J. Morgan Futch

Game Land Management Plan

2016 – 2026

North Carolina Wildlife Resources Commission Game Lands (NCWRC) An Overview

NC WILDLIFE'S CROWN JEWELS

North Carolina's game land system is based on science-driven management practices and is an exceptional asset for the people of the State of North Carolina. The 2 million acres of NCWRC owned and managed land create HIGH Ecosystem value in flood protection with positive effects on property values and air and water quality, while helping to prevent additional restrictive environmental regulations.

The primary purpose of our game lands is the conservation of North Carolina wildlife species and the provision of public hunting, trapping and fishing opportunities. Our game lands are important players in the preservation of rare, threatened and endangered species. Prescribed burning and early successional habitat management allow for healthy habitats for thriving wildlife. Fields left fallow and disked on alternating years promote natural herbaceous regeneration. Water levels of impounded wetlands are drawn down at appropriate times to create conditions beneficial to waterfowl. Protection of stream buffers ensures that precious fish species are protected and encouraged along with thriving game fishes. Heritage forest land is worked and preserved and rare forestlands are protected.

The game lands also provide broad expanses of public recreational opportunities. North Carolina has more acreage of managed game lands than all states east of the Mississippi, with the exceptions of Florida and Michigan, both of which include lake and ocean frontage as managed land. There is overwhelming public endorsement of conserving the land along with documentation of the economic benefits of doing so. According to the outdoor recreation industry, over $3.3 billion is spent annually on wildlife related recreation in our state alone. As North Carolina transitions from a traditional economy based on tobacco, furniture and textiles to a global economy driven by knowledge-based enterprises, our managed public game lands help preserve our economy and our way of life.

Game lands include:

- A great treasure in the largest intact and least disturbed bottomland forest ecosystem in the mid-Atlantic Region and some of the oldest cypress-tupelo trees on the East Coast, many at least 800 years old;
- One of the largest, most intact remnants of longleaf pine ecosystems in North Carolina, a high priority wildlife habitat in the Lands Management program. Among the species dependent upon this type of habitat are bobwhite quail, a variety of songbirds, fox squirrels and the federally endangered red-cockaded woodpecker;
- The densest populations of black bear, white-tailed deer and turkey, and the highest density of nesting birds in the state. Most of our 32 black bear sanctuaries are on game lands;
- A system of floating waterfowl blinds, 19 public hunting blinds for disabled sportsmen, 32 public boating access areas, 33 public fishing areas, six wildlife observation platforms, four public WRC shooting ranges with plans to build and manage many more as opportunities occur;
- And some of the finest examples of multiple conservation collaborations in the country.

As in the past, it is anticipated that future projected expenditures will be funded by North Carolina's apportionment of Pittman Robertson Federal Assistance in Wildlife Restoration funding and license receipts, as well as from contributions from various conservation partners. The opportunity provided by these managed public game lands to our mission of conserving North Carolina's wildlife and habitat for future generations is priceless.

N.C. Wildlife Resources Commission staff has extensively contributed to the development and preparation of this plan through their various fields of professional expertise. All content, management strategies, recommendations, goals, and needs for change were developed using the best available science and professional working knowledge of the J. Morgan Futch Game Land, its habitats, and terrestrial and aquatic species. Careful consideration has been given to all input received from the public, external agencies, and organizations that have an interest in or use the game land to ensure a that comprehensive management program is administered on J. Morgan Futch Game Land. The successful implementation of this plan will depend on the continued input and support from all interested parties.

Plan Development Team Members

- **David Allen**, Coastal Wildlife Diversity Supervisor, Division of Wildlife Management
- **Joe Fuller**, Migratory Game Bird Coordinator, Division of Wildlife Management
- **Jeff Hall**, Wildlife Diversity Biologist, Division of Wildlife Management
- **Isaac Harrold**, Program Manager, Land and Water Access Section
- **Doug Howell,** Waterfowl Biologist, Division of Wildlife Management
- **Tommy Hughes**, Coastal EcoRegion Supervisor, Lands and Water Access Section
- **William Ridgeway**, Northern Coastal EcoRegion Technician Supervisor, La nd and Water Access Section
- **Preston Royster**, Design Services Project Engineer, Engineering Section
- **Sara Schweitzer**, Coastal Waterbird Biologist, Division of Wildlife Management
- **Chris Turner**, District 1 Wildlife Biologist, Division of Wildlife Management
- **David Turner**, Northern Coastal EcoRegion Management Biologist, Land and Water Access Section

Executive Summary

The North Carolina Wildlife Resources Commission charged staff to develop Game Land Management Plans for all state-owned game lands. The creation of this plan was a joint effort from North Carolina Wildlife Resources Commission biologist and land managers, natural resource conservation groups and agencies, and the public. The primary goal for this plan is to establish a clear path for management activities for the J. Morgan Futch Game Land for the next ten years and set a "Desired Future Condition" for habitat types beyond that ten-year horizon.

When it comes to building waterfowl impoundments, location is key. The land now known as Futch was purchased in 1999 and 2001 and consists of only 596 acres. Most of the land was farmed and there were some existing managed waterfowl impoundments. Once the North Carolina Wildlife Resources Commission acquired the property, extensive restoration and enhancements turned the entire game land into separate manageable units. These units incorporate agricultural grain production, moist soil plant management, submerged aquatic vegetation management, and standing timber management. This mix of management regimes helps meet the needs for waterbirds migrating through, wintering, and breeding on the Albemarle-Pamlico Peninsula. The J. Morgan Futch Game Land is an important component in waterbird management in northeast North Carolina. Each year thousands of migrating ducks and tundra swans rest, feed, and winter at and around the game land. Shorebirds and wading birds are beneficiaries of the wetland management occurring at Futch.

The permit waterfowl hunts offered at Futch are highly sought after. Over 1,500 hunters apply for Futch waterfowl hunts annually. Through the permit system, hunter numbers are controlled to manage disturbance to waterfowl. The North Carolina Wildlife Resources Commission recognizes the need for more waterfowl impoundments in key locations. With additional managed wetlands, opportunities to hunt other species may exist that are currently not allowed at Futch.

Continued funding for replacing and repairing infrastructure, maintaining staffing levels that meet workloads, and having a clear path forward will help continue to make J. Morgan Futch Game Land a premier state-owned waterfowl hunting destination in North Carolina.

Introduction

North Carolina Wildlife Resources Commission

The North Carolina Wildlife Resources Commission, hereafter known as NCWRC, was established in 1947. Prior to 1947, the tasks of managing state owned Wildlife Management Areas were executed by the Department of Conservation and Development. General dissatisfaction with the program led to the creation of the Wildlife Resources Law in 1947 that established the North Carolina Wildlife Resources Commission.

Since 1947, the NCWRC has been dedicated to the conservation and sustainability of the state's fish and wildlife resources through research, scientific management, wise use, and public input. The NCWRC is the state regulatory agency responsible for the enforcement of fishing, hunting, trapping, and boating laws and provides programs and opportunities for wildlife-related educational, recreational, and sporting activities.

Game Land Program Mission Statement

Consistent with the original establishment legislation for the NCWRC, the mission of the game lands program is to enhance, facilitate, and augment delivery of comprehensive and sound wildlife conservation programs. Inherent in delivery of a land conservation program consistent with this mission is the feasibility and desirability of multiple uses on lands owned by the state within the system. In addition to hunting, fishing, trapping, and wildlife viewing as primary uses, we recognize the desirability of providing opportunities for other activities on state-owned game lands that are feasible and consistent with the agency's mission and compatible with these traditional uses.

Game Land Program Management Objectives

- To provide, protect, and actively manage habitats and habitat conditions to benefit aquatic and terrestrial wildlife resources
- To provide public opportunities for hunting, fishing, trapping, and wildlife viewing
- To provide for other resource-based game land uses to the extent that such uses are compatible with the conservation of natural resources and can be employed without displacing primary users
- To provide an optimally sustainable yield of forest products where feasible and appropriate and as directed by wildlife management objectives

History

Prior to 1971, game lands in North Carolina were limited to designated and tightly controlled Wildlife Management Areas. In 1971, the current Game Lands Program was established. This change involved the expansion of game lands from about 700,000 acres to 1.5 million acres, changes in regulations, and reductions in fees to hunters and fishermen (Dean 1971). The old Wildlife Management Areas were incorporated into the new Game Lands Program, but the new program also allowed the Commission to lease/incorporate additional lands as game lands to expand the land base. Beginning in the 1980s, land owners (both corporate and private) realized they could lease their properties for a higher rate to hunting clubs and private individuals and began to do so. These properties were subsequently removed from the Game Lands Program. Fortunately, the Natural Heritage Trust Fund was established in 1987 and the Clean Water Management Trust Fund in 1996. These funds provided money for the fee simple acquisition of select properties, many of which have been incorporated into the Game Lands Program. These funds greatly compensated for the loss of game lands leased from the private sector and currently over 2 million acres are enrolled in the Game Lands Program.

With the Management Area system, Commission staff were housed on each management area. These personnel were assigned both law enforcement and habitat management duties on their respective areas. Administration of the new Game Lands Program was assigned to the Division of Wildlife Management. Depot locations with equipment and habitat development crews were established and strategically located in the vicinity of all game lands in the state. All law enforcement on these properties was assigned to the Division of Law Enforcement. With some minor organizational changes this system remained intact until 2012. In 2012, land management staff in the Division of Wildlife Management and certain similar positions in the Division of Inland Fisheries were merged with Division of Engineering staff into the Division of Engineering and Lands Management. This organizational change was made to deliver a more comprehensive and efficient wildlife and fisheries management program on all public lands and waters in the state. Depots remained at former locations with the establishment of new depots/crews at certain remote locations that were not efficiently served under the former program.

Purpose and Need

The purpose of this Game Land Management Plan is to provide a guide for managers to follow in the creation of wildlife and land management prescriptions. Fish and wildlife habitat needs were given priority; outdoor and wildlife related requests/activities were considered individually depending on compatibility and appropriateness. All aspects of game land management were considered in the development of this Plan and include but are not limited to; fish and wildlife communities, forest management, infrastructure development and maintenance, public uses, fish and wildlife information needs, financial assets and future needs, future plans for acquisition,

regulations and enforcement, and existing and needed partnerships and collaboration. While this plan is based on a ten-year horizon, it will remain an adaptable and dynamic document.

More specifically, this plan will:

- Provide a clear direction for game land management.
- Provide the public, local, state, and federal officials with a better understanding of game land management and objectives.
- Provide clear management objectives to ensure that these actions are consistent with the game land programs goals.
- Provide a basis for future budgetary operational expenses and manpower needs.

Regional Context

J. Morgan Futch Game Land(Futch) is located in the Mid Atlantic Coastal Plain. In North Carolina, a huge diversity of fish and wildlife habitats exist across the three distinctive regions of the state: the Coastal Plain, the Piedmont, and the Mountains. These regions fall within larger ecoregions that span state borders and link North Carolina to neighboring states (Fig. 1). Elevations ranging from sea level to over 6,000 feet provide habitat for over 1,000 species of birds, mammals, fish, reptiles, amphibians, mollusks, and crustaceans, in addition to thousands of other invertebrate species.

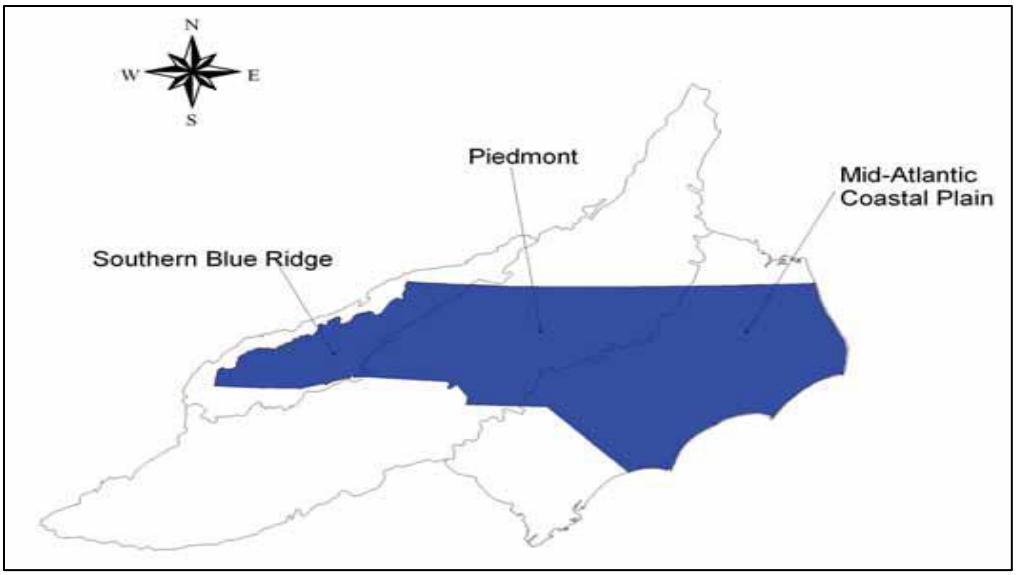

Fig. 1. Ecoregional delineations in North Carolina (Bailey 1995).

The Coastal Plain region is characterized by flat lands extending from the coast inland an average of 125 miles. The region covers almost two-fifths of the area of the state.

Futch lies on the Albemarle-Pamlico Peninsula (Fig 2). The nearly 1,634 square mile peninsula is bordered to the north by the Albemarle Sound, the Pamlico Sound to the south, and the Croatan Sound to the east (Heath 1975). The Albemarle-Pamlico Sound estuary is the second largest estuarine system in the United States after the Chesapeake Bay (Darnell 2008). The peninsula is a low and flat land mass that has both tidal and non-tidal wetlands and maritime forest. These areas provide for a high black bear density. The US Fish and Wildlife Service's Red Wolf Recovery Program is centered on the Pocosin Lakes National Wildlife Refuge. The area also supports a disjunct population of red-cockaded woodpeckers. The peninsula and surrounding sounds are important for migrating and wintering waterfowl including an estimated 40,000 wintering tundra swans. Five counties lie wholly or partly on the peninsula and include Beaufort, Washington, Tyrrell, Hyde, and Dare. Over the last 100 years, much of the area has been ditched and converted for agricultural use with major crops being corn, soybeans, wheat, and increasingly cotton (ACJV 2005). Forested areas of the peninsula include industrial pine plantations, nonriverine swamps, and pocosins. Major overstory species include bald cypress, tupelo gum, blackgum, red maple, and pond pine. Nearly 483,000 acres of the peninsula is in state or federal ownership (Fig. 3). Futch is located in the northeastern part of Tyrrell County, 5 miles from the Albemarle Sound and 6 miles from Alligator River.

