



Bear Island WMA

Wetlands Management Review





▲ Pictured (left to right): Stephen Rockwood, Bill Mace, David Richard, Daniel Barrineau, Alicia Farrell, Molly Kneece, Jennifer Howard

Acknowledgements

The insights and observations in this review were made possible by the spirit of collaboration between the South Carolina Department of Natural Resources (SCDNR) Bear Island Wildlife Management Area (WMA) waterfowl and wetland management leadership, Biologist Daniel Barrineau, Regional Coordinator Alicia Farrell, and Statewide Waterfowl Project Leader Molly Kneece; the wetland review team of Bill Mace, David Richard, and Stephen Rockwood; and third-party facilitator, Jennifer Howard. The review team commends SCDNR leadership for embracing an external review process in the spirit of furthering the application of sound science in the responsible management of the state’s resources.

The review team commends the local land management staff for their innovation and flexibility in addressing a constantly changing set of variables that are inevitable in a natural environment. Staff demonstrated an ability to be responsive and proactive in implementing management regimes that reflect current conditions and a commitment to maintaining or improving infrastructure.

The management goal for Bear Island WMA is to maintain and enhance the integrity of the natural resources of the area while optimizing public recreational and educational opportunities.



Wetland Review Team

Stephen V. Rockwood Biologist Ducks Unlimited

Though formally retired, Stephen V. Rockwood works as a wetlands biologist for Ducks Unlimited (DU) in Austin, Texas. Rockwood assists the Texas Conservation staff with water policy issues, land conservation, and habitat/restoration management on a part-time basis.



Prior to working for DU, Rockwood spent 32 years working for the Florida Fish and Wildlife Conservation Commission (FWC). During that time, he managed coastal, brackish, and freshwater impoundments for waterfowl and other wetland dependent species and developed FWC's first and only public waterfowl management area in the upper basin of the St. Johns River in southeast Florida. Rockwood is experienced with the establishment and management of moist-soil impoundments and flood storage reservoirs.

In 2004, he then served as the agency's wetland habitat specialist and was responsible for administering and coordinating wetland management activities throughout the state, providing technical assistance to private landowners and other public and private entities and serving as the state's representative on the Atlantic Coast Joint Venture, the Atlantic Flyway Technical Section, the Southeast Aquatic Resources Partnership, and the USDA Wetlands Reserve Program, among others.

Rockwood spent the last six years of his FWC career serving as Bureau Chief of the Aquatic Habitat Conservation and Restoration Program. This program was responsible for the restoration and management of Florida's public aquatic resources, including freshwater resources, bay and estuaries and select marine systems such as coral reefs.

Rockwood has served in leadership roles for The Wildlife Society (TWS) and the Florida Chapter of The Wildlife Society, and chaired numerous technical committees including the Atlantic Coast Joint Venture, the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) Wetlands Wildlife Committee and the Atlantic Flyway Environmental Issues Committee.

David Richard
Executive Vice President
Stream Property Management

David Richard has more than 45 years of professional experience with land management responsibilities throughout Louisiana and Texas. His extensive knowledge of southwest Louisiana has been utilized by commercial and corporate clients and numerous local, state, and federal agencies. He has provided a variety of wetland restoration, land management, mitigation services and landowner representation, and has consulted on wetland management activities at basin management levels including wetlands in Texas, South Carolina, Alabama, the Canadian Prairie and the Arctic.



Richard currently serves as executive vice president with Stream Wetland Services (SWS) in Lake Charles, Louisiana, and is responsible for the management of more than 150,000 acres of diverse upland and wetland types and locations. Specifically, he plans and implements wetland and wildlife enhancement, restoration and mitigation programs. Additionally, he has been utilized by numerous clients for invasive species management, long-term land management and beneficial use of dredge material monitoring and management.

Prior to joining SWS, Richard served as a biologist for 15 years on Rockefeller Wildlife Refuge for the Louisiana Department of Wildlife and Fisheries.

