Draft Compatibility Determination

Title

Draft Compatibility Determination for Bicycling on

Mathews Brake National Wildlife Refuge

Refuge Use Category

Outdoor Recreation (General)

Refuge Use Type(s)

Bicycling (including electric-bikes)

Refuge

Mathews Brake National Wildlife Refuge

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

Mathews Brake National Wildlife Refuge (NWR) was established in 1980 pursuant to the Migratory Bird Conservation Act of 1929. Mathews Brake NWR was established for the following purpose:

- "…to contribute to the perpetuation of the migratory waterfowl resource in the lower Mississippi River Delta…".

The National Wildlife Refuge System (NWRS) Administration Act of 1966 as amended by the National Wildlife Refuge Improvement Act of 1997 (16 U.S.C. 668dd et seq.) provides authority for the United States Fish and Wildlife Service (USFWS; Service's) to manage Mathews Brake NWR and its wildlife populations. It directs Refuge Managers to increase recreational opportunities including hunting on National Wildlife Refuges when compatible with the purpose for which each refuge was established and the mission of the NWRS. In addition, it declares that compatible wildlife-dependent public uses are legitimate and appropriate uses of the NWRS and are to receive priority consideration in planning and management. There are six wildlife-dependent public uses: hunting, fishing, wildlife observation, wildlife photography, along with environmental education and interpretation.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System (Refuge System) is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife,and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

Yes

Use of traditional bicycles (hereafter bikes) and electric-bikes (e-bikes) to access hunting and fishing opportunities and non-wildlife dependent use is an existing associated use. Electric-bikes operated where the motor is not used exclusively to propel the rider (pedal assist mode) is currently authorized where traditional bikes are allowed.

A specific compatibility determination (CD) was never prepared, and this CD reevaluates portions of the January 30, 2006, CD for Mathews Brake NWR. The bicycling use has been primarily conducted on the Refuge as a mode of transportation that facilitates access for the priority public uses. The use is consistent with the February 10, 2006, Theodore Roosevelt National Wildlife Refuge Complex Comprehensive Conservation Plan (CCP) and associated Environmental Assessment (EA)/Environmental Impact Statement (EIS) and Finding of No Significant Impact (FONSI)/Record of Decision (ROD; February 10, 2006). A public meeting was held on November 6, 2003, to solicit input during the scoping phase of the CCP and specifically on the CD from November 3, 2005, to December 9, 2006. Written comments are included in the CD and acknowledge a lack of data on non-game species. All public comments were addressed during the process.

Bicycling is being reevaluated because consumptive and non-consumptive use has increased on Mathews Brake NWR over the past decade. Social media has beneficially promoted Refuge use and visitation, in addition to traditional outreach methods. Currently, the Theodore Roosevelt NWR Complex sells approximately 10,000 permits annually for hunting and fishing and issues a few special use permits for research. Capabilities of bicycles (especially e-bikes), user resourcefulness, and other factors have significantly changed on public lands There is also a mandatory reevaluation period of at least every 10 years for non-wildlife dependent recreation uses and every 15 years for wildlife-dependent recreation uses per Policy 603 FW 2.11 H. Bicycling on Yazoo NWR falls under both categories.

What is the use?

The use is bicycling (including e-bikes) which is defined as riding a bicycle on or off roads, paths, or trails. Electric-bikes are defined as low-speed electric bicycles that are “a two- or three-wheeled electric bicycle with fully operable pedals and an electric motor of not more than 750 watts (1 horsepower) that meets the requirements of one of the three classes defined by 50 CFR 27.31m”. Class 1 e-bikes are defined as “an electric bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour.” Class 2 e-bikes are defined as those “equipped with a motor that may be used exclusively to propel the bicycle and that is

not capable of providing assistance when the bicycle reaches the speed of 20 miles per hour." Class 3 e-bikes are those "equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour."

Is the use a priority public use?

No
Bicycling (including e-bikes) is not a priority public use, but it strongly supports Big 6 legislated priority wildlife-dependent public uses of the Refuge System such as hunting, fishing, and wildlife observation.

Where would the use be conducted?