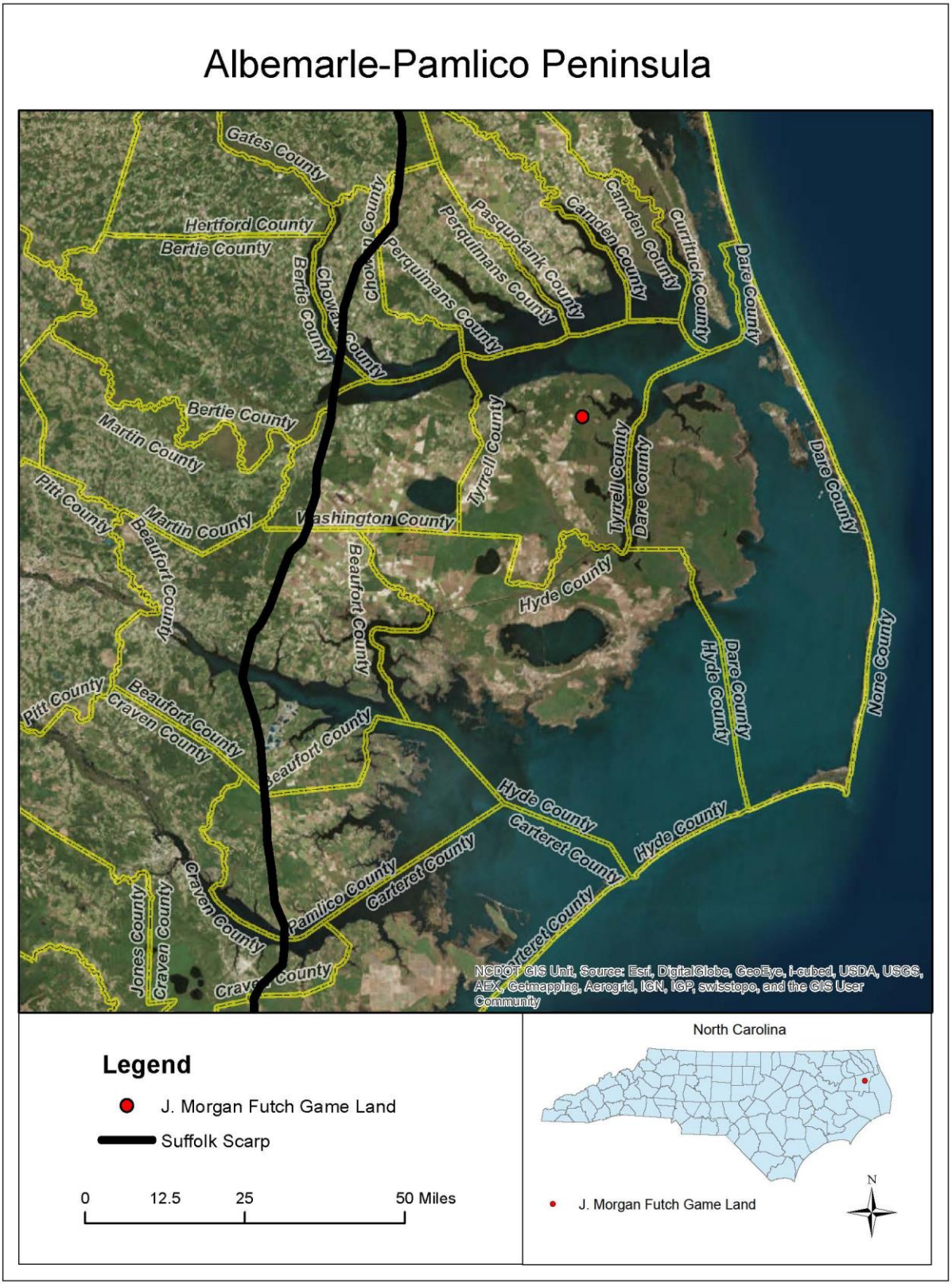

Fig. 2. Map of the Albemarle-Pamlico Peninsula

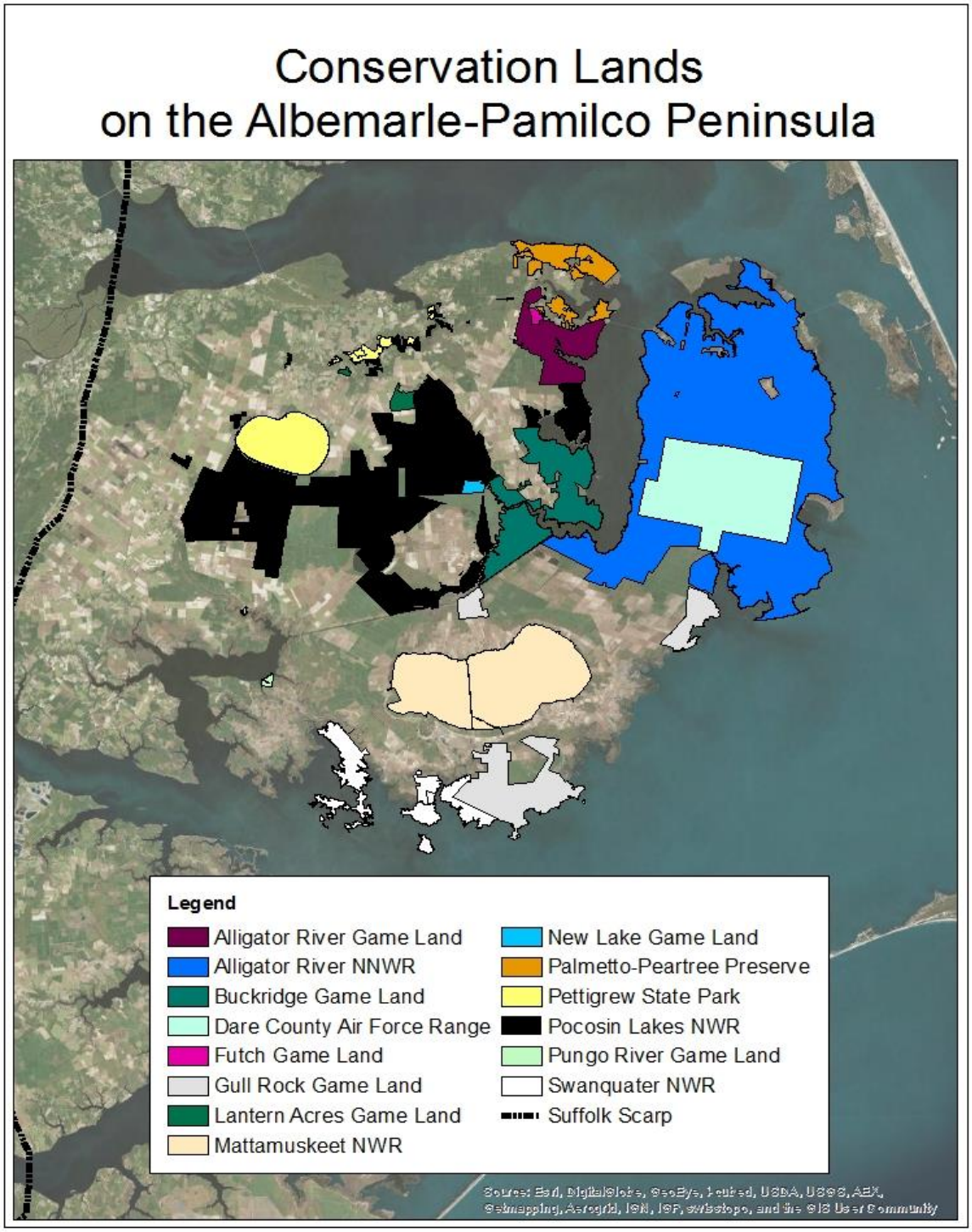

Fig. 3. Conservation Lands of the Albemarle-Pamlico Peninsula

Role of J. Morgan Futch Game Land in Regional Conservation

Spurred by plummeting waterfowl populations, the North American Waterfowl Management Plan (1986) called for the protection, restoration, and enhancement of black duck migrating, breeding, and wintering habitats and breeding and migrating habitats for mallards on the east coast of the United States. The North American Waterfowl Management Plan (NAWMP) identified regions where partnerships could implement the goals of the NAWMP. The Atlantic Coast Joint Venture (ACJV) was formed in 1988 to offer a stepped down approach to fulfill the goals and objectives of the NAWMP (ACJV 1988). The original ACJV plan recognized the importance of the Albemarle-Pamlico Peninsula as an important waterfowl migrating and wintering area and called for the protection and enhancement of 5,000 acres of cleared, wet agricultural lands (Atlantic Coast Joint Venture 1988).

Futch is a small tract of only 596 acres. Although small in acreage, the entire tract is managed as impounded wetlands with focuses on moist soil vegetation units, submerged aquatic vegetation units, and cropped cereal grain units. Futch is bordered to the south and west by Alligator River Game Land. Along with Futch's waterfowl importance, Futch supplies important foraging habitats for red wolves, American bald eagles, shorebirds and wading birds, and a high black bear population. Futch's acquisition by the NCWRC and the subsequent restoration, enhancement, and management helps meet goals set by the ACJV and the South Atlantic Migratory Bird Initiative for waterfowl, shorebirds, and wading birds.

Game Land Specific Information

Location and Size

Futch Game Land is located 7 miles east of Columbia, NC on US Highway 64 in Tyrrell County. The game land is only 596 acres and borders Alligator River Game Land to the south and west. The entire game land is a series of managed waterfowl impoundments and associated roads and dikes. There are 15 sub-impoundments that make up Futch. Six former catfish rearing ponds are managed for either moist soil vegetation or submerged aquatic vegetation. Two timber units serve primarily moist soil units since a tornado in 2011 destroyed many of the trees in those units. The remaining 7 sub-impoundments are managed on rotation for corn or soybeans and moist soil units. Usually two of these impoundments are managed for moist soil vegetation.

Climate

Tyrrell County falls into the humid subtropical climate zones as does most of North Carolina. Average annual temperature for years 1981-2010 is 60.7 degrees Fahrenheit. July and August typically being the warmest months with daytime temperatures close to 90 degrees Fahrenheit (National Oceanic and Atmospheric Administration 2014a). The average yearly precipitation is 50.15 inches, with June, July, August, and September being the wettest months. November is typically the driest month with just over 3 inches of precipitation (National Oceanic and Atmospheric Administration 2014a). The first freeze for Plymouth averages October 30 and the average last freeze averages April 8 (National Oceanic and Atmospheric Administration 2014b). Winds are typically out of the west and northwest during the fall and winter months and south and south west through the spring and summer (State Climate Office of North Carolina 2013).

Significant rainfall occurs with tropical systems. Hurricanes that have severely impacted the area in recent history were Isabel in 2003 and Irene in 2011.

Soils

The soils found on Futch are a result of receding ocean shoreline, deposits from ancient rivers, and the buildup of organic matter. Overtime, deep organic soils formed creating the mucks that exist today. Average elevation at Futch is 2 feet above sea level. All soils found at Futch are considered “hydric”. Hydric soils by definition are “…soils that in their undrained condition are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (water loving) vegetation” (U.S. Department of Agriculture 1985).

The primary soils found at Futch are Portsmouth loam and Tomotley fine sandy loam. These soils are well suited for agriculture under artificial drainage systems. The entire game land is a series of diked wetlands. Pumps are used to add water in the fall and winter and drawdown

water in the spring. Through the growing season, pumps are used to release water from the property to facilitate agricultural crop production. Other soils include Ponzer muck, Hyde loam, Pungo muck, and Belhaven muck (U.S. Department of Agriculture 2013) (Fig. 4). All soils represented on the game land share the characteristics of being nearly level, and very poorly drained, except Tomotley soils are poorly drained. Under natural conditions, without the aid of water level manipulation, all the soils listed are rarely flooded. Prior to conversion to agricultural land, this area would have supported a forest with dominate species including bald cypress, pond pine, red maple, green ash, sweetgum, tupelo gum, water oak, and willow oak. Understory plants would have included American holly, sweetbay, waxmyrtle and reeds.

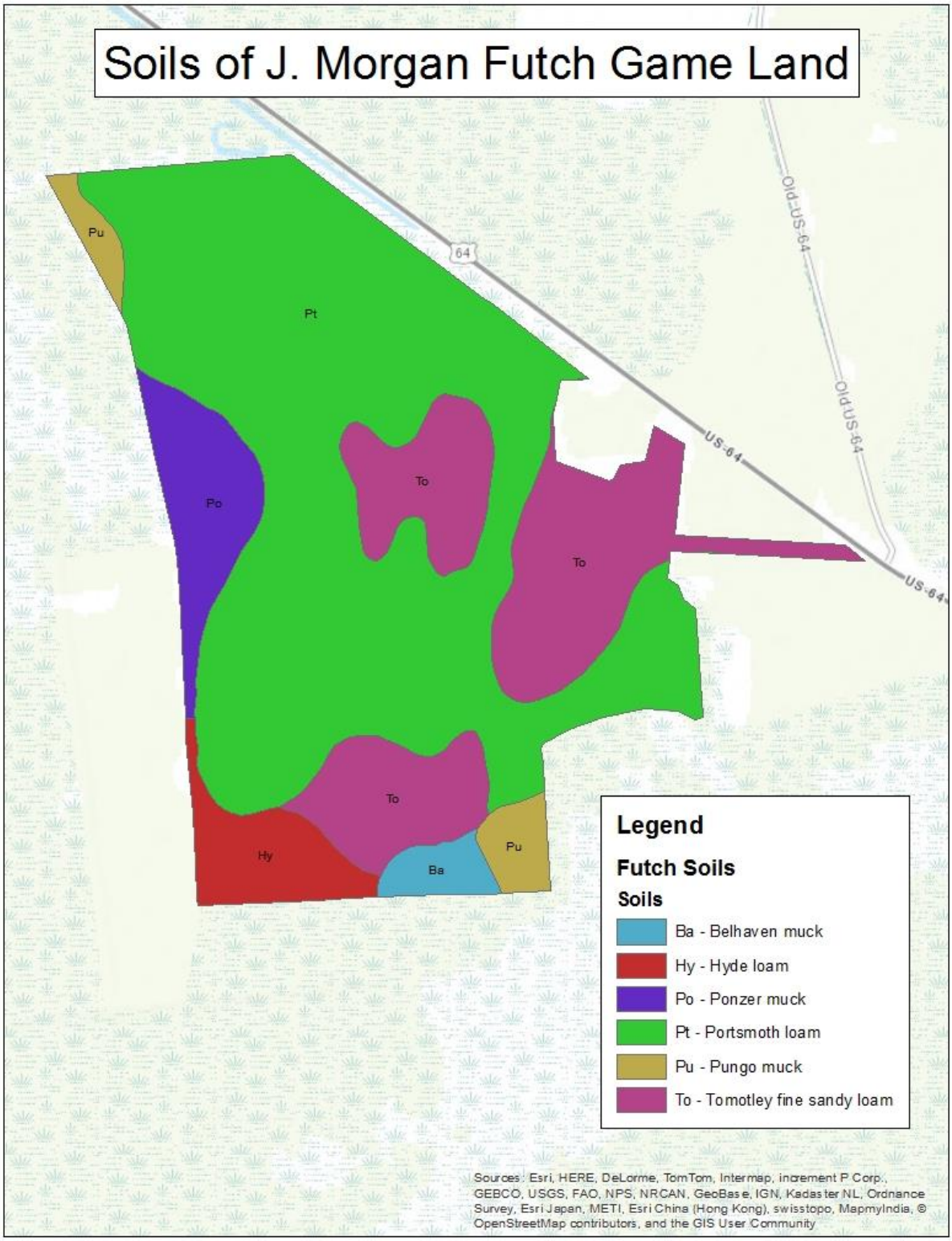

Fig. 4. Soils of J. Morgan Futch Game Land.

Hydrology

Futch lies near the northern edge of the Albemarle-Pamlico Peninsula. The Albemarle Sounds major fresh water inflows include the Roanoke River, Chowan River, and the Pasquotank River. Barrier islands to the east prohibit major salt water influxes from the Atlantic Ocean. The closest inlet is Oregon Inlet which has more influence on salinity with the Pamlico Sound than the Albemarle Sound. Historically, most of the surface water received at Futch probably drained through, what is now, Alligator River Game Land to Second Creek. Artificial canals along US Highway 64 carry most of the water that is removed from Futch. Most of this water now likely flows north to canals connected to Alligator Creek. Both Alligator Creek and Second Creek empty into Alligator River.

Within the game land, a series of feeder canals, perimeter canals, and ditchs allow managers to innodate or remove water from each of the impoundments. Depending on the soil type, the water table is listed as 0-1 foot or 0-1.5 feet. Without the dike and pump system, most of the area would stay wet for long periods of time preventing active land management for waterfowl. Some upgrades and repairs to exisiting water control structures and pumps are required and will be discussed in the Infrastructure section of this plan.