Bill Mace
Manager
Annandale Plantation

Bill Mace brought local perspective to Bear Island WMA wetlands review team. He has 46 years of waterfowl management experience working in the Santee Delta of Georgetown County and serves on the SCDNR Waterfowl Advisory Committee. For the last 12 years, Mace has been the manager at Annandale Plantation in the Santee Delta. Annandale Plantation is 3,500 acres with 1,800 acres of managed wetlands. The wetlands are



managed in a brackish/fresh state with widgeon grass being the primary food source. Annandale also manages 30 acres of plant and flood impoundments for waterfowl. With timber, quail, dove and other upland operations, Annandale Plantation is a multi-faceted wildlife management property under Mace's guidance.

Prior to Annandale, Mace spent 34 years with SCDNR managing brackish water impoundments and uplands at the Santee Coastal Reserve while it was privately hunted by the Santee Gun Club and after SCDNR acquired the property. Mace was instrumental in assisting with the set up and implementation of the first public lottery waterfowl hunts on the Cape, Cedar Island and Murphy Island, all of which comprise Santee Coastal Reserve. He is sought after for his practical expertise in restoring and managing impoundments and constructing of historic rice trunks. His clients for construction of historic rice trunks include state agencies, private landowners, and the U.S. Fish and Wildlife Service .

Jennifer Howard
Conservation Communications
Consultant
Terra Communications



Steward Terra's name - to care for and earth - embodies the mission of assisting natural resource and conservation professionals tell their stories in deliberate and impactful ways. Howard is committed to helping organizations succeed by leveraging meaningful words and supporting visuals through strategic communications planning and implementation, media relations, and meeting/small group facilitation. Steward Terra's current and previous client list includes local land trusts such as Open Land Trust (Beaufort, SC) and Pee Dee Land Trust and large conservation leaders such as The Nature Conservancy, Audubon South Carolina, American Battlefield Trust, and The Longleaf Alliance. She also serves as the first paid executive director of the South Carolina Land Trust Network. Clients value her ability to distill technical information and her sensitivity to navigating competing or complex interests.

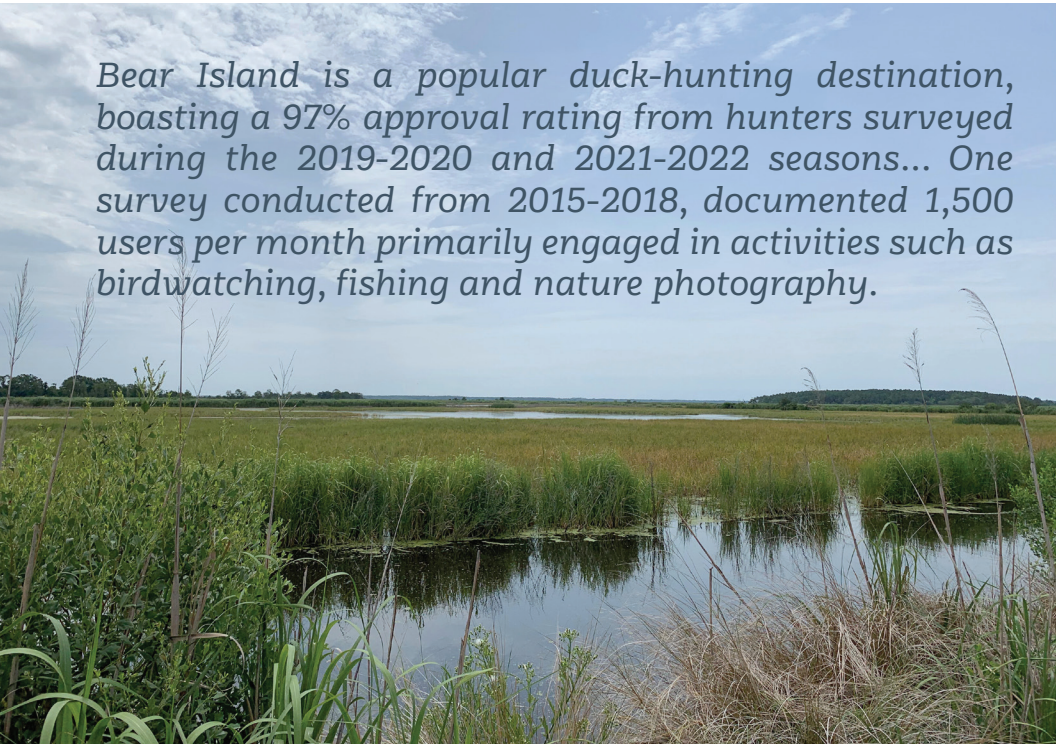
Prior to founding Steward Terra, Howard worked for more than 20 years in the forest products industry: International Paper, Westvaco, MWV, WestRock; as a wood procurement forester, public affairs forester, and director of marketing and communications for the company's land management division.

