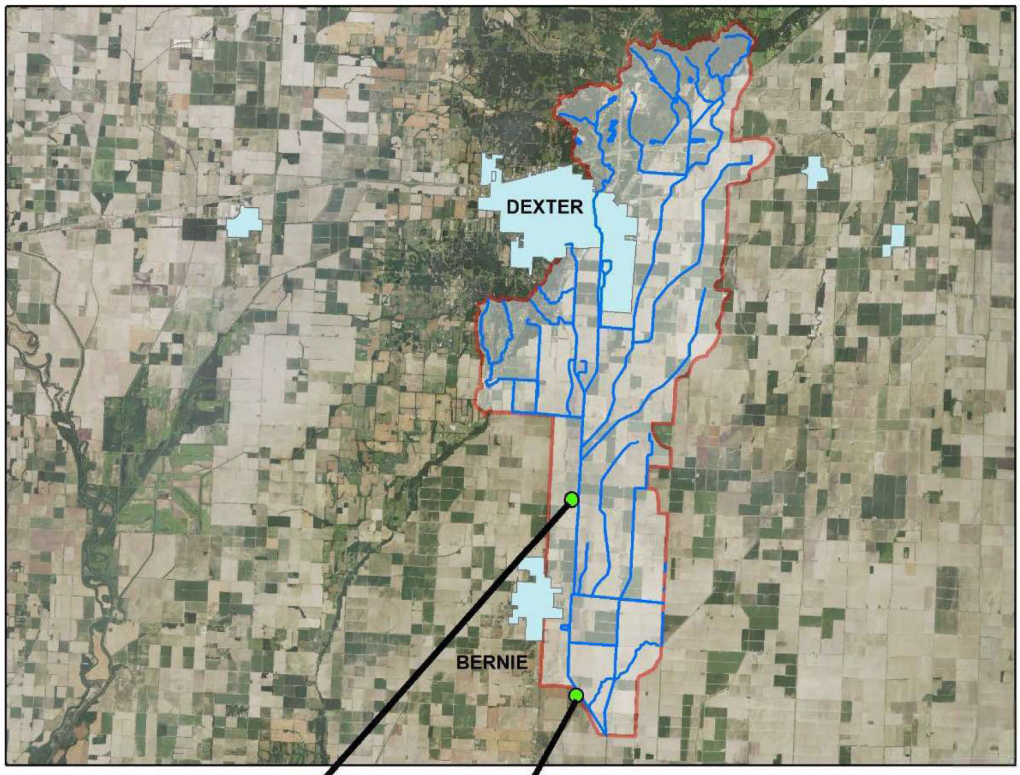
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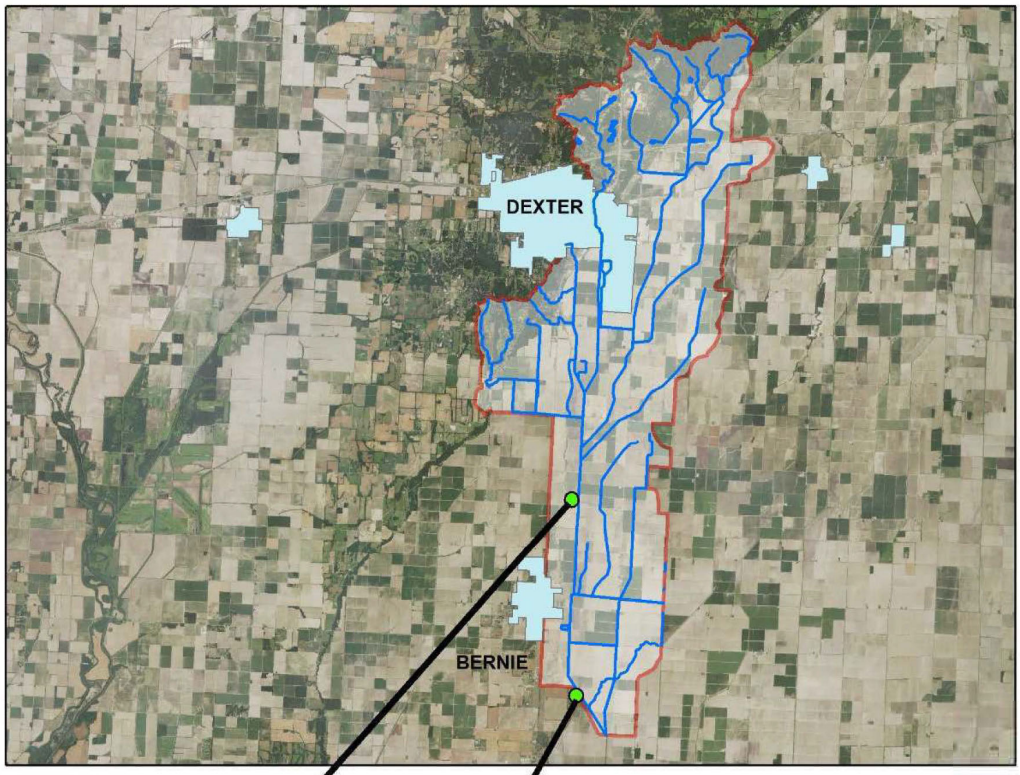
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Emai	Resp	Type	Agency Name	Title	Salutation	Contact N	Contact Nan	Address 1	Address 2	City	State	Zip	Email
		Tribal	Absentee-Shawnee Tribe of Indians of Oklahoma					2025 S. Gordon Cooper Drive		Shawnee	OK	74801	
		Tribal	Eastern Shawnee Tribe of Oklahoma					70500 E. 128 Road		Wyandotte	OK	74370	
		Tribal	Osage Nation					627 Grandview Avenue		Pawhuska	OK	74056	
		Tribal	Quapaw Tribe of Oklahoma					5681 S. 630 Road		Quapaw	OK	74363-0765	
		Tribal	Shawnee Tribe					29 S. Highway 69A		Miami	OK	74354	
		Federal	U.S. Army Corps of Engineers, Memphis District	Deputy Chief, Regulatory Division	Mr.	Roger S.	Allan						Roger.s.allan.@usace.army.mil
		Federal	U.S. Environmental Protection Agency	Region 7 Administrator	Ms.	Meg	McCollister	11201 Renner Boulevard		Lenexa	KS	66219	r7actionline@epa.gov
		Federal	Federal Emergency Management Agency	Region 7 Administrator	Ms.	Andrea	Spillars						FEMARegion7info@fema.dhs.gov
		Federal	U.S. Fish and Wildlife Service	Missouri Ecological Services Field Office				101 Park Deville Drive	Suite A	Columbia	MO	65203	
		Federal	U.S. Geological Survey	Central Midwest Water Science Center Director				1400 Independence Road		Rolla	MO	65401	
		Federal	U.S. Congress	Senate	Honorable	Josh	Hawley	555 Independence Street	#1600	Cape Girardeau	MO	63703	
		Federal	U.S. Congress	Senate	Honorable	Eric	Schmitt	111 S. 10th Street	Suite 23.305	St. Louis	MO	63102	
		Federal	U.S. Congress	House - 8th Congressional District	Honorable	Jason	Smith	2502 Tanner Drive	Suite 205	Cape Girardeau	MO	63703	
		State	USDA Rural Development	Area 4 Director	Mr.	Brent	Summers						brent.summers@usda.gov
		State	USDA Rural Development	State Director	Mr.	Kyle	Wilkens	601 Business Loop 70 West	Suite 235	Columbia	MO	65203	kyle.wilkens@usda.gov
		State	USDA Farm Service Agency	State Executive Director	Mr.	Joe	Aull	601 Business Loop 70 West	Suite 225	Columbia	MO	65203	joe.aull@usda.gov
		State	Missouri Farm Bureau	President	Mr.	Garrett	Hawkins			St. Clair County	MO		garrett.hawkins@mofb.com
		State	Missouri Department of Conservation - Southeast Regional Office					2302 County Park Drive		Cape Girardeau	MO	63701	SERegion@mdc.mo.gov