Electric-bikes would be used, consistent with the 2006 Mathews Brake National Wildlife Refuge Comprehensive Conservation Plan (USFWS 2006), and the 2026 Theodore Roosevelt National Wildlife Refuge Complex Hunting and Fishing Draft Plan, to access hunting and fishing areas within the Refuge and allow for non-wildlife dependent activities. Bicycle (bike) use, including use of bikes and e-bikes is limited to maintained roads, trails, turnrows, fire lanes, power lines, pipelines, or levees/earthen dams/dikes. Bikes and e-bikes are prohibited on foot traffic–only trails and any area closed by posted signage or other information sources.

When would the use be conducted?

Refuge visitors would use bikes and e-bikes to access priority public use opportunities which would occur year-round.

Certain areas of some Refuges in the Theodore Roosevelt National Wildlife Refuge Complex may be closed to bicycling to limit disturbance to wildlife and to avoid hazardous conditions (e.g., deer muzzleloader/gun hunt closures, road closures, and waterfowl sanctuary closures). Season dates, hours, seasonal zone closures, and other regulations in the Theodore Roosevelt National Wildlife Refuge Complex Public Use Regulations Brochure and in the Theodore Roosevelt National Wildlife Refuge Complex Hunting and Fishing Draft Plan (USFWS 2026) are provided to protect natural resources and adverse impacts from bicycling.

How would the use be conducted?

Bicycling (including e-bikes) on the Refuge would be conducted in accordance with the stipulations necessary to ensure compatibility. Associated use of bikes and e-bikes would occur to facilitate priority public use. In recent years, the use of e-bikes has increased with consumptive users. Electric-bikes have become a popular alternative to ATV/UTV travel and access. Visitors provide their own equipment. All traditional bikes and e-bikes (in pedal-assist mode) must stay on maintained roads, trails, turnrows, fire lanes, power lines, pipelines, or levees/earthen dams/dikes.

Bikes and e-bikes are prohibited on foot traffic–only trails and any area closed by posted signage or other information sources. Bicycles are approved for use on Mathews Brake NWR year-round in accordance with other rules and regulations.

At the discretion of the Project Leader or designated staff, some areas may be seasonally, temporarily, or permanently closed to priority public use if wildlife impacts, habitat impacts, or user conflicts are documented.

A Special Use Permit would not be required for bicycling (including e-bikes). A Theodore Roosevelt NWR Complex Annual Public Use Permit would be required if participating in hunting or fishing activities.

Why is this use being proposed or reevaluated?

The mandatory 15-year reevaluation date for wildlife dependent use was June 12, 2021. Non-wildlife dependent use has also passed on Mathews Brake NWR. While use of bikes and e-bikes is an existing supporting use associated with hunting and fishing, it has not been analyzed in a standalone CD for Mathews Brake NWR. Policy 603 FW 2.11 H requires this reevaluation as well as the increase in activities and capabilities require an evaluation.

We have observed a growing number of conflicts associated with allowing bikes and e-bikes to travel off designated trails across our national wildlife refuges. Off-trail use increases the likelihood of resource damage, including rutting, soil disturbance, and vegetation impacts, as bikes and e-bikes are capable of traveling into soft or sensitive areas not designed for repeated traffic. Faster and farther travel ranges also increase disturbance to wildlife and create safety concerns and conflicts with other users engaged in priority wildlife-dependent recreation. These issues collectively undermine both habitat protection and the quality of visitor experience and reinforce the need for clearer limits on where bikes and e-bikes may operate.

Availability of Resources

To comply with the Refuge Recreation Act (Public Law 87-714), the Project Leader must determine whether sufficient resources—financial, staffing, facilities, or other infrastructure—are available to support the proposed use without materially interfering with the Refuge purpose(s) or the mission of the National Wildlife Refuge System. This determination should be informed by a review of current capacity and, where applicable, the Refuge's Comprehensive Conservation Plan (CCP).

Assessment of current resources and capacity

Bicycling (including e-bikes) is being reevaluated for use on Refuge lands. Administration of the hunting and fishing program on the Refuge is estimated to cost $13,082 per year. Staff time involving Refuge Managers to specifically administer bicycling (including e-bikes) is anticipated to be low with support from State conservation officers and USFWS officers providing law enforcement patrols. Refuge

volunteers have historically assisted with light maintenance of the roads and trials, but the Refuge does not have adequate staff or volunteers to maintain all the roads, parking areas, trails, levees/earthen dams/dikes, etc. Routine maintenance of roads, parking lots, and trails would be required, especially after flood events and storms. USFWS law enforcement patrols have been limited and need significant support for improvement. State conservation officer involvement could increase with a mutual agreement in place.