Habitats

The primary purpose for the acquisition of Futch is to provide habitat for migrating and wintering waterfowl and provide breeding and brooding rearing habitat for wood ducks. A second objective for the property is for shorebird/wading bird habitat management. Habitats on Futch are those that are essential to the management and maintenance of wetland type habitats. The largest habitat type is agricultural cropland. During the growing season, an average of 237 acres are planted in either corn or soybeans then and flooded after harvest. Of the seven agricultural fields, two are typically managed for moist soil plants and flooded during the fall and winter. Six former catfish rearing ponds and associated dikes constitute 76 acres on the southern part of the tract. These ponds are managed on rotation for submerged aquatic vegetation or moist soil plants. Two timber units are located on the southeastern corner of the tract. A nine acre timber harvest in 2002 removed pines to facilitate both units being converted into “green tree” impoundments. A tornado in the spring of 2011 destroyed portions of these two units. Currently, the units are managed for moist soil vegetation and offer shelter and loafing areas for wintering waterfowl. Each habitat type will be discussed in more detail in the Habitat Communities section.

Surrounding Land Use

Tyrrell County is a rural county with a 2013 population estimate of 4,109 people (U.S. Department of Commerce 2014). The US Census Bureau is reporting a population decline, most likely due to younger workers leaving the area to find better paying jobs. Columbia is the county seat.

Land acreage for Tyrrell County totals 251,000 acres. Nearly 107,000 acres (42.6%) are in a state of conservation through the US Fish and Wildlife Service, NC Division of Coastal Management, NCWRC, North Carolina Division of Parks and Recreation, or The Conservation Fund (Fig. 5). Major land clearing and ditching during the 1970's converted large acreages of forest into agricultural fields. Agriculture accounts for nearly 70,000 acres or 28% of the land area. Major crops are corn, soybeans, cotton, potatoes, and wheat. Several hog operations are located in the northeastern part of the county.

Tyrrell is heavily forested with 153,000 acres (61%) in some type of forest (Brown 2004). Much of the forested land is owned by the above mentioned conservation groups.

Alligator River Game Land borders Futch to the west and south. US Highway 64 runs along the eastern border with 2 small privately own tracts of timberland bordering some parts of the eastern edge. A narrow sliver of forest land separates Futch from Alligator River Game Land to the north. Across US 64, 0.5 mile to the east, lays the small community of Alligator.

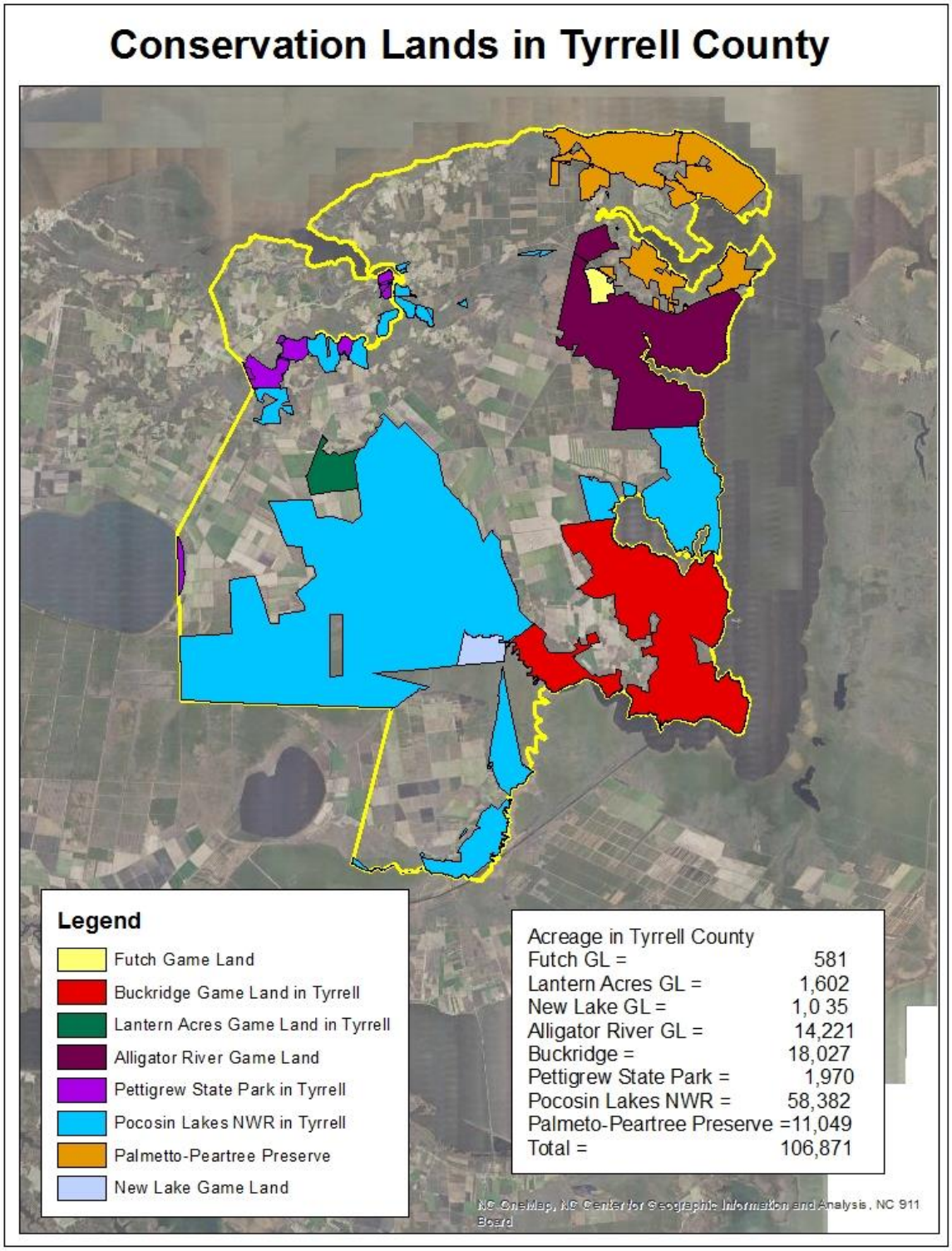

Fig. 5. Conservation Lands in Tyrrell County

Cultural Resources

North Carolina is not only known for its natural history, but also its rich historical/cultural resources. Part of the Coastal Algonquian Native Americans, the Secota villages of Mecopen along the Scuppernong River near present day Columbia and Tramaskecoc on the Alligator River near Gum Neck, were shown on maps as early as 1585 (The Greater Tyrrell County Chamber of Commerce 2014). Villages typically centered near the sounds, estuaries, and rivers. European settlement began in the late 1600's and early 1700's.

Unauthorized artifact collecting activities on all state owned property including NCWRC owned lands are prohibited by the Archaeological Resources Protection Act (G.S 70 Article 2) (Appendix I). No known artifacts have been found on the game land.

Acquisition History

The Northeast North Carolina Wetlands Initiative is a coordinated state effort to protect wetlands and water quality and improve habitat for migratory birds within the Currituck-Chowan and the Albemarle-Pamlico Focus Area of the Atlantic Coast Joint Venture. Through fee title acquisitions, partners including Clean Water Management Trust Fund, The Nature Conservancy, North Carolina Natural Heritage, Ducks Unlimited, NCWRC, and the North American Wetlands Conservation Council have conserved thousands of acres in this focus area.

The first acquisition of what is now known as J. Morgan Futch Game Land took place in 1999 (Fig. 6). This tract (343± acres) contained the catfish ponds, some agricultural acreage managed for moist soil vegetation and row crops and two timber units. Recognizing the importance of this area to waterfowl and shorebirds, the NCRWC pursued acquisition of the northern tract. The purchase assured that adjacent management would not negatively impact the work being done on the southern tract. Using North American Wetlands Conservation Act, NCWRC, and Ducks Unlimited funds, the NCWRC closed on the remaining 252± acres in 2002.

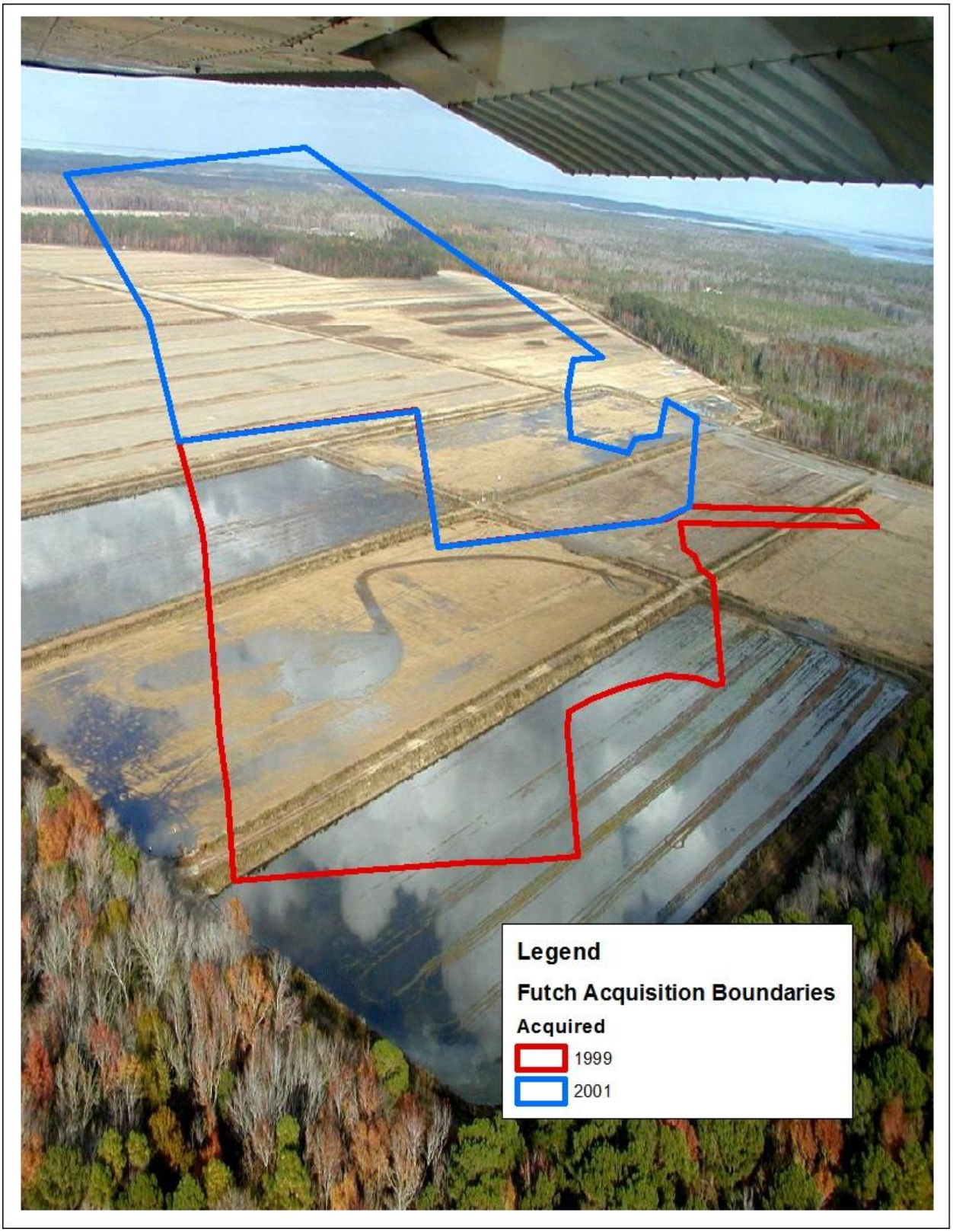

Fig. 6. Acquisition map of J. Morgan Futch Game Land. Aerial photo taken by Joe Fuller.

Purpose of J. Morgan Futch Game Land

The acquisition of Futch and ongoing management aids in meeting goals set by the Atlantic Coast Joint Venture and the South Atlantic Migratory Bird Initiative. Futch now provides 500 acres of managed wetland habitats. The property helps mitigate the loss of submerged aquatic vegetation in the Albemarle and Currituck Sounds, provides the opportunity to manage for moist soil vegetation in prior converted wetlands, allows managers the opportunity to mix farming practices with wetland management, and provide habitats for waterfowl, wading birds, and shorebirds.

Priority waterfowl that have benefited from acquisition include northern pintail, American black duck, and mallard. Most waterfowl use Futch as a wintering site, however, nesting habitat is available for black ducks. Wood ducks are abundant in the forested wetlands surrounding Futch and the Futch tract offers brood rearing and winter habitats. Futch usually sees large numbers of green-winged teal feeding in the impoundments. Futch also aids in wintering thousands of tundra swans.

Shallow water habitat and the presence of mudflats are important foraging habitats for wading birds and shorebirds. Snowy egrets, little blue herons, tricolored herons, and glossy ibises have been observed at Futch.

Futch provides important foraging habitat for at least 1 pair of American bald eagles nesting nearby on the Alligator River Game Land. Red wolf sign is commonly found on Futch as the roads and dikes offer excellent foraging habitat.

Along with the wildlife habitat benefits that Futch provides, Futch offers the opportunity for sportsmen to hunt one of the premier public waterfowl areas in the state. The waterfowl hunts are offered by permit only to control the number of hunters. With the addition of floating waterfowl blinds in fall of 2013, hunters can now have a quality hunt without the concern of other hunters encroaching on their setup. Point-of-sale dove and archery deer hunts are offered prior to the waterfowl season.

Two observation towers offer an elevated platform where bird watchers can view the entire game land. Hiking is limited to the Scouting-only Zones and observation towers in the fall and winter to limit disturbance to waterfowl. Although Futch is hunted during the waterfowl season, it is mainly after the close of the waterfowl season can the true benefit of the game land become apparent. The Futch tract offers thousands of wintering waterfowl a resting, feeding, staging area as they prepare for migration north. In February, bird watchers are able to view a myriad of ducks and thousands of tundra swans.

Game Land Goals and Measures of Success

Goals

- Provide for a diversity of habitat types through science based land management practices to ensure that a wide variety of terrestrial and aquatic wildlife species are conserved on the game land.
- Conserve popular game species at huntable levels through science based land management and sound regulations.
- Provide quality habitat across the game land for endangered, threatened, and rare species to promote sustainable and perpetual populations.
- Provide seasonal habitats to meet the needs of waterfowl, shorebirds, and wading birds.
- Maintain productive submerged aquatic vegetation (SAV) units.
- Maintain productive moist soil units.
- Provide sufficient infrastructure and opportunity to allow game lands users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups.
- Maintain Cooperative Farmer relationships through Lease Agreements.
- Reduce or sustain the number of sub-impoundments planted in soybeans.

Measures of Success

- Vegetation surveys indicate that beneficial plants are the dominant vegetation component in the SAV impoundments.
- Vegetation surveys indicate that beneficial plants are the dominant vegetation component in the moist soil impoundments.
- Surveys of game land users indicate a high level of user satisfaction.
- Restrictions placed on the number of impoundments that are planted in soybeans through the Cooperative Farm Lease.
- Undesirable weed species are controlled at a level that does not significantly impact moist soil habitats, SAV habitats, and water movement operations.

Habitat Communities

The management strategies discussed below were developed using observations of past management at Futch, experiences of plant responses to different regimes, and literature reviews. These strategies take into context the understanding that each sub-impoundment is but one unit in the complex called Futch. The main objective for Futch is waterfowl habitat management. Similar wetland management is taking place at Alligator River NWR, Mattamuskeet NWR, Pocosin Lakes NWR, Pea Island NWR, Lantern Acres Game Land, Gull Rock Game Land, and

Roanoke Island Marshes Game Land. Futch is but one player in the conservation of waterfowl, shorebirds, and wading birds in the region. Each decision for land management affects some species positively while others are negatively impacted. With three habitat types and varied management scenarios, we can strive to provide habitats that are favorable to several priority suites of species.