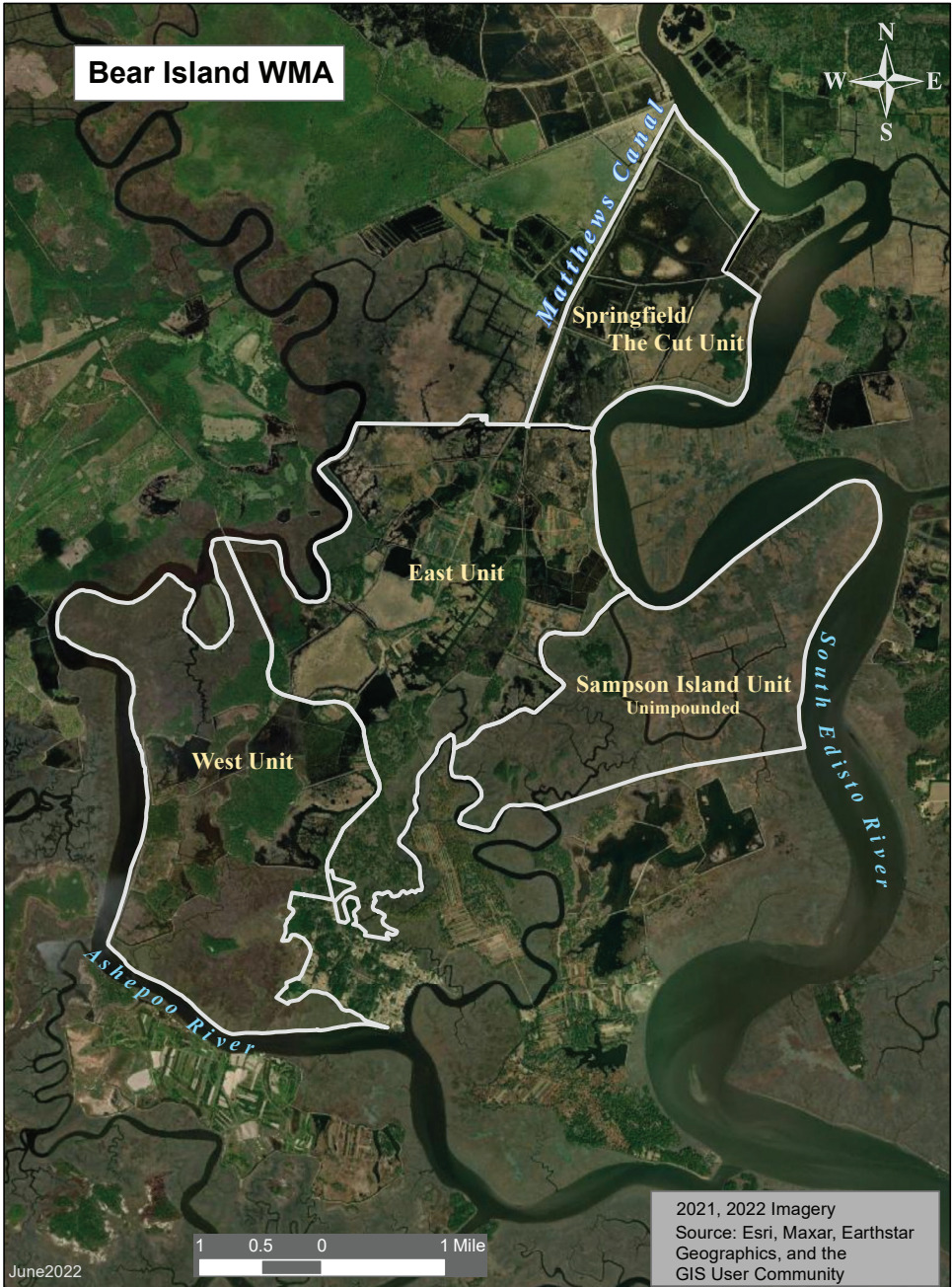
Property Overview

Bear Island WMA is an ecological gem, located in the heart of the Ashepoo, Combahee and Edisto Rivers (ACE) Basin, one of the largest undeveloped estuaries on the Atlantic Coast. The property consists of 12,021 contiguous acres bounded by the South Edisto River to the east and the Ashepoo River to the west. The property is a complex of interconnected managed brackish and freshwater marsh wetlands, along with tidal marshes that provide valuable wintering and migration habitat for waterfowl. Upland forest and agriculture fields account for less than 2,000 acres.

Bear Island is a popular duck-hunting destination, boasting a 97% approval rating from hunters surveyed during the 2019-2020 and 2021-2022 seasons. Lottery hunts are conducted on the property multiple days per week and provide opportunities for approximately 340 duck hunters throughout the waterfowl hunting season. White-tailed deer and small game are hunted during specified seasons in designated areas. Additionally, Bear Island WMA's proximity to the urban centers of Beaufort, Bluffton and Hilton Head make it a favorite among recreational birders and nature photographers. One survey conducted from 2015-2018, documented 1,500 users per month primarily engaged in activities such as birdwatching, fishing and nature photography.

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▲ By the numbers

Managed wetlands: 4,844 acres in 33 impoundments

Tidal marshes: 5,315 acres

Dikes: 55 miles

Water control structures: 65

Many plants beneficial for waterfowl forage are found at Bear Island WMA. The freshwater impoundments are proliferated with Panic grass, Carolina Redroot, Smartweeds, and many species of wild millets. Widgeon grass, Sea Purslane, and Dwarf Spikerush are abundant in the brackish impoundments.



▼ Carolina Redroot ►

- Dwarf spikerush
- Flat sedges
- Giant foxtail millet
- Panic grasses
- Carolina Redroot