There is no direct fee associated with this use; however, hunting and fishing indirectly provides financial support for limited maintenance. Non-consumptive uses such as wildlife observation and non-commercial photography do not generate revenue. Funds are often needed to also address law enforcement and management due to bicycle (including e-bike) use. Biological surveys and public use data are lacking at Mathews Brake NWR.

Adequate resources, including financial, personnel, facilities, and other infrastructure, exist to allow bicycling (including e-bikes) in a way that would not materially interfere with or detract from the fulfillment of the Refuge's purposes and the Refuge System's mission.

Annual administration costs for the hunting and fishing program across the Complex, including salaries, equipment, law enforcement, brochures, data collection, and biological information analysis, total $663,074. A summary of the required and available resources is as follows:

One-time costs: Signage and outreach costs.

Annual/recurring expenses (that is, for annual operations and maintenance): The total annual cost of administering the hunting and fishing program on Mathews Brake NWR is $13,082.

Offsetting revenue: From 2017 through 2025, the Complex sold, on average, approximately 10,000 annual public use permits through the recreational fee program. These permits were sold in 2025 to each user age 16 years of age through 64 years of age for $25 each ($20 permit fee and a $5 processing fee). The permit is free for all youth 15 years of age or under and adults 65 years of age or older. This single permit, currently, provides consumptive use and access to eight NWRs (Mathews Brake, Hillside, Holt Collier, Mathews Brake, Morgan Brake, Panther Swamp, St. Catherine Creek, and Yazoo). These permits generate between $200,000 – $250,000 annually; however, the permitting platform ranges in cost from $75,000 - $100,000 annually.

Impacts of changes to resources and capacity

The availability of resources is subject to change and the level of use provided may

vary based on current staffing, partner support, funding, or infrastructure conditions. Costs may increase over time, in relation to changes in the costs for equipment, maintaining facilities, etc. A substantial increase to the number of requests may also create the need for additional resources to administer the use. The Project Leader would use sound professional judgment in evaluating whether the Refuge or its partners can develop, operate, and maintain the use in a compatible manner.

For other Refuge uses, if resource conditions shift such that the Refuge can no longer sustain the use in a compatible manner, the Project Leader may modify or suspend the use pursuant to 50 CFR 25.21 (or 50 CFR 36.42 for Alaska). The public would be notified of any changes to Refuge uses, including temporary modification or suspension, re-evaluation of compatibility and/or discontinuing of Refuge uses.

Anticipated Impacts of the Use

Potential impacts of a proposed use on the Refuge's purpose(s) and the Refuge System mission

The effects and impacts of the proposed use to Refuge resources, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use. This CD includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an “affected resource.

Natural resources would not be more than negligibly impacted by the action when managed under federal regulations and Refuge-specific regulations. Natural resources include habitat and vegetation, air and water quality, wildlife and fish, and public use. Additional impacts on terrestrial and amphibious wildlife, vegetation, soil, public safety, and visitor experience can occur from bicycling to access priority public use opportunities. Most studies involving the impacts of bicycling have focused on impacts to vegetation and soil. Bicycling to access priority public use opportunities may result in minimal disturbance to vegetation and soils through such mechanisms as trampling and compaction.

According to recreation ecology research, most forms of recreation have a disruptive and potentially harmful impact on wildlife (Wisdom et al. 2004; Nielsen et al. 2019; Miller et al. 2020). Some evidence suggests that motorized recreation has a higher impact (e.g., the distance at which motorized uses are found to cause disturbance is smaller compared to non-motorized recreation). Other research suggests that motorized recreation causes less disturbance because vehicles move through an area more quickly and their travel behavior is more predictable (they are more likely to stay on trail compared to non-motorized modes), with the result that wildlife may be more able to adjust to them; however, motorized users may also penetrate farther into more remote portions of the Refuge, thus distributing impacts over a larger area.

Research also suggests that non-motorized users have more frequent interactions

with wildlife than motorized uses, which could result in more impacts. Furthermore, exposure to long-term recreation activities (greater than one year) has a substantial impact on abundance, suggesting that repeated human disturbances can have a cumulative effect on wildlife.