		State	Missouri Department of Conservation	Private Land Conservationist	Ms.	Kara	Tompkins	18450 Ridgeview Lane		Dexter	MO	63841	kara.mcspadden@mdc.mo.gov
		State	Missouri Department of Natural Resources- Water Protection Program	Division of Environmental Quality				PO Box 176		Jefferson City	MO	65102-0176	cleanwater@dnr.mo.gov
		State	Missouri Department of Natural Resources- State Historic Preservation Office	Missouri State Parks				PO Box 176		Jefferson City	MO	65102-0176	cleanwater@dnr.mo.gov
		State	Missouri State Senate	Senate District 25	Honorable	Jason	Bean	201 W. Capitol Avenue	Room 321	Jefferson City	MO	65101	
		State	Missouri State Representative	House District 151	Honorable	Herman	Morse	201 W. Capitol Avenue	Room 135	Jefferson City	MO	65101	Herman.Morse@house.mo.gov
		State	NRCS Missouri	State Conservationist	Mr.	Scott	Edwards	601 Business Loop 70 West	Suite 250	Columbia	MO	65203	scott.edwards@usda.gov
		State	NRCS Missouri	Assistant State Conservationist for Water Resources a	Mr.	Chris	Hamilton	601 Business Loop 70 West	Suite 250	Columbia	MO	65203	chris.hamilton@usda.gov
		State	Missouri State Emergency Management Agency	Emergency Coordinator (Stoddard County)	Mr.	Andrew	Bohnert	601 W Business 60		Dexter	MO	63841	
		State	Missouri State Floodplain Administrators	Floodplain Administrator (Stoddard County)	Mr.	Beau	Bishop	501 W. Business 60	PO Box 680	Dexter	MO	63841	
		State	Missouri Department of Agriculture					1616 Missouri Boulevard	PO Box 630	Jefferson City	MO	65102	
		State	Missouri Department of Transportation - Southeast District					2675 N. Main Street		Sikeston	MO	63801	
		State	Governor of Missouri	Governor	Honorable	Mike	Parson	PO Box 720		Jefferson City	MO	65102	
		County	Stoddard County Commission	Presiding Commissioner	Mr.	Greg	Mathis	PO Box 110		Bloomfield	MO	63825-0110	
		County	Stoddard County Soil and Water Conservation District	District Manager	Ms.	Janet	Johns	18450 Ridgeview Lane		Dexter	MO	63841	janet.johns@swcd.mo.gov
		City	City of Bernie	Mayor	Honorable	James	Tilmon	202 N Allen St	PO Box 605	Bernie	MO	63822	
		City	City of Dexter	Mayor	Honorable	Jason	Banken	301 E. Stoddard		Dexter	MO	63841	
		City	City of Dexter	City Administrator	Mr.	David	Wyman	301 E. Stoddard		Dexter	MO	63841	david.wyman@cityofdexter.org
		Local	Drainage District 37	President	Mr.	Tim	Mayberry	6282 CO RD 717		Dexter	MO	63841	tmayb6282@gmail.com

Landowners/Partners

Own	ATTN	Contact Name - First	Contact Name - Last	Address 1	Address 2	City	State	Zip