Common terms and definitions will be used in discussion in each of the habitat types and management strategies below. The three habitat types and types of management include; agricultural fields, both cropped and moist soil, catfish ponds, including submerged aquatic vegetation and moist soil, and timber units managed primarily as moist soil units.

- Drawdown – The process of removing water from an impoundment.
- Early Season Drawdown – A drawdown that occurs within the first 45 days of the growing season, typically March 15 through May 1.
- Late Season Drawdown – Drawdown occurring during the last 90 days of a growing season, typically after July 15.
- Mid-season Drawdown – Drawdown occurring after May 1 until July 15.
- Moist Soil – Refers to the management of wetland sites in a manner that maintains a high moisture level in the soil throughout most of the growing season. Land may be inundated during part of the growing season.
- Moist Soil Vegetation - Vegetation adapted to grow in moist to saturated soil conditions.
- Submerged Aquatic Vegetation (SAV) - Vegetation that lives below the water surface. Impoundments managed for SAV's are considered "aquatic" units.
- Beneficial Plants – Within the context of waterfowl management, beneficial plants are desired waterfowl foods (e.g., smartweed, millets, barnyard grass, Walter's millet, sedges, spikerush, widgeon grass, sago pondweed).

Timing of drawdowns and the speed at which water is removed from the ponds can have a profound impact on plant establishment. Early drawdowns promote smartweed, spikerush, sedges, and barnyard grass. Mid-season drawdowns tend to promote Walter's millet, *Panicum sp*. grasses, and crabgrass (Fredrickson and Taylor 2007). At Futch, undesirable species favoring mid-season drawdowns include alligatorweed, sesbania, cocklebur, and sicklepod. Caution must be used in prescribing a mid-season drawdown in the moist soil units of the agricultural fields as alligatorweed, sesbania, and sicklepod are quick to establish and compete with beneficial plants. Early, slow (2-4 weeks) drawdowns are favored in the agricultural field moist soil units. There are slight slopes within all the impoundments at Futch and this drawdown process concentrates prey (invertebrates and minnows), creates habitat conditions that can be utilized by a variety of waterfowl, wading birds, and shorebirds during early spring migration, and provide soil conditions for the generation of a wide variety of plants (Fredrickson and Taylor 2007). Fast drawdowns (1-3 days) reduce the availability of foraging areas for shorebirds and wading birds.

Since wintering waterfowl habitat management is the driving force determining management decisions at Futch, considerable effort is directed to supplying waterfowl foods. Flooding the ponds begin in September resulting in some of the foods being submerged for nearly 150 days. One exception to this is that most of the corn ears left on the stalk are above the water line. Corn kernels that run through the combine are subject to flooding and the deterioration that results. As shown in Table 1 below, some of the native plant seeds are better adapted to resist deterioration when submerged compared to grain crops, allowing more food to be available throughout the winter. In moist soil units, management is aimed at promoting natural germination of smartweed, barnyard grass, Walter's millet, sedges, and *Panicum sp*. grasses.

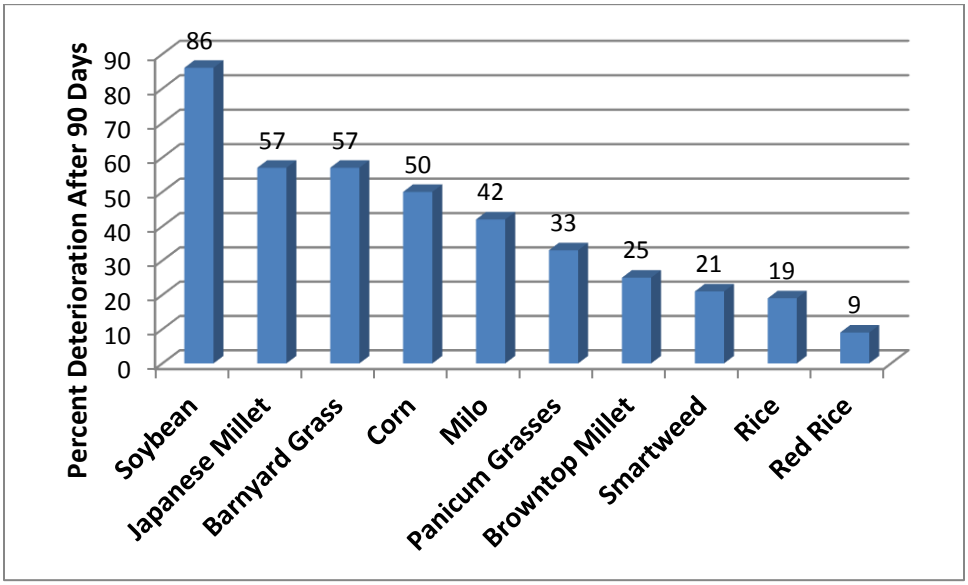

Table 1. Percent deterioration of selected agricultural crops and native plant seeds submerged for 90 days (Fredrickson and Reid 1988, Neely 1956, and Nelms and Twedt 1996).

Flooding the impoundments will vary depending on when the crops are harvested or whether the impoundment had been managed as moist soil or a SAV unit. Timing of flooding has significant impacts on hunters, forage area availability to wading birds and shorebirds, availability of food to waterfowl, and vegetation growth. Fall flooding should coincide with the arrival of fall migrants. Inundation too early will subject the available seeds to extra deterioration and can cause algae issues if the temperatures are high.

Agricultural Fields

Futch is a unique game land in that the majority of the acreage is an active farm. The habitat types that are represented at Futch are similar in that each habitat is managed for waterfowl. Each sub-impoundment on the game land falls into one of three habitat types: agricultural fields, former catfish rearing ponds, or timber units.

Recognizing agriculture and wildlife management can be integrated, the NCWRC instituted a Co-op Farm Lease Agreement. The Co-op Farm Lease is a contract which specifies the area, lease period, acceptable practices, and payment. The lease addresses the use of pesticides, acceptable crops, and the amount of crop that must be left in the field. Sealed bids are solicited every three years and the highest bidder wins the lease. Full lease details can found in the Co-op Farm Lease in Appendix II. Acquisitions of agricultural lands have given the NCWRC an opportunity to manage large amounts of open land for wildlife with little cost to the agency. Through the Co-op Farm Program, locals, hunters, and wildlife have benefited from the open lands.

Taken by Kimberly McCargo

A. Location and condition of habitat (Fig. 7)

Agricultural fields are the largest habitat component on Futch comprising 371 acres (Fig. 7). These fields are divided into seven sub-impoundments where water levels can be managed independently. Most of Futch's acreage was in agricultural production prior to State acquisition. Some of the dikes and infrastructure were already in place and after acquisition by the NCWRC, improvements and the installation of dikes, pumps, and water control structures provided the NCWRC the ability to actively manipulate water levels across the entire farm.

The agricultural field units fall into one of two management regimes: agricultural production or moist soil vegetation management. Typical agricultural crops include corn and soybeans. During different times of the year and varied water levels, the agricultural fields offer habitats to different suites of species. The fields are in good condition through the farming activities. The canals and internal ditches are cleaned periodically to facilitate draining. The intensive management of these habitats presents challenges that will be covered in the Management Challenges section below.

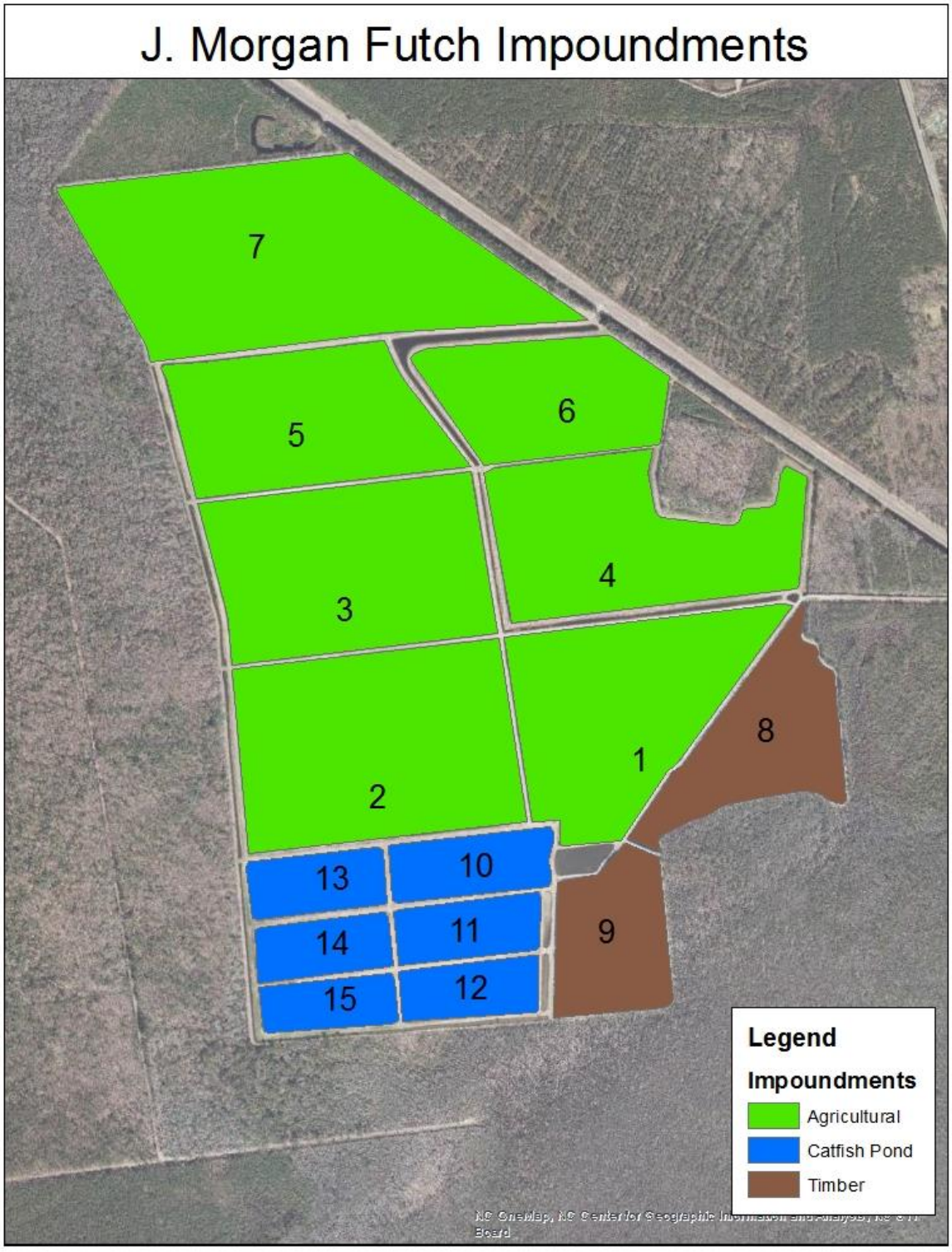

Fig. 7. J. Morgan Futch Impoundments

B. Priority Species

Priority game species for the agricultural field habitats include: northern pintail, American black duck, mallard, green-winged teal, blue-winged teal, American widgeon, wood duck, and tundra swan. White-tailed deer, black bear, mourning dove, and common snipe are beneficiaries of the agricultural plantings and subsequent water level management in the agricultural fields. The following table lists Federal or State listed non-game species potentially found in these habitats and their conservation status.

Table 2. Listed non-game species associated with agricultural fields.

Taxonomic Group	Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Bird	Wood stork	*Mycteria americana*	E(T)	S_1B,S_1N,G_4
Bird	Bald eagle	*Haliaeetus leucocephalus*	T	S_3B,S_3N,G_5
Bird	Little blue heron	*Egretta caerulea*	SC	S_3B,S_3N,G_5
Bird	Tricolored heron	*Egretta tricolor*	SC	S_3B,S_3N,G_5
Bird	Snowy egret	*Egretta thula*	SC	S_2S_3B,S_3,G_5
Bird	Glossy ibis	*Plegadis falcinellus*	SC	S_1S_2B,G_5
Mammal	Red wolf	*Canis rufus*	SR(E,XN)	S_1,G_1Q
Reptile	Carolina watersnake	*Nerodia sipedon williamengelsi*	SC	S_3,G_5T_3
Reptile	Pigmy rattlesnake	*Sistrurus miliarius*	SC	S_3,G_5
Reptile	Timber rattlesnake	*Crotalus horridus*	SC	S_3,G_4

For descriptions of Status and Rank codes see Appendix VIII.

C. Management Challenges

As with any intensively managed habitat type, the agricultural fields at Futch continually need interventions to maintain the habitat. The labor associated with maintaining the 371 acres that constitute the agriculture fields could be a tremendous burden on the existing NCWRC staff should it not be for the work done by the co-op farmer. Currently, the agricultural acres are enrolled in a co-op farm program. Should no farmer be willing to tend the land, the crew would assume the active management of the entire 371 agricultural acres. The planting of the nearly 250 acres would likely not take place. Much of this acreage would be managed for moist soil vegetation. Corn and millet will continue to be planted but not at the levels that are currently being planted.

Being that the farm is enrolled in a co-op program, most weeds have been managed at acceptable levels. Alligatorweed and sesbania are the two weed species that are the most difficult to

manage. Alligatorweed competes directly with efforts to promote desirable vegetation in moist soil units. If desirable moist soil plants such as smartweed, Walter's millet, fall panicum, or flat sedge can establish prior to alligatorweed germination, the alligatorweed will be suppressed since it does not tolerate competition and shade very well. Alligatorweed within the cropped units is typically controlled with the weed management program the co-op farmer uses for growing corn and soybeans.

Alligatorweed hampers the ability to move water throughout the game land. The ditches and canals can become clogged with alligatorweed, reducing the flow of water. Floating mats of alligatorweed can become concentrated around the intakes of pumps reducing water volume to intakes which may cause equipment failures.

Sesbania herbacea (bigpod sesbania or coffeebean) is a new moist soil weed to Futch. In the cropped units, the co-op farmer has been able to control sesbania. An exception to this control is during wet springs and summers when the farmer cannot access the fields. Sesbania can be a major component within the field borders if the borders have been disturbed in the spring. Late spring or early summer soil disturbances will promote sesbania germination within the moist soil units. Large stands of sesbania will shade out desirable moist soil plants reducing the quality of habitat for waterfowl. Several dabbling ducks forage sesbania seeds. Sesbania seed is commercially available and marketed for waterfowl and upland game bird food plots; it has no place in the current management for Futch as a desirable species.

To lesser degrees, cattails and sicklepod also contribute to management complexity. Cattails will begin to establish in the moist soil units in the wettest areas. However, after two years the moist soil units will be rotated back to a cropped unit and cattails are subsequently controlled by the weed management systems the co-op farmer uses. Sicklepod typically shows up in the uncropped field borders when the borders have been disturbed during the spring. The seeds and foliage are toxic and therefore are of no value to wildlife. Within the cropped area, the weed management program by the co-op farmer typically can control sicklepod in corn and soybeans.

Methods for weed management will be discussed in the Management Strategies and Needs section for each habitat type.

The entire game land is designed to be able to manipulate water levels across 15 sub-impoundments. Dividing these sub-impoundments are 12.8 miles of dikes. Large canals that typically hold water the entire year, the large canal running along US 64, and the aquatic units in the catfish ponds offer ideal habitats for muskrat and nutria. Although burrowing rodents do not pose a huge management challenge in the agricultural fields, dike damage can rinder the dikes (also used as roads) impassible to equipment, thus hindering the ability to manage the farm.

Water leakage through the dikes, as a result of muskrats and nutria burrowing, can hinder the ability to drain or flood the units.