Given that e-bikes are very similar to bikes in terms of noise, trail impact, and speed, it is reasonable to assume that their impact on wildlife and wildlife habitats would be similar to other non-motorized bicycles (see e.g., Wisdom et al. 2004). The available literature regarding the difference in impacts between e-bikes and traditional bicycles concludes there is no significant difference in impacts to wildlife between e-bikes and traditional bicycles (Nielsen et al. 2019). Studies looking at wildlife impacts from disturbance, particularly bicycle use, are inconsistent, mostly due to the varied nature of wildlife and the complex factors influencing behavior (Marion 2019). Further, literature analyzing variation in ecological impacts between the three classes of e-bikes is limited.

The effects of bicycling on wildlife are generally similar to those caused by hikers and other non-motorized trail users. These disturbances can lead to a range of ecological impacts, including reduced species richness and diversity, lower rates of occurrence, survival, or reproduction, and altered behaviors such as decreased foraging and increased vigilance. Such behavioral changes are often interpreted as negative responses to human presence. In addition, physiological stress responses—such as decreased weight and elevated stress hormone levels—have been associated with repeated disturbances (Nielsen et al. 2019).

Some e-bike users may be able to travel farther distances than those users otherwise could on traditional bicycles (MacArthur et al. 2014; Miller at al. 2020). As a result, it is possible that wildlife in more remote portions of the Refuge could be impacted to a greater extent than if limited only to traditional bicycles.

When evaluating the use of e-bikes, evidence suggests that the impacts of e-bikes (e.g., erosion, noise pollution, effects on wildlife) are no different from traditional bikes (Nielsen et al. 2019); however, e-bikes have the ability to carry riders faster and farther and allow riders to carry more gear. One potential impact of e-bikes is their ability to travel at speeds from 20 to 28 miles per hour with little effort and the potential for serious injury to riders (class 3 e-bikes). Some novice users may not be able to adequately control these heavier bicycles and thus may be prone to accidents. Also at higher speeds, e-bike users may encounter wildlife that would not have the ability to flee from the area, resulting in collisions between e-bike users and wildlife. As is the case with traditional bicycles, impacts to wildlife from e-bike use would be localized.

Overall, e-bikes have raised safety concerns among some users and land managers due in part to their high-speed capabilities. Possible issues could include increases in collisions and injury rates due to e-bikes sharing trails with pedestrians or other users, as well as increased severity of injuries (Congressional Research Service 2023).

Although research comparing Class 1, 2, and 3 e-bikes is limited, some studies have explored potential safety differences among these classifications. One literature review found that "crash risk is similar between Class 3 and Class 1 e-bikes; however, injury severity tends to be higher among Class 3 e-bikers" (FHWA 2022). The study noted the higher speed of class 3 e-bikes results in slightly higher conflict rates and safety-oriented maneuvers. Class 3 e-bikes travel substantially faster than traditional bicycles, about twice the speed on average. Class 1 e-bike riders travel only marginally faster than conventional bicycles (3.0 km/hr) and their speed results in slightly higher conflict rates and safety-oriented maneuvers. However, the review identified no definitive answer regarding whether e-bikes are more or less safe than traditional bicycling, and under which circumstances.

Conflicts among user groups exist but may be reduced through further guidance and regulations outlined in this CD. As with other uses, law enforcement and other staff would monitor visitor use and Refuge lands for these impacts. Any issues would be addressed with visitor contact and education.

The use of e-bikes to access priority public use opportunities can offer positive outcomes for mobility impaired users and can promote accessibility and inclusion.

Bicycling is permitted on maintained roads, trails, turnrows, fire lanes, power lines, pipelines, levees, earthen dams, dikes, and designated ATV/UTV trails within Mathews Brake NWR. Electric bicycles (e-bikes) are defined as two- or three-wheeled bicycles equipped with fully operable pedals and an electric motor of not more than 750 watts (1 horsepower). Electric-bikes operated in pedal-assist mode are allowed in all areas where traditional bicycles are permitted. Any person operating an e-bike in a manner where the motor is not used exclusively to propel the rider for an extended period of time shall be afforded the same rights and privileges as traditional bicycle users, including access to priority public use opportunities on the Refuge. All e-bike use must comply with applicable federal and refuge-specific regulations.