- Saltmarsh Bullrush
- Sea Purslane
- Smartweeds
- Sprangletop
- Walter's Millet
- Widgeon grass



▼ Smartweeds



▼ Widgeon grass



Project Overview

In June 2022, SCDNR engaged a third-party facilitator and a team of three external wetland experts from public and private sectors across the South to conduct a thorough review of the impoundment management practices on Bear Island WMA. The team was tasked with evaluating the following six areas:

1. Evaluate the existing management plan for gaps or misplaced goals
2. Evaluate infrastructure (dike, water control structures)
3. Evaluate current water management and habitat manipulation (burning, mechanical and chemical practices) for intended food composition
4. Evaluate the potential for agricultural crops vs. natural food sources
5. Evaluate waterfowl disturbance issues
6. Evaluate efforts to control invasive and undesirable species



During one web-based teleconference and a two-day onsite classroom session and field tour, the team reviewed and discussed all aspects of Bear Island WMA’s wetland management program and documentation including:

- WMA Management Plan
- Maps
- Detailed management accomplishments
- Equipment and staffing
- Budget
- Waterfowl harvest data

Key Takeaways

Personnel

Local, regional and state leadership demonstrated an in-depth knowledge of the science of habitat management, an ability to be objective and adaptive problem solvers and an understanding of the value of strong working relationships with adjoining property owners. The review team observed an environment that embraced innovation, including actively documenting and addressing habitat needs for the endangered black rail (*Laterallus jamaicensis*), and incorporating impoundment water level management for shorebirds in the off-season. At the time of the review, Bear Island WMA is fully staffed with the exception of one full-time equipment operator position that is currently posted.