Crop damage from bears is expected every year. Once the corn reaches the milk stage, bear damage can be seen. This damage has little to do with habitat quality and availability to waterfowl, however, crop damage can discourage the co-op farmer from wanting to farm Futch or may deter the farmer from planting corn. The loss of a corn crop would have significant impacts to weed control, food availability, and hunter expectation and satisfaction. Bears also destroy infrastructure such as pumps, bridges, observation towers, waterfowl blinds, and signage. Feral hogs have not been observed on Futch, but are considered to be on the adjacent Alligator River Game Land. Hogs will have similar crop ramifications as do bears. Hogs rooting will cause dike damage. Rooting inside the impoundments may create situations that promote the growth of undesirable weeds such as sicklepod, sesbania, and alligatorweed.

Two electric pumps and two diesel powered pumps are used to move water throughout the farm. The two pumps along the eastern side of the game land can be used to dewater or flood the farm. A large diesel powered pump on the western side is used to dewater the farm. Failure of the main electric pump will limit the ability for staff to flood the impoundments in the fall. The canal along US 64 is the main water source for flooding the farm. Alligatorweed infestations and siltation of the feeder canal leading from US 64 will reduce flow to the pumps therefore extending the time it takes to flood the units. During dry periods in the fall, flooding the impoundments requires staff to check the pump daily to see if the canal along US 64 has been recharged. Drawdown typically is easily achieved using the large diesel pump on the western property line and the main hub electric pump.

One challenge to the management of the agriculture fields and included moist soil units is the timing of pond drawdown and flooding. Balancing the needs for waterfowl looking for resting and foraging areas during the migration north, the needs for shorebirds and wading birds during March, April, and May, amphibian needs during the spring, and the farmers needs to prepare the land for planting will continue to be a challenge in the framework of Futch. Ways to manage for the different needs will be discussed in the Management Strategies and Needs section.

D. Management Strategies and Needs

Agricultural Fields - Cropped

Management of the agricultural fields will be done primarily through the Cooperative Farm Lease. The co-op farmer will be responsible for planting the fields. Permitted crops are listed in the agreement. Other crops not listed will be considered for their compatibility to wildlife related goals. Close coordination with the Columbia Depot staff on field border maintenance, addressing weed issues, and crops left are essential in making the agricultural lands productive to wildlife.

Typical crops planted as part of the co-op farm include corn and soybeans. Corn is the preferred crop, however, the NCWRC recognizes the importance of incorporating soybeans into the cropping rotation. Soybeans decompose rapidly when flooded, losing 86% for their energy content within 90 days of flooding (Ringelman 1990). With the addition of soybeans into the cropping system, the farmer has a larger arsenal of herbicides that can be used to control weeds. With no other warm season cash crop available, except corn, that can equal the monetary value of soybeans, they will continue to be planted. Rotating crops and therefore using different herbicides, the farmer is preventing herbicide resistant weeds from establishing. Cropping also helps control unwanted weeds such as alligatorweed, sesbania, and cattails.

A slow early drawdown should begin in early March. A slow drawdown should reduce water levels slowly concentrating prey for wading birds and shorebirds and offer some mudflats for foraging shorebirds. Maintaining water levels when crops are in the fields is the responsibility of the co-op farmer. As soon as the crops are harvested, NCWRC staff will begin to flood the fields. Water levels will be maintained per schedule listed in the annual Waterfowl Impoundment Water Level Management Plan

To maintain the level of management in the cropped agricultural units, the NCWRC must use the services of co-op farmers. The NCWRC must also provide the infrastructure necessary for adequate water removal from the farm. Installation of water control structures to limit the volume of water to remove from the ponds will reduce pumping cost. Repairs to the flap gates to prevent water from entering the farm will also assist with water level management. These needs are discussed in the Infrastructure Development and Maintenance section of this plan.

The management strategies presented below are for moist soil units that are in rotation with the cropped units.

Agricultural Fields – Moist Soil

Of the seven fields that are in agricultural production, two are being managed as moist soil units. These units are managed independently from the cropped units. Typically, a field is managed for two years as a moist soil unit then returned to a cropped field the third year. The two moist soil units should be rotated into moist soil management in separate years. Discussion for management will address a unit as if it is the first year of moist soil management after cropping.

- Conduct early season drawdown on moist soil unit. Begin pulling boards early March. Complete drawdown by mid-April.

At this point, the field should be moist and may not support agricultural equipment. Within these moist soil units, the goal for an early drawdown is to promote the germination of beneficial plants including smartweed, barnyard grass, some *Panicum sp*. grasses, and some spikerushes (Strader and Stinson 2005). Alligatorweed and sesbania germinate later in the season and an early drawdown with good beneficial plant germination should hinder the germination of alligatorweed and sesbania and out-compete the undesirables that do germinate. Slow drawdowns will concentrate prey for wading birds and offer mudflat foraging areas for shorebirds.

- Supplement moist soil production by planting corn in a portion of acreage. Corn should be planted using a no-till planter to reduce soil disturbance.

If drawdown is complete by mid to late April, the site may be dry enough to support equipment and corn planting. Beneficial moist soil plants are the goal for the moist soil units. Corn planted in the moist soil units will not be harvested and be available for waterfowl. Linear strips of corn will offer some wind breaks, loafing areas, and cover to waterfowl when flooded. Corn should be managed as is in the cropped areas.

- Maintain moist soil conditions to prevent establishment of sesbania, cocklebur, and sicklepod.

Sesbania, sicklepod, and cocklebur germinate best in drier conditions, especially after the soil has been disturbed during the spring. During late May, June, and July, the beneficial plants should be established and out-competing most of the undesirables. Water should fill most of the lateral ditches and the water should be creeping into the field.

- Plant millet in early July.

Areas targeted for planting millet should be those that do not have many beneficial waterfowl plants or areas near blinds. If beneficial plants cover most of the unit, supplemental planting may not be necessary. Plant either Japanese millet or browntop millet. Browntop millet should be planted on the drier sites. Disk or conduct an herbicide burndown on the area to be planted. Broadcast 25 pounds per acre or drill at 18-20 pounds per acre. Pack the seedbed after broadcast seeding. If planting Japanese millet, catch available rainwater after millet reaches 6 inches tall. Do not over top Japanese millet with water. Browntop and Japanese millet have 25% and 57% deterioration when submerged for 90 days respectively (Neely 1956). Although Japanese millet deteriorates quicker than browntop, the growth habitat of Japanese millet is more erect where browntop has a tendency to lodge and lay down putting more of the seed head at or under the water when flooded.

- Control undesirable vegetation.

If an early drawdown is successful in promoting beneficial species, the need for the control of undesirables should be limited. Should small areas of undesirable species develop, NCWRC staff can spot spray using a glyphosate herbicide. Excepted weeds in the moist soil units of the agricultural fields include sesbania, cocklebur, and sicklepod. Larger areas should have been identified, killed through disking or herbicide, and planted in millet. Alligatorweed should be out competed in the fields, but may persist in the canals. Target alligatorweed in May-June when it is blooming with glyphosate or imazapyr. Imazapyr has residual properties and caution should be used in areas that are subject to erosion.

- Create openings in the moist soil units prior to flooding.

Focus openings around blinds by mowing or disking prior to flooding. Open areas are important to provide landing and foraging areas for waterfowl. It is crucial not to create openings too early in the year or efforts will be lost. If disking in late-summer to early-fall, the vegetation will regrow some prior to flooding. Later fall disking should promote smartweed germination the following spring. Planted crops cannot be mowed, burned, or disked. Volunteer crops from prior growing seasons are considered "naturalized" and can be manipulated. For example, Japanese millet readily volunteers the year after the initial planting and that can be mowed.

- Conduct vegetation surveys.

Conduct vegetation surveys to determine vegetation species components in moist soil units prior to flooding. Using notes taken from water levels schedules and vegetation surveys will aid in adapting management decisions in the impoundments.

- Flood - Maintain water levels per schedule.

Within the moist soil units, boards in the water control structures should be set after desirable vegetation is established. Do not over top beneficial plants. Wet to moist conditions are ideal and provide habitat for wading birds and shorebirds. Throughout the growing season, the ditches should be full. Water depths should be beginning to increase in mid-September per schedule.

While our ability to manipulated water levels within the 15 sub-impoundments is adequate most of the time, some situations may arise where ideal conditions for each impoundment may not be achieved. In the moist soil units, water will need to be held at higher levels than the cropped agricultural fields. This may require pumping water into the canals and moist soil impoundments. Water control structures will need to be tight so we do not flood growing agricultural crops. Most of the water needed during the growing season should be caught as a result of rain. As with the water control structures, the impoundment dikes must also be tight. Efforts should be made to repair leaking dikes. Continued trapping efforts should reduce muskrat and nutria populations to prevent dike damage.

E. Desired Future Condition

Desired Future Condition (DFC) may never be achieved in these habitats. Ideally, DFC would be an open landscape that did not produce undesirable/noxious vegetation in the agricultural fields. Undesirable/noxious weeds will continue to pose a management problem on the game land.

Retaining a co-op farmer is crucial in maintaining the level of management in the agricultural fields. The co-op farmer's actions in the cropped areas positively affect the moist soil units. After the two years of moist soil management, that unit is then farmed, eliminating perennial vegetation like cattails and willows. Annual undesirable weeds like sesbania and sicklepod are subjected to several years of herbicide control.

Replacing soybeans within the cropping rotation should be a goal for the management of Futch. Soybeans decompose rapidly in water, can cause compaction issues in the esophagus of waterfowl, and contain digestive inhibitors that reduce the availability of protein and other nutrients (Ringelman 1990). Future co-op contracts may place a limit on the number of units that can be planted in soybeans.

Desired Future Condition would also include the removal of burrowing rodents. A trapping program has reduced numbers of muskrat and nutria.

Catfish Ponds

A. Location and condition of habitat (Fig. 7)

Six former catfish rearing ponds are located in the southwest corner of the property. These ponds are shallow with maximum average depths in the submerged aquatic vegetation (SAV) units during winter near 20 inches.

Modifications to flash board risers have given NCWRC staff greater flexibility in managing water levels. Water is supplied using an electric well. At least 2 of the well outlet tubes feeding the ponds must be open to run the well; otherwise damage may occur to the well system. A one directional lift pump is capable of pulling water from the canal on the western and southern side of the catfish ponds. Impoundments 10, 11, and 12 can drain through impoundments 13, 14, and 15 respectively or water can be drained into small retention ponds and then to timber unit 9. Impoundments 11 and 12 have deeper troughs on the eastern edge that may prevent total draining. Impoundment 10 also has a valved water control structure that allows water to drain into impoundment number 1.

All six impoundments are in good condition. Typically following moist soil management and the first year of SAV management the pond bottoms are firm which helps with walking and SAV establishment. The dikes are in fair to good condition. Muskrats and nutria burrow into the dikes causing some issues. Under both moist soil and SAV management, NCWRC are able to

get good responses from beneficial plants. Cattails and alligatorweed are the major weed species noted in the catfish ponds.

B. Priority Species

Priority game species for the former catfish pond habitats include: northern pintail, American black duck, mallard, green-winged teal, blue-winged teal, American widgeon, wood duck, and tundra swan. The following table lists Federal or State listed non-game species potentially found in these habitats and their conservation status.

Table 3. Listed non-game species associated with the catfish ponds.

Taxonomic Group	Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Bird	Wood stork	*Mycteria americana*	E(T)	S_1B,S_1N,G_4
Bird	Bald eagle	*Haliaeetus leucocephalus*	T	S_3B,S_3N,G_5
Bird	Little blue heron	*Egretta caerulea*	SC	S_3B,S_3N,G_5
Bird	Tricolored heron	*Egretta tricolor*	SC	S_3B,S_3N,G_5
Bird	Snowy egret	*Egretta thula*	SC	S_2S_3B,S_3,G_5
Bird	Glossy ibis	*Plegadis falcinellus*	SC	S_1S_2B,G_5
Mammal	Red wolf	*Canis rufus*	SR(E,XN)	S_1,G_1Q
Reptile	Carolina watersnake	*Nerodia sipedon williamengelsi*	SC	S_3,G_5T_3
Reptile	Pigmy rattlesnake	*Sistrurus miliarius*	SC	S_3,G_5
Reptile	Timber rattlesnake	*Crotalus horridus*	SC	S_3,G_4

For descriptions of Status and Rank codes see Appendix VIII.

Wading birds and shorebirds will take advantage of the catfish pond impoundments that are being managed as moist soil units. The aquatic (SAV) units will be too deep for most of these birds. The pigmy rattlesnake, timber rattlesnake, and the red wolf will hunt on the associated dike system. The aquatic units are flooded for the entire year and offer habitat for amphibians. Fish are a major predator to frog eggs. The aquatic units are drained for moist soil management on a 2 to 3-year rotation limiting fish populations in the catfish ponds. The catfish ponds may offer some of the best habitat for amphibians on Futch.

Wading bird use of moist soil managed catfish pond. Taken by Kimberly McCargo

C. Management Challenges

The catfish ponds are in fairly good condition. There are some challenges, however, that need to be addressed. Alligatorweed and cattails are the most prevalent weed species noted in the catfish ponds. Alligatorweed is the most difficult to control. Within the moist soil units, alligatorweed can cover a large portion of the pond. During aquatic management, alligatorweed control is difficult and NCWRC would have to use boats rigged with handheld sprayers. Cattails in the catfish ponds must be sprayed to be controlled. Without the disturbance and herbicide program that exist in the agricultural fields, cattails in the catfish ponds become established as a result of moist soil to aquatic management and longer inundations. Left unchecked, cattails can cover most of a unit.

Large canals that typically hold water the entire year, the large canal running along US 64, and the aquatic units in the catfish ponds offer ideal habitats for muskrat and nutria. Dike damage from the burrowing rodents can make dikes impassible to equipment, hindering the ability to manage the farm. Water leakage through the dikes, as a result of burrowing muskrats and nutria, can hinder the ability to drain or flood the units.

Pulling water off and adding water when needed can be a management challenge. Drawdowns are hampered during wet spring and summer prohibiting the settling and packing of the pond

bottoms. Flooding the ponds is done by an electric well and by catching available rain water. As many as 3 moist soil managed ponds will need flooding through late summer to early fall from 1 well. Balancing the needs for waterfowl looking for resting and foraging areas during the migration north, the needs for shorebirds and wading birds during March, April, and May, amphibian needs during the spring and summer will be a high priority. Managing for the different needs will be discussed in the Management Strategies and Needs section.

Throughout the spring and summer the SAV ponds have water in them and the warming water can create conditions favoring algae development. Filamentous algae can impact SAV production.

D. Management Strategies and Needs

Catfish Ponds – Submerged Aquatic Vegetation

A main objective stated in the grant proposal for the acquisition for Futch called for the restoration/establishment of SAV's in the former catfish ponds. Sago pondweed tubers were planted in the catfish ponds to meet this requirement. SAV species that may be found in the catfish ponds include muskgrass, southern naiad, water hyssops, sea purslane, and sago pondweed. Sago pondweed is by far the dominate species in the aquatic units.

Typical management of the SAV ponds includes 2-3 years of SAV management followed by 1 year of moist soil management. Vegetation surveys in the fall and considerations for pond bottom firmness will be used to determine which SAV ponds to convert to moist soil units the following year. During the first year of SAV management, the catfish ponds have had good responses of sago pondweed. The second year the pond is in aquatic management, sago production is still good but open areas in the vegetation can be found. The bottoms of the ponds begin to soften and the water is turbid. The softening of the bottoms can be described as a 4 to 6-inch layer of chocolate pudding above a somewhat firmer floor. These conditions make walking in the ponds difficult. The described layer of semi-suspended soil particles limits the establishment of SAV's and the habitat quality for waterfowl is diminished. Below is a typical management scenario for SAV management in the catfish ponds the first year of aquatics after moist soil management.

- Maintain water levels per schedule.

Water levels during the winter months following moist soil management should be around 10-12 inches. Maintain these levels through spring.

- Control undesirable vegetation in May-June.

Anticipated weeds include alligatorweed and cattails and can be controlled with an aquatic labeled glyphosate or imazapyr product. For large areas that need to be spot sprayed, a boat rigged with a hand held sprayer should be sufficient. In rare cases, aerial applications by

contract may be required. Alligatorweed is a persistent problem around the edges of the ponds and can be controlled using a truck with a slip-on sprayer unit.

- Monitor algae growth.

The warmer days can warm water and may create conditions that favor algae growth. If algae problems exist, flush cooler well water through the pond. This should lower the water temperature reducing algae growth.

- Maintain water levels.

During the summer months, there is some discretion in maintaining water depths. Staff should note how the SAV's are growing. The goal is to keep the water at or above the growing SAV's. This may mean adding water to the pond above that which is prescribed.

- Conduct vegetation survey and pond bottom firmness assessment.

Surveys are critical in determining which ponds are performing well and which ponds to transition to moist soil management the falling year. Surveys should be conducted in late fall prior to waterfowl arrival.

- Begin dropping water levels per schedule in October.

Water levels may be as high as 22 inches in September depending on SAV growth. These depths are too deep for dabbling ducks and wading birds. Reducing water levels will allow the SAV's to be assessable to arriving waterfowl. Water levels should be maintained at 10-12 inches through the winter.

Needs for management of the SAV units are being met. Being able to pump water on or move water off the units is critical to the management of the SAV units. Weeds will need to be controlled at times through various methods. Currently, all needs are being met.

Catfish Ponds – Moist Soil

Managing for SAV's requires a period of moist soil management. Moist soil units in the catfish ponds fit in well with the overall species management goals set for Futch. As mentioned in the introduction to the Habitat Communities section of this plan, each sub-impoundment is but one unit in the complex called Futch. The catfish ponds that are being managed as moist soil units fill a habitat management niche that is lacking throughout the rest of Futch. Typically, 2-3 of the catfish ponds are being managed as moist soil units in a given year. Water levels will begin to drop in late March with final drawdown and bottom cracking in June and July. This long drawdown period coincides well with spring migration and nesting season for wading birds and shorebirds providing shallow water and exposed mudflats. The extended inundation period allows amphibians more time to lay eggs and for the development of the tadpoles. Ducks and

swans migrating north will concentrate on both the moist soil and aquatic managed catfish ponds.

Unlike the moist soil units in the agricultural fields where the objective is to conduct an early drawdown, the objective for the moist soil units in the catfish pond is for a slow mid-season drawdown. Mid-season drawdown takes place later in the growing season and the vegetation response will be different than in the agricultural fields. Beneficial vegetation observed in the moist soil units as a result of mid-season drawdowns include, Walter's millet, fall panicum, spikerushes, foxtails, and sedges. Smartweed is typically found along the banks and the upper ends of the ponds as a result of those areas drying before the rest of the pond.

Management recommendations described below represent a SAV unit transitioning to a moist soil unit.

- Maintain water level per schedule.

Allow water levels to naturally drop from February 1 until the end of March. During April, May, and June remove 2-3 inches of water a month until dry. Either the pump on the southern end of the property will need to be used or the hub pump pulling water through the timber units.

- Remove all water from the pond. Allow "cracking" of the pond bottom.

By late June, all the water should be removed. The goal for moist soil management in the catfish ponds is to firm up the bottom of the pond. This will allow for a firmer seedbed for moist soil plants and a firm seedbed for SAV growth the following years. The term "cracking" refers to the soil drying to a point that the ground cracks. This cracking action naturally promotes the establishment of grasses, like fall panicum, foxtail, and Walter's millet.

During wet spring and summers, cracking may not occur. During these years, spikerushes and sedges are likely to be the dominate beneficial vegetation species. Walter's millet and fall panicum are expected to be found on the few dryer sites.

- Control undesirable vegetation.

Alligatorweed, cattail, and sesbania are expected in the catfish pond moist soil units. As mentioned in the introduction to the Habitat Communities section, mid-season drawdowns will benefit the establishment of alligatorweed and sesbania. Alligatorweed is currently the largest threat to the moist soil management. Treat alligatorweed with a glyphosate product in May-June as soon as equipment can get into the units. Imazapyr products will continue to be soil active and therefor prohibiting germination of beneficial vegetation.

Cattails can be treated with glyphosate at the same time when alligatorweed is being treated. Sesbania had not been a problem in the catfish ponds, however, mid-season drawdowns favor the germination of sesbania. Sesbania tends to establish in areas that are disturbed. This condition

may not exist in the catfish pond and therefore had not been a problem. Staff should note if sesbania is establishing in the catfish pond and should either spray or pull up existing plants.

- Plant Japanese millet in early July.

Japanese millet can be planted in early July. Disk areas or spray a glyphosate product on areas to be planted. Potential areas to be planted are areas that were sprayed to control alligatorweed. Do not destroy good stands of smartweed, wild millets, foxtails, or panic grasses just to plant Japanese millet. Drill 18-20 pounds per acre or broadcast 25 pounds per acre followed by a packer to provide good seed soil contact.

- Begin catching water and flooding ponds.

After cracking, beneficial grasses should begin to establish. Set boards to catch available rainwater. If Japanese millet has been planted, catch available water but do not overtop young millet. Begin pumping into the ponds per schedule starting in early September.

- Conduct vegetation surveys.

Surveys should be conducted in late fall prior to waterfowl arrival.

- Maintain water levels per schedule.

Maintain water levels through the hunting season and the transition to SAV management.

To maintain the catfish ponds, the ability to move water is a must. Currently, the well is functioning allowing NCWRC staff to flood the ponds when needed. Maintaining a functioning pump on the southern edge of the property will allow for the greatest opportunity to remove water when needed. Installation of a water control structure on the western canal will help the farmer from having to pull the water from the entire canal during the growing season reducing his operating costs.

NCWRC staff need to secure funding for contract trapping to remove nutria and muskrat. Current efforts to control muskrat and nutria through fur trapping during the trapping season using permitted trappers have been ineffective. Catches of non-target species are high during February.

E. Desired Future Condition

As mentioned in the Management Challenges section, nutria and muskrats, cattail and alligatorweed, and water manipulation problems all impact the management of the catfish ponds. A DFC would be to have the catfish ponds without issues resulting from the sources mentioned above. Outside of those unrealistic desires, the catfish ponds are managed effectively. Continued funding for staff, contract work, materials, and equipment will aid the NCWRC in maintaining the important SAV and moist soil impoundments.

Timber Units

A. Location and condition of habitat (Fig. 7)

Two timber units lie on the southeastern part of the game land. Impoundment #8 and Impoundment #9 are 29.5 acres and 21.8 acres respectively. Both impoundments are being managed as moist soil units. Impoundment #8 has 10 acres that were cleared prior to State acquisition that can be planted in millet to supplement the natural foods offered by moist soil management. Impoundment 9 is completely forested. A tornado in April 2011 obliterated Impoundment #9 knocking down most of the timber and injuring much of the rest. This disturbance likely resulted in more sunlight reaching the forest floor and stimulating moist soil vegetation growth.

Flooded timber unit. Taken by William Ridgeway

B. Priority Species

Priority game species for the timber units include: northern pintail, American black duck, mallard, green-winged teal, blue-winged teal, and wood duck. The following table lists Federal or State listed non-game species potentially found in these habitats and their conservation status.

Table 4. Listed non-game species associated with the timber units.

Taxonomic Group	Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Bird	Wood stork	*Mycteria americana*	E(T)	S_1B,S_1N,G_4
Bird	Bald eagle	*Haliaeetus leucocephalus*	T	S_3B,S_3N,G_5
Bird	Little blue heron	*Egretta caerulea*	SC	S_3B,S_3N,G_5
Bird	Tricolored heron	*Egretta tricolor*	SC	S_3B,S_3N,G_5
Bird	Snowy egret	*Egretta thula*	SC	S_2S_3B,S_3,G_5
Bird	Glossy ibis	*Plegadis falcinellus*	SC	S_1S_2B,G_5
Mammal	Red wolf	*Canis rufus*	SR(E,XN)	S_1,G_1Q
Reptile	Carolina watersnake	*Nerodia sipedon williamengelsi*	SC	S_3,G_5T_3
Reptile	Pigmy rattlesnake	*Sistrurus miliarius*	SC	S_3,G_5
Reptile	Timber rattlesnake	*Crotalus horridus*	SC	S_3,G_4

For descriptions of Status and Rank codes see Appendix VIII.

Wading birds and shorebirds will take advantage of the moist soil management inside the timber units. Pigmy rattlesnakes, timber rattlesnakes, and red wolves will hunt on the associated dike system and may be found inside the unit in the summer and fall.

C. Management Challenges

Challenges facing the management of the timber units include access, vegetation management, and dike repair. Access for equipment in Impoundment #8 is currently adequate to maintain the openings. There are six sections that make up the 10 acres of openings divided by ditches. Access to each section is from the western side of the impoundment. The access paths should be maintained for ingress and egress of equipment.

Maintaining the openings will continue to be a challenge. Past staffing levels dictated that these openings received low priority. Infrequent soil disturbance levels favor the establishment of woody and other perennial vegetation. With the creation of an addition management crew stationed in Columbia, staff can refocus on this unit. Phragmites, cattails, and sesbania will be an increasing management concern in the openings. The tornado reduced the number of living trees in Impoundment #9 thereby creating a more open understory instead of a dense canopy. There are no known management challenges to Impoundment #9 except dike maintenance.

Dike maintenance in both units will be a management challenge. Muskrat and nutria damage will continue to be a concern. The deep canals offer yearlong habitat to both species. Trapping

to remove nuisance animals is the only management solution. Staff should side mow these dikes as needed to prevent trees from establishing.

D. Management Strategies and Needs

Unlike the moist soil habitat offered in the catfish ponds, the timber units offer a sheltered loafing area and de facto refuge area for waterfowl. During the early waterfowl permit hunts, hunters are able to hunt within the zone for which they were drawn due to some impoundments not having huntable water, but during the late season waterfowl hunts, hunters apply for and are selected to hunt a blind. There are no blinds in the timber units so these units are refuge areas. The standing trees and bushes offer wind breaks for loafing waterfowl.

During the wood duck nesting and brood rearing season, the timber unit is flooded. As water is pulled down in late April and early May broods will use the canals surrounding the timber units. Wading birds use both units during this period.

One consideration NCWRC staff need to evaluate is the seedling growth and the vigor of mature trees in the timber units. This will impact Impoundment #9 as this unit is completely forested. One method to stimulate regeneration is to flood during the dormant season for 3 years and then allow the unit to remain dry for two years (Williams et al. 2002).

Management recommendations below are similar to that described for the moist soil units in the catfish ponds. The goal for the timber units will be to provide additional moist soil habitats. Slow mid-season drawdowns will promote Walter's millet, fall panicum, foxtails, and sedges.

- Maintain water level per schedule.

Allow water levels to naturally drop from February 1 until the end of March. During April, May, and June remove 2-3 inches of water a month until dry.

- Control undesirable vegetation.

Cattail, phragmites, and sesbania are expected in the timber units. As mentioned in the introduction to the Habitat Communities section, mid-season drawdowns will benefit the establishment of sesbania. Areas that stay extremely wet during most of the growing season are susceptible to cattails. Imazapyr products will continue to be soil active and therefor prohibiting germination of beneficial vegetation.

Cattails can be treated with glyphosate at the same time when alligatorweed is being treated. Sesbania had not been a problem in the timber units in the past, however, mid-season drawdowns are favorable for the germination of sesbania. Sesbania tends to establish in areas that are disturbed. Staff should note if sesbania is establishing in the timber units and should either spray or pull up existing plants.

- Plant Japanese millet in early July.

Unlike the catfish ponds, "cracking" may not occur in the timber units. Impoundment #8 will likely dry out enough to allow agricultural equipment to disk the openings. Japanese millet can be planted in early July. Disk areas or spray a glyphosate product on areas to be planted. Potential areas to be planted are areas that were sprayed to control weeds. Do not destroy good stands of smartweed, wild millets, foxtails, or panic grasses just to plant Japanese millet. Drill 18-20 pounds per acre or broadcast 25 pounds per acre followed by a packer to provide good seed soil contact.

- Begin catching water and flooding ponds.

After beneficial vegetation establishes, set boards to catch available rainwater. If Japanese millet has been planted, catch available water but do not overtop young millet. Begin pumping into the ponds per schedule starting in early September.

- Conduct vegetation surveys.

Surveys should be conducted in late fall prior to waterfowl arrival.

- Maintain water levels per schedule.

Needs to manage both timber units include a functioning hub pump. Nearly all the water in the timber units is either pumped in or pumped out through the hub pump. NCWRC staff will need to work to maintain the openings. Staff should monitor weeds and actively address infestations.

NCWRC staff need to secure funding for contract trapping to remove nutria and muskrat. Current efforts to control muskrat and nutria through fur trapping during the trapping season using permitted trappers have been ineffective. Catches of non-target species are high during February.

E. Desired Future Condition

For Impoundment #8, a DFC would be for staff to maintain access into each opening and maintain those openings to prevent perennial vegetation from overtaking the openings. Eliminating the threat of phragmites and sesbania will aid in the management of Impoundment #8. A DFC for Impoundment #9 would include the regeneration of the canopy structure similar to one prior to the 2011 tornado.

As mentioned with each habitat types above, the removal of muskrats and nutria would aid in maintaining the dike system.

Canals, Ditches, and Permanent Pond

Canals, ditches, and a permanent pond are not actively managed as the habitat communities discussed above, but they do deserve a mention as an important habitat to wading birds, reptiles, and amphibians. The canals and the "brooder" pond hold water the entire year. These areas

provide habitat for aquatic snakes and turtles. During early spring drawdowns, prey is concentrated where ditches empty into canals. Wading birds take advantage of this opportunity.

Infrastructure Development and Maintenance

The built infrastructure should provide for sufficient access and use for wildlife-related recreation, support management activities, and should not negatively impact habitats or wildlife resources. Some guiding principles for developed infrastructure on the J. Morgan Futch Game Land are listed below:

- All weather access should be provided to key locations on the game land.
- Disabled access should be made to facilities where possible.
- Erosion related to infrastructure should be avoided, minimized and/or mitigated.
- While meeting user and management needs, built infrastructure should leave a minimal footprint on the game land.

Assessments of existing infrastructure throughout the J. Morgan Futch Game Land were conducted by Engineering and Lands Management staff in 2014. The infrastructure map included show the location of existing roads, parking areas, wells, pumps, and dikes within the game land (Fig. 8). The results of the assessments along with the recommendations for maintenance and improvements are discussed by category below.