Short-term impacts

In summary, impacts on terrestrial wildlife, vegetation, soil, public safety, and visitor experience can occur from bicycling to access priority public use opportunities. These impacts associated with supporting uses would be temporary, seasonal, and localized, occurring directly in or adjacent to the areas where priority uses would take place.

Long-term impacts

There are no other past, present, or reasonably foreseeable future actions expected from bicycling to access hunting and fishing opportunities and other approved outdoor activities on Mathews Brake NWR, given the stipulations below, current and expected future levels of use. As noted above, available literature concludes there is no significant difference in impacts to wildlife between bikes and e-bikes (Nielsen et al. 2019). Studies have found that after initial impacts to vegetation and soils,

subsequent use does impact trails more, and impacts of bicyclists tend to be the same as hikers. With the use anticipated to be sporadic and dispersed and by individuals and small groups, such effects as habituation, avoidance, and resulting decreased fitness of individuals are not expected to adversely impact wildlife populations. The program can be modified or eliminated to minimize any adverse impacts observed.

Public Review and Comment

The draft compatibility determination would be available for public review and comment for 14 calendar days from May 28, 2026, to June 11, 2026. The State of Mississippi has been asked directly to review and comment on the draft compatibility determination. A hard copy of this document would be posted and made available at the Panther Swamp NWR office/Theodore Roosevelt NWR Complex Headquarters located at 12595 MS Highway 149, Yazoo City, MS 39194. Copies would be made available electronically on the Refuge website at https://www.fws.gov/refuge/theodore-roosevelt-complex-headquarters-panther-swamp and Facebook page. Please let us know if you need the documents in an alternative format. Concerns expressed during the public comment period would be addressed in the final determination.

All comments received from individuals become part of the official public record. The Service would handle all requests for such comments in accordance with the Freedom of Information Act and the Council on Environmental Quality's National Environmental Policy Act regulations in 40 CFR 1506.6(f). The Service's practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that the Service withhold their home address from the record, which the Service would honor to the extent allowable by law. If you wish for the Service to withhold your name, address, or both, you must state this prominently at the beginning of your comments.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

Bicycling can be compatible with the following stipulations.

1. Bikes and e-bikes would be permitted on maintained roads, approved trails, turnrows, fire lanes, power lines, pipelines, and levees/earthen dams/dikes.
2. Electric-bikes must remain in pedal-assist mode.

3. Temporary closures of sensitive and other areas as determined by the Refuge Manager in coordination with the Project Leader may occur. Refuge staff would periodically review water levels, post information and signage as necessary, and monitor conditions.

4. Bicycles or associated equipment left more than 72 hours would be considered abandoned and removed. Refuge staff and USFWS officers would work collaboratively to address abandoned property.
5. Harassment of wildlife is prohibited.
6. If this use results in unacceptable levels of disturbance to foraging birds and other resident wildlife, or habitat, or any adverse impacts occur from any aspect of this use, then further restrictions may be imposed to protect the plant and animal resources on the Complex.
7. Individuals using bicycles to support hunting or fishing would follow all Refuge regulations and would possess a valid Annual Theodore Roosevelt National Wildlife Refuge Complex Public Use Permit. The permit is required for all hunting and fishing activities on the Refuge.
8. Bicycle races or other organized group events are not allowed.
9. Permitted trails are those that avoid wetland edges and nesting areas. The refuge would take further measures to protect select species during sensitive breeding periods as necessary.
10. Project Leader may alter permitted biking trails in response to conflicts with visitor use patterns as needed to connect all members of the public with the outdoors.

Justification

Bicycling provides a means of transportation and participation in Refuge priority public uses such as hunting and fishing. Refuge management, research, photography, and other uses may require bikes to aid in accomplishing objectives. Wildlife may or may not always be involved in all activities such as photography and water quality management. Regardless of the purpose, bicycling is an important tool used by thousands of annual visitors, universities and colleges, and Refuge staff.

The stipulations outlined above would help ensure that the use is compatible at Mathews Brake NWR. Bicycling as outlined in this compatibility determination, would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the Refuge. Based on available science and best professional judgement, the Service has determined that bicycling at Mathews Brake NWR, in accordance with the stipulations provided here, would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the Refuge. Rather, appropriate and compatible bicycling would be the use of the Mathews Brake NWR through which the public can develop an appreciation for

wildlife and wild lands.

Signature of Determination

Project Leader Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

2036

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