The quality and diversity of fresh and brackish wetlands at Bear Island WMA is a direct result of good land-management decisions.

OPPORTUNITY: The quality and diversity of fresh and brackish wetlands at Bear Island WMA is a direct result of good land-management decisions. This includes a thorough knowledge of the effects of timing and duration of water level manipulations, salinities, soil disturbance and vegetation management. Daniel Barrineau, unit biologist for Bear Island WMA and three additional coastal WMAs, holds 10 years of experience relating directly to the management of waterfowl habitat, four years in the agency’s Marine division and an internship at neighboring Nemours Wildlife Foundation. His experience in both the theoretical and applied understanding of wetland management gained onsite at Bear Island WMA contributes significantly to habitat success. Presently, there is not a plan for knowledge transfer or training of a junior staff member to learn the intricacies of wetland management at Bear Island WMA. Staff and leadership are encouraged to develop and implement a succession plan and take advantage of mentorship opportunities to ensure good management at Bear Island WMA continues.

In the meantime, onsite managers are encouraged to develop a documented baseline data set by quantifying habitat observations: conducting plant inventories, tracking and evaluating changes; and quantifying water observations: documenting water depths, salinities and rainfall on a regular

basis. The baseline will serve a valuable role in prioritizing future work and should also capture use data across suites of game and non-game species. A measurement of hunt success alone neglects to acknowledge the benefits that this habitat management brings to a variety of wildlife species, native plants and species that represent the base of the food chain.

Infrastructure

Bear Island WMA's infrastructure is in remarkable condition. Road and dike systems are well-maintained, and the property is free of litter. Water control structures are functioning and specifically designed to allow for the repair of portions of the structures without requiring complete replacement, when possible. However, the infrastructure remains vulnerable due to variables out of staff control, such as tidal and storm impacts and general weathering of materials.

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Staff and the review team agree that Matthews Canal is problematic. It facilitates access from the South Edisto River to the adjoining managed wetlands, exacerbating the disturbance of ducks during the hunting season. Additionally, tidal and river flows impact the integrity of infrastructure along Matthews Canal by exacerbating erosion. Ducks harvested by public hunters from boats in Matthews Canal are often not able to be retrieved without trespassing on adjoining private property or illegally entering the WMA, causing unsafe conditions and impacting hunt quality for others. Though the issues of disturbance and erosion will require separate solutions, all





solutions will take significant investment (both political and budgetary) by the agency.

Staff noted an opportunity to improve the management of the Mosquito impoundment by subdividing. A subdivision would create more uniform water levels across the impoundment and allow for more precise water management thereby improving growing conditions for desirable plant species. Additionally, the ability to manage water in Sara and Lower Hog impoundments could be improved by cleaning out the inlet canals to the Ashepoo River.

Lastly, the review team noted the positive impact of the U.S. Army Corps of Engineers Managed Tidal Impoundment General Permit that helps expedite infrastructure repairs and commends SCDNR and local partners for their proactive efforts to ensure the general permit is renewed.

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OPPORTUNITY: Water control structures are a critical tool in managing water to promote desirable plant species such as widgeon grass (*Ruppia maritima*) and Carolina redroot (*Lachnanthes caroliana*). They currently are constructed of treated wood and have a lifespan of 15-25 years. Staff and SCDNR leadership are encouraged to continue exploring alternative water control structure materials and installation methods that will extend the longevity of trunks and spillway boxes.



Matthews Canal will continue to pose challenges until a solution is found. Potential solutions will need to incorporate the perspectives of numerous stakeholders, including the adjoining private property owners and public hunters who use the canal. One potential solution could be to install a structure near the mouth of the canal to prevent erosion, prevent disturbance adjacent to hunted impoundments and increase ability to control water levels and salinities. The review team and local staff advise this opportunity may be best explored by the recently established Waterfowl Advisory Committee.