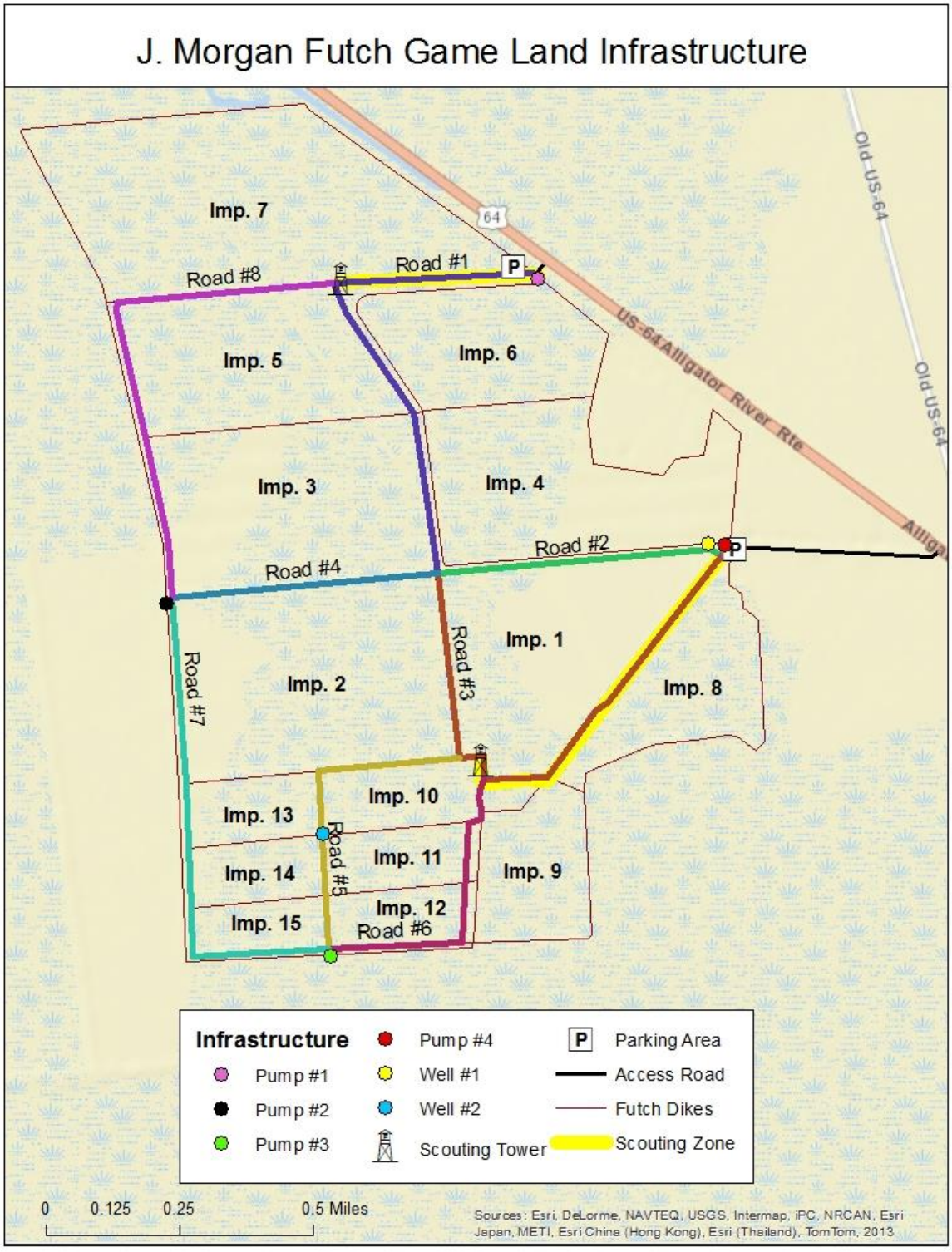

Fig. 8. J. Morgan Futch Game Land Infrastructure

Road Assessments

The game land has a fairly extensive road network given the relative small size of the property. Access is provided to the entire game land. These roads were inspected by Engineering and Lands Management staff over several dates in February and May of 2014. The waterfowl impoundments were flooded during the inspection in February, and they were drained during the inspection in May. Meetings were also held to discuss the current infrastructure conditions and future needs.

Access is provided to nearly all areas of the game land. Currently, there is no vehicle access into the game land. Only NCWRC staff and the contract farmer have access into the game land. Gates are located at the two entrances to the game land off of US 64. The roads are used by NCWRC staff to access the game land for maintenance and conservation work. They are also used by the contract farmers and staff for planting, tending, and harvesting crops.

Existing Road Conditions

All of the roads on Futch are located on the dikes between the impoundments and canals. They are all dirt roads. There are no hard surfaced or all-weather roads (gravel or pavement) on the game land with the exception of the roads from US 64 to the parking areas. The dirt roads require minimal maintenance due to the limited traffic on the game land. However, the dirt roads can make access difficult during wet weather. One other problem observed with the roads and dikes was damage created by burrowing rodents. Similar to dams, the burrows can lead to holes in the road that make passage impossible. At the time of the inspections, all of the roads were passable, however, holes were noted in several locations.

Overall, the game land has a good road network that allows access to all of the game land. However, as noted, none of the roads on the game land are all-weather roads. The dirt roads do not make a stable road surface.

In order to stabilize the road surface and provide a fully passable road, an all-weather surface should be installed. Due to cost, gravel is the best option for the majority of the roads on the game land. In addition to gravel, filter fabric may also be required below the stone on the subgrade to prevent the stone base from migrating into the soil below. The road must be graded with a crown to provide drainage off of the road surface and to extend the life of the gravel. Drainage ditches will likely not be required for most of the roads on the game land since the roads are flat and elevated. They also drain directly into the impoundment areas. Finally, native, grassy groundcover should be established on all disturbed and/or bare areas adjacent to the roads. Established groundcover will minimize erosion by stabilizing the soil.

Future Road Improvements

Maintenance and needs for future improvements were identified on several sections of game land roads. The recommended road improvements are discussed in this section and grouped by priority as follows:

High Priority

As mentioned above, all of the roads on Futch are made of dirt. Over the next ten years, the highest priority roads (in descending order) to upgrade are the following:

- Road #1 – Access Road from Parking Area #1 west to Observation Deck #1 and south to the junction of impoundments 1, 2, 3, 4
- Road #2 – Access Road from Parking Area #2 west to the junction of impoundments 1, 2, 3, 4
- Road #3 – Access Road from Parking Area #2 southwest to Observation Deck #2 and north to junction of impoundments 1, 2, 3, 4

Road #1

As mentioned above, this road is located on the dike between the impoundments. It begins at parking area #1 off of US 64 and travels west to observation deck #1 (the junction of impoundments 5,6, and 7). It then heads south to the junction of impoundments 1, 2, 3, and 4. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 18' wide should be sufficient for this road. The section of road needing repair is approximately 0.80 miles long and will have an estimated cost of $160,000.

Road #2

Road #2 begins at parking area #2 and travels west to the junction of impoundments 1, 2, 3, and 4. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.50 miles long and will have an estimated cost of $100,000.

Road #3

Road #3 begins at parking area #2 and travels southwest to observation deck #2, then north to the junction of impoundments 1, 2, 3, and 4. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. The section of the road running southwest from parking area #2 to observation deck #2 is low in places. During the inspection in February when the impoundments were flooded, there was very little freeboard from the water surface to the road surface and standing water from the impoundment was observed in several areas. So, the road will need to be raised in several places. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.90 miles long and will have an estimated cost of $180,000.

Medium Priority

The roads listed above have been rated as the highest priority for repair over the next ten years. However, they are not the only roads on the game land in need of upgrade. The roads listed

below (in descending order) are considered as medium priority and should be repaired after the high priority projects are completed.

- Road #4 – Access Road from the junction of impoundments 1, 2, 3, 4 west to Pump #2
- Road #5 – Access Road from Observation Deck #2 to Pump #3

Road #4

Road #4 begins at the junction of impoundments 1, 2, 3, and 4 and travels west to pump #2. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.40 miles long and will have an estimated cost of $80,000.

Road #5

Road #5 begins at observation deck #2 and travels west and then south to pump #3. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.50 miles long and will have an estimated cost of $100,000.

Low Priority

Other roads on the J. Morgan Futch Game Land in need of repair or upgrade are listed below. These are considered the lowest priority for this assessment. However, there are more roads not listed that also need upgrades.

- Road #6 – Access Road from Observation Deck #2 to Pump #3
- Road #7 – Access Road from Pump #2 to Pump #3
- Road #8 – Access Road from Observation Deck #1 to Pump #3

Road #6

Road #6 begins at Road #3 (just south of observation deck #2) and travels south then west to pump #3. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.50 miles long and will have an estimated cost of $100,000.

Road #7

Road #7 begins at pump #2 (the west side of impoundments 2 and 3) and travels south to the southwest corner of the game land then east to pump #3. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.75 miles long and will have an estimated cost of $150,000.

Road #8

Road #8 begins at observation deck #1 and travels west to the southwest corner of impoundment 7 then south to pump #2. At the time of inspection, this section of road was passable, however it is a dirt road. The intent would be to install a gravel road surface to make the road accessible under all weather conditions. A road cross-section that is approximately 12' wide should be sufficient for this road. The section of road needing repair is approximately 0.80 miles long and will have an estimated cost of $160,000.

New Road Construction

As mentioned above, Futch has an extensive road network. All of the roads are located on the tops of the dikes. As such, access is available to entire game land. For this reason, no new roads are proposed.

Road Maintenance

All roads require inspection and maintenance to function well and avoid damage and deterioration. Maintenance should be performed regularly, as the longer the delay in needed maintenance, the more damage will occur and the more costly the repairs will be.

Typical Road Maintenance Practices

- Inspect Roads regularly, especially before the winter season and following heavy rains.
- Keep ditches and culverts free from debris (see also Culvert Maintenance Section of this Management Plan).
- Remove sediment from the road or ditches where it blocks normal drainage.
- Regrade and shape the road surface periodically to maintain proper surface drainage.
    - Typical road should be crowned at approximately 4%, or ½" per foot.
    - Some roads may not require a crown, but should have a constant cross slope (super-elevation).
    - Gravel should be distributed at an even depth across the road.
    - Gravel should have an even distribution of fine and course materials.
    - Keep downhill side of the road free of berms, unless intentionally placed to control drainage.
    - Proper maintenance and grading of the road will require a motor grader and a roller.
- Avoid disturbing soil and vegetation in ditches, shoulders, and cut/fill slopes to minimize erosion.
- Maintain shoulders on both sides of the road to ensure oncoming vehicles have enough room to pass. Shoulders should be relatively flat, with a mowed grass surface.
- Maintain an erosion-resistant surfacing such as grass or rip rap in ditches.
- If it is determined that a road needs major repairs or upgrade, contact Regional Supervisor and Design Services to schedule an assessment.

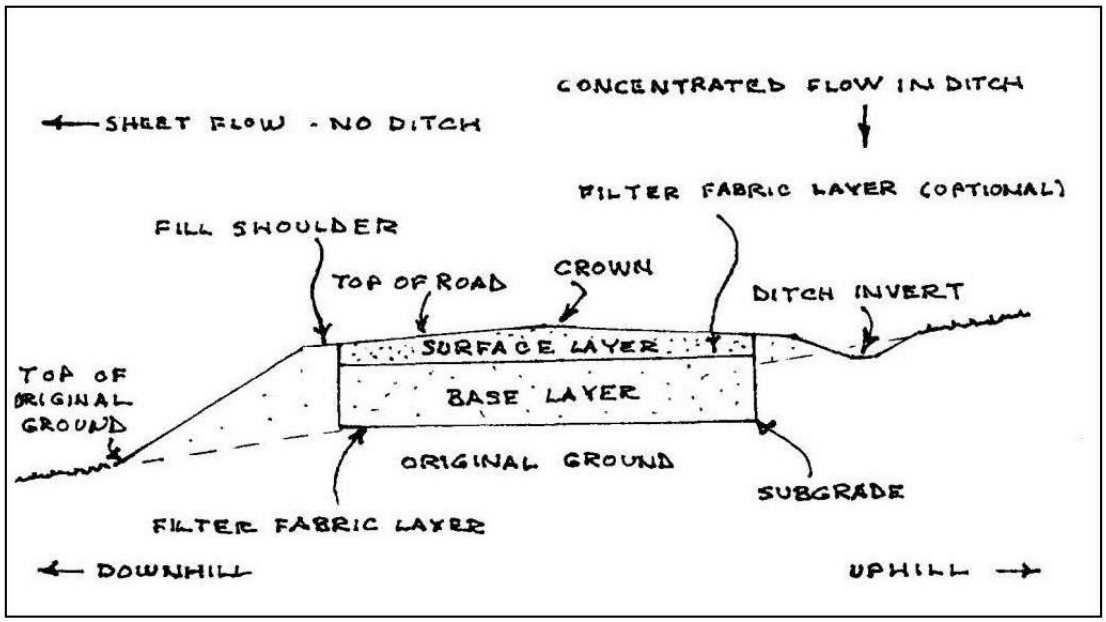

Fig. 9. Typical Road Cross-Section – Canaan, NH Highway Department

Road Safety Features

- Remove trees and other vegetation as necessary to provide adequate sight distance and clear travel way.
- Install and maintain road signage. This includes:
  - Stop signs –Should be installed as necessary at every intersection, with the signs on the minor roads.
  - Warning signs – Should be installed to warn the public of any road closures or problems in the game land.
  - Road/Route signs – Should be installed at every road intersection on a game land.
  - Information kiosks with Game Land road map – Entry signs should be installed at every entrance to a game land off of a DOT road. Information kiosks should be located near the entrances and in parking areas.
  - Signs should be initially installed at areas with higher traffic volumes. Additional signs should be installed as deemed necessary.

Troubleshooting

<u>Road Surface Problems</u>

Problem: Longitudinal erosion of the road surface
Possible Causes:

- Flat or U-Shaped road. A crown or super-elevation of the road is needed to shed water laterally off the outer edges of the road surface

- Small ridge of soil or grass growth along the outer edge of the road is preventing water from draining off the road surface. Edge needs to be graded to remove this ridge.
- Water is traveling in a wheel rut. Road needs to be regraded. This problem often results from soft roads.
- Road ditch is not large enough and overflows onto road surface. Install more frequent turnouts to get water away from the road or increase the size of the ditch.

Problem: Lateral erosion cutting across the road surface
Possible Causes:

- Most often occurs at a low spot in the road or where a ditch filled in and no longer functions. Water builds up and overtops and erodes the road surface. A culvert should be installed in this location.

Problem: Potholes
Possible Causes:

- Potholes are typically caused by insufficient crown or road cross slope. The road should be re-graded to remove the potholes, then re-crown or super-elevate the road as necessary.

Ditch Problems

Problem: Bottom of ditch is eroding
Possible Causes:

- Slope of ditch is too steep to handle the flow without additional protective measures, which include addition vegetation, erosion control mats, rip rap, check dams, etc.
- Ditch is too small to handle the volume of water flowing through it. May need to install periodic turnouts to reduce flow through the ditch.
- Bottom of ditch is too narrow and needs to be widened to a parabolic shape.

Problem: Sides of ditches are slumping or eroding
Possible Causes:

- Side slopes are too steep and need to be lessened by digging them back to flatten the slope.
- Side slopes need to be stabilized with additional vegetation, erosion control mat, or rip rap.

Parking Areas

There are two existing parking areas on the J Morgan Futch Game Land. Both lots are located on the east side of the game land and are accessed off of the east side of US 64. The northern lot (parking area #1) is located directly off of US 64. The southern lot (parking area #2) is located approximately 0.30 miles off of US 64 at the end of a gravel road. Both lots are gravel.

Parking area #1 contains approximately 15-20 parking spaces. This is an adequate amount of parking at this location. However, the parking spaces are not well delineated. So, it would be good to grade the parking lot and delineate the parking. It would also be good to install a

concrete, ADA accessible parking space and aisle. The estimated cost for these improvements would be approximately $30,000. Based on conversations with NCWRC staff, it was indicated that NCDOT may be preparing to widen US 64 in this location. Prior to doing any work on the lot, the plans for the road widening should be reviewed to ensure that no improvements will be impacted.

Parking area #2 contains approximately 15-20 parking spaces as well. This is an adequate amount of parking at this location. Similar to parking area #1, the parking spaces are not well delineated. The parking lot is also extremely narrow, which leads to parallel parking, difficult maneuvering, and narrow drive aisles. Ideally, a bulkhead would be installed on the south side of the existing lot to increase the width of the parking area to provide more maneuvering room. A concrete, ADA accessible parking space and aisle should also be considered. The estimated cost for these improvements would be approximately $90,000.

Gates

Gates should be used on game lands for maintenance and habitat conservation. For maintenance purposes, gates should be used to limit access to roads that are unsafe or are in disrepair, or to limit use on roads to certain times a year in order to minimize the wear and deterioration of the road.

All gates installed on game lands should be the standard swing gate and painted orange for maximum visibility. No cable gates should be installed, and any existing cables should be replaced.

Gates are currently installed at both parking areas to limit vehicular access into the game land. Currently, the only vehicular access is for NCWRC staff and the contract farmer that tends the land. There are four gates at parking area #1, and there is one gate at parking area #2. No new gates are proposed as part of this management plan.

Drainage Structure Assessments

Dam/Dike Assessments

There are no official dams on the J. Morgan Futch Game Land. However, nearly the entire game land consists of waterfowl impoundments separated by earthen dikes and water control structures. Many of the same maintenance requirements for dams are required on the dikes and structures.

Woody and thick vegetation should be removed from the dikes. Larger trees should be cut down, the root ball should be excavated, and the cavity should be filled with compacted dirt. Smaller trees can either be mowed or cut down with the root balls remaining in place. Following tree removal, a healthy stand of grass should be established. The tops and sides of the dikes should be graded to provide smooth surfaces and any erosion should be repaired. Any bare areas should be seeded and stabilized. Burrowing rodents should be removed as often as required.

The burrow may lead to holes and possible failures of the dikes. The burrows should be excavated, and compacted fill should be placed in the hole.

Overall, the dikes on the J. Morgan Futch Game Lands are in relatively good condition. An operations and maintenance plan should to be put together and followed for maintaining the dikes and water control structures with regularly scheduled inspections.

Water Control Structures

All of the water control structures observed consisted of approximately 36-42 inch diameter semi-circle CMP risers with flashboards. The barrels of the structures are all 18-24 inch CMP pipe. These structures are effective at maintaining specific water levels, however, they can be dangerous to adjust and maintain. As a result, extreme caution must be used when working around these structures.

All of the structures inspected appeared to be in good shape. However, some of the riser top elevations are not set high enough to impound water to the desired depth. Currently, many makeshift solutions are being used to increase the water depth such as blocking the top of the riser with plywood. Ideally, the risers that are not at the correct elevation should either be removed and reinstalled at the correct elevation or modified to change the elevation.

Another potential problem with the risers is their location. Most of them are located out in the impoundments and canals. This is not a big problem since the water is relatively shallow, and waders can be used to reach most of the risers. However, some of the risers (particularly in the diversion canals) are located in deeper water. At the time of inspection, there were some wooden foot bridges leading to some of the risers. These bridges do not appear to be structurally sound, and they do not meet any safety requirements for widths and hand rails, in particular. A potential solution for these areas is to install a full circle riser near the water's edge with an inlet barrel extending into the canal or impoundment. The bridges could also be replaced with steel or aluminum structures to provide better and safer access.

As part of the inspection, it was noted that the riser in the southeast corner of the game land is only accessible by boat. A small bridge for pedestrian traffic only could be installed at this location to provide better access to the structure. The estimated cost to install or replace the bridges could range from $10,000 to $25,000 per bridge depending on the size and foundation requirements.

Another scenario that was observed occurred where culverts are currently installed in the diversion canals. Water control structures could be installed at these locations to better control water in the impoundments. One location where a structure would be beneficial is near the southwest corner of impoundment #2 in the diversion canal. The estimated cost to install water control structures could range from $5,000 to $15,000 per structure depending on the size and any dewatering measures that may be required.

If problems arise with the outlet structures, it would be worth looking into replacing them with concrete structures that may offer greater durability and longevity. However, the additional cost of concrete structures will have to be considered.

Diversion Canals

There are multiple diversion canals used to drain and fill the impoundments on the game land. The canals require periodic cleaning to remove excess sediment and aquatic vegetation that can accumulate. Sediment and vegetation can limit the flow to the impoundments and pumps. It can also clog culverts and water control structures. It would also be beneficial to upsize the water control structures and barrels and culverts at the ends of the canals to allow greater water flow and lessen the impacts of the any accumulated sediment and aquatic vegetation.

Dam/Dike/Impoundment Maintenance

Dams are complex structures that consist of many parts (Fig. 10). In order to prevent failures, dams must be inspected to identify potential problems, and maintenance must be performed to prevent deterioration of the structure that may result in failures. Because of their complexity, dams can fail in many ways including, but not limited to, overtopping, seepage failure, and structural failure.

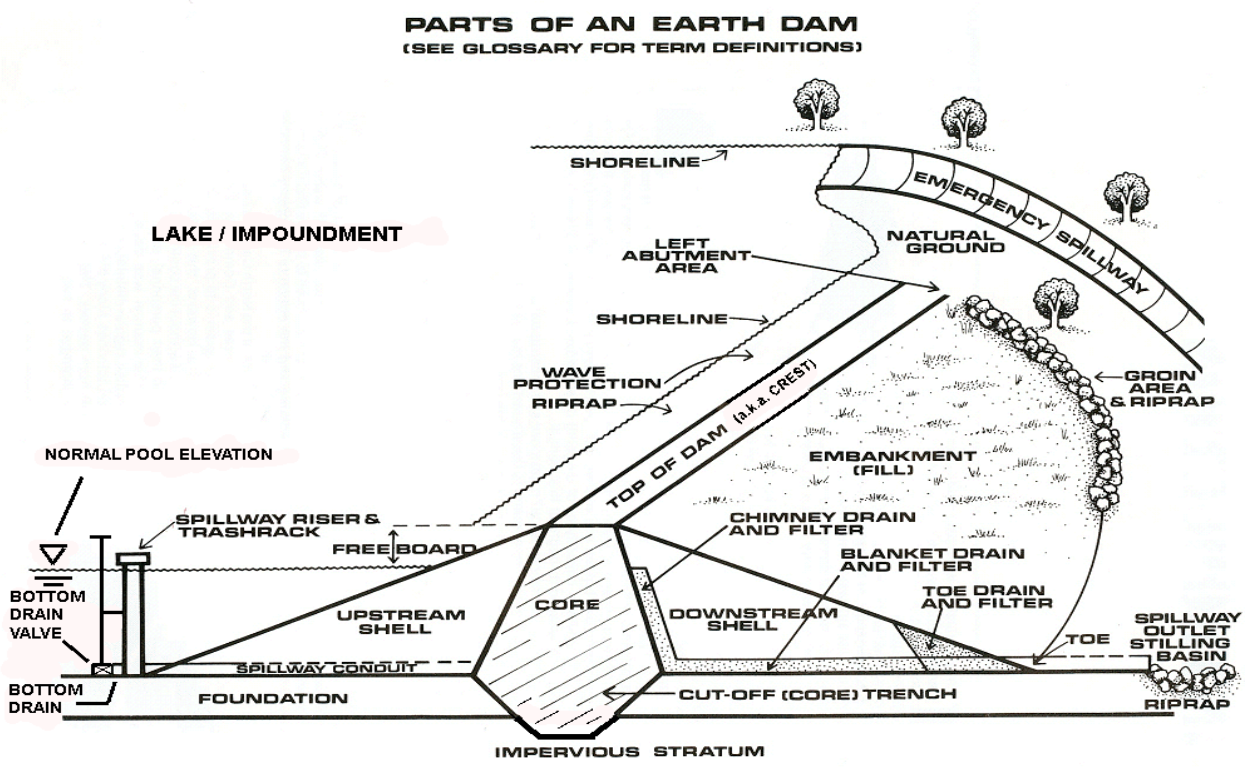

Fig. 10. Parts of an Earthen Dam (from Dam, Operation, Maintenance, and Inspection Manual – NCDENR Land Quality Section)

Periodic inspection of dams is very important. Dams should be thoroughly visually inspected by technician staff at least twice a year, once in the summer and once in the winter. A closer inspection of the embankment can be made in the winter when the vegetation is dormant and in the summer after the embankment has been mowed. An engineer should be contacted after the embankment has been mowed. Ideally, an engineer will inspect the dam once per year. An engineer should be contacted any time of the year if a problem is observed. Each component of the dam should be inspected for problems, and corrective action should be taken as necessary. Records of inspections and corrective measures should be kept on hand to monitor any problems that may be observed. Checklists for inspections are available in the "Dam, Operation, Maintenance, and Inspection Manual" published by NCDENR.

A healthy stand of grass should be maintained on the dam embankment, toe, groin, top (if a road is not present), and in the emergency spillway to prevent erosion. Shrubs and woody vegetation should not be allowed on the embankment or in the spillway. Roots can cause seepage paths, and trees that fall can leave large holes that can weaken the dam. Brush and trees can also make it difficult to visually inspect the embankment for other issues, and they also provide a haven for burrowing rodents. They also prevent grass growth. As such, all trees, shrubs, and bushy vegetation should be removed from the dam. Embankments should be mowed at least once a year with equipment capable of navigating the potentially steep slopes and capable of removing small woody growth. Emergent vegetation on the shoreline of the embankment should also be controlled. Commercial herbicides can be used in these areas, however all application instructions, environmental precautions, and safety practices should be followed.

Any and all erosion observed on the embankment, on the groin, and in the emergency spillway should be addressed immediately. Vegetation should be re-established in the eroded area by adding soil as necessary and installing topsoil and fertilizer if necessary prior to seeding. Turf reinforcing mat may also be required to stabilize the repair. The cause of the erosion should also be addressed. The upstream face/shoreline of the embankment should also be checked for erosion. This may be caused by wave action. These areas should be repaired immediately by excavating out the eroded material and installing filter fabric and rip rap to prevent further damage.

Dam inspections should also address seepage that is observed. Seepage can occur anywhere on the downstream face, around principal spillway pipes, or beyond the toe of the dam. Seepage may vary in appearance from a soft, wet area to a flowing spring. These areas may show up as areas where the vegetation is more lush and darker green. Marsh or wetland vegetation may also be present in these areas. Seepage can lead to weakening of the embankment evidenced by slides caused by soil saturation or pressures in the soil pores. Seepage can also lead to piping, or the movement of soil particles, which can lead to dam failure. A continuous or sudden drop in the water level may also be an indication that seepage is occurring. Regular inspections and record keeping (seepage flow rates, water levels, content of flow, size of wet areas, and type of vegetation growth) are important to monitor the seepage conditions to determine whether the seepage is steady or in a state of change. If seepage is observed, an engineer should be notified.

The embankment should also be inspected for cracks, slides, sloughing, and settlement. Short, isolated cracks are not usually significant, however larger (wider than ¼ inch), well-defined cracks indicate problems. Transverse cracks that appear across the embankment may be due to

differential settlement, and they can provide paths for seepage and piping. Longitudinal cracks that appear parallel to the embankment mat indicate the early stages of a slide. Small cracks should be filled to prevent water intrusion. Slides are serious threats to dam safety as they can lead to instability of the embankment and failure. If a slide develops, the water level should be lowered to investigate the cause and facilitate the construction of a repair. An engineer should be contacted to examine all cracks, slides, and settlements observed.

During the dam inspection, evidence of rodents (groundhogs, muskrat, and beavers) should be noted. Burrows can weaken the embankment and serve as pathways for seepage. Beavers can also plug spillways causing the water level to rise above the design level. Rodents should be removed from the dam by acceptable means and burrows should be filled. Trash racks, spillways, and other outlets should be inspected for clogging and cleaned as necessary.

Roads on top of dams should be maintained to prevent damage to dam embankments. They should be constructed using a proper base and wearing surface. If a wearing surface is not constructed, traffic should not be allowed on the dam during wet conditions. Water trapped in ruts can lead to saturation and weakening of the embankment. A wearing surface will prevent or minimize ponding water and infiltration. A wearing surface should be constructed to drain into the impoundment, and stormwater runoff should not be concentrated at one point.

Principal Spillway pipes should be inspected thoroughly once a year. They should be inspected for improper alignment (sagging), elongation and displacement at joints, cracks, leaks, surface wear, loss of protective coating, corrosion, and blockage. Special attention should be paid to pipe joints. The pipe should also be checked for signs of water seeping along the outside. Small or minor problems can be patched; however major problems may require replacement of the pipe. An engineer should be contacted if problems with the pipe are observed. Erosion at the pipe outlet should also be inspected. Severe undermining can lead to pipe joint displacement and weakening of the dam embankment. Rip rap may be installed to mitigate against continued erosion, however, an engineer should be contacted if there is severe erosion. Inspection reports should be kept to monitor the progression of any observed problems.

Riser structures should be thoroughly inspected at least once a year. They should be examined for spalling and deterioration. Any cracking, staining, exposed reinforcing bars, and broken out sections that are observed should be further examined as this may lead to structural instability. They should also be checked for alignment and settlement. Mechanical equipment such as valves, gates, stems, and couplings should be inspected for corrosion, broken, or worn parts. It would also be good to operate these devices at least once a year to ensure that they are functioning and seating properly. An engineer should be contacted if problems in riser structures are observed, and they should be addressed immediately.

Trash racks and flashboards should be inspected on a more frequent basis. Clogging of these features can lead to higher water levels that may compromise the stability of the dam. Clogs should be cleared and all trash should be removed. If possible, the cause of the clogging should be identified and addressed. Broken trash racks and boards should be repaired or replaced. Broken trash racks can allow trash and debris to enter the riser and/or principal spillway pipe and can lead to clogging of these features.

Vegetated emergency spillways should be inspected at least twice per year (at the same time as the embankment). Spillway should be mowed to prevent trees, brush, and weeds from becoming established and to promote the growth of grass. Any erosion should be repaired immediately, and any obstructions should be removed. Periodic reseeding and fertilization may be necessary to avoid erosion and bare areas.

Concrete and other lined emergency spillways should be thoroughly inspected at least once a year. Concrete should be inspected for floor or wall movement, improper alignment, settlement, joint displacement, undermining, and cracking. Structural repairs should begin by removing all unsound concrete. Cracks must be repaired carefully to prevent water intrusion. An engineer should be notified if any structural problems are observed with the spillway. Rip rap lined spillways should be inspected for erosion and displacement of stone. All woody vegetation should be removed, and any obstructions should be removed. Inspection forms and notes should be kept to monitor the progression of any observed deficiencies.

It is important to keep detailed and accurate records of all observations, inspections, maintenance, rainfall and pool levels, drawdowns, and other operational procedures. These records can aid in monitoring the progression of deficiencies as well as diagnosing problems. More information on dam inspections, operation, and maintenance can be found in the "Dam, Operation, Maintenance, and Inspection Manual" prepared by NCDENR Division of Land Resources Land Quality Section.

Culvert Assessments

As mentioned above, nearly the entire game land is a managed wetland impoundment. As such, there are a number of water control structures consisting of a CMP flashboard riser and CMP barrel. The barrels of the structures should be treated as culverts.

There are also some culverts on the game land. The majority of the culverts were installed by the contract farmer to aid access from the dikes into the impoundments. In several locations, there is a relatively shallow ditch between the impoundment and dike. These culverts make access easier.

Other culverts are located where the dike/road crosses the diversion canals. As mentioned above in the water control structure assessment, there would be some benefit to installing water control structures at these locations. Currently, NCWRC staff is placing plywood over the culvert inlets to aid in controlling the water elevation. The addition of water control structures would make this more effective, more efficient, and safer. The estimated cost to install water control structures could range from $5,000 to $15,000 per structure depending on the size and any dewatering measures that may be required.

Nearly all of the NCWRC installed culverts are 18" CMP. While there is little flow into these pipes from the surrounding areas, these pipes can see a tremendous amount of flow when the pumps are turned on to fill or drain the impoundments. The pipes are also susceptible to clogging due to sediment and aquatic vegetation that accumulates in the canals. It is recommended that the culverts nearest to the pumps be removed and replaced with larger pipes to ensure adequate water is supplied to the pumps. Aquatic vegetation should also be removed

from the canals. The estimated cost to replace the culverts could range from $5,000 to $15,000 per culvert depending on the size and any dewatering measures that may be required.

Culvert Maintenance

Culvert maintenance is performed to extend the life and ensure proper function of the installed drainage structure. The accumulation of sediment and/or debris at the inlet or outlet of a culvert or damage such as crimping of the pipe effectively reduces the diameter and flow capacity of the pipe.

Culvert maintenance includes removal of accumulated sediment and/or debris that prevents passage of water