Disturbance

Bear Island WMA is particularly vulnerable to the impacts of waterfowl disturbance in two areas: Matthews Canal and the South Edisto River. The WMA is located directly west across the river from the ACE Basin National Wildlife Refuge (NWR) where hunting is not allowed. Staff report that waterfowl roost on the NWR and return to Bear Island WMA to forage. The public water separating the two areas creates intense pressure and disrupts waterfowl use of the WMA. As stated previously, hunting from Matthews Canal has created a situation with birds killed or crippled falling on WMA property or on private lands that cannot be legally retrieved. Public duck hunting in these two areas occurs every day during the waterfowl season and creates a significant disturbance in adjacent impoundments on Bear Island WMA, limiting duck use in these impoundments.

OPPORTUNITY: This type of hunting and disturbance is a regulatory issue that should be handled by SCDNR with corroboration of the legislature.



Funding

Staff reports adequate funding with minimal staffing and equipment needs. SCDNR and partners have been proactive in securing substantial grants from The North American Wetlands Conservation Act (NAWCA) to allow for major infrastructure improvements, including the replacement of water control structures, retopping of dikes and the installation of new structures to facilitate better water movement. It bears noting that the revenue supporting the operation of Bear Island WMA is derived primarily from hunter-funded sources. Non-consumptive users are significantly larger in number and are not required to purchase a permit for entry.

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OPPORTUNITY: Funding opportunities with NAWCA and National Oceanic and Atmospheric Administration (NOAA) would provide funding for maintenance and potentially new projects. Identifying, applying for and securing these grants should continue to be a priority. Additionally, the review team noted the need to maintain state funding to support the management plan and one-time purchases including equipment such as a Marsh Master with attachments; an amphibious, long-reach excavator



and a tractor-mounted ditcher. As the population of the state continues to grow, WMAs will experience additional pressure from a variety of users. SCDNR is encouraged to explore implementing a fee for non-hunting users, similar to programs in other states.

Plants

The review team noted that the hydrology and soils across significant portions of Bear Island are best suited for moist soil management. SCDNR staff is commended for continuing to explore planted crops along edges or within impoundments with suitable growing conditions. It was noted that it is just as important to have available food sources at the end of the season as it is in the beginning of the season for waterfowl to use so that they can successfully make the migration back to the breeding grounds. This is likely to be successfully accomplished by managing for beneficial native moist soil plant species.

Invasive plants can germinate in a variety of environments, produce abundant seed that is resilient over time, grow rapidly and have few natural predators. Invasives often outcompete the desired native vegetation, negatively impacting the wildlife species such as waterfowl that rely on native plants for forage.





▲ Cattail



▼ Chinese Tallow Tree ▲



The review team noted effective, proactive steps to begin the eradication of Chinese tallow (*Triadica sebifera*). Limited occurrences of giant cutgrass, locally referred to as white marsh (*Zizaniopsis miliacea*) were observed. Cattail (*Typha spp.*), while not considered invasive, outcompetes more desirable native vegetation.

WMA staff is encouraged to maintain vigilance in the treatment of Chinese tallow and phragmites, and proactively monitor for invasive plants that plague other sites in South Carolina and across the Southeast...

OPPORTUNITY: WMA staff is encouraged to maintain vigilance in the treatment of Chinese tallow and phragmites, and proactively monitor for invasive plants that plague other sites in South Carolina and across the Southeast such as giant salvinia (*Salvinia molesta*). The opportunistic use of high-salinity water to control invasives, such as cattail, should be continued, and infrastructure changes that may enhance the opportunity should be pursued. Desirable and undesirable plants in a disturbed state can continue to provide productive waterfowl habitat through the abundance of invertebrates on dying vegetation.

Bear Island WMA is led by innovative professionals and currently has funding for the equipment and staffing necessary to maintain quality habitats.



Conclusion

Bear Island WMA is led by innovative professionals and currently has funding for the equipment and staffing necessary to maintain quality habitats. Adaptive management practices are well used on the property. The wetland review team encourages SCDNR leadership to work in partnership with the Waterfowl Advisory Committee, hydrologists, engineers, and neighboring property owners to explore solutions needed as outlined in this report. Regulatory and other solutions may be needed to eliminate willful and wanton waste of waterfowl exacerbated by the proximity to the river and the access via Matthews Canal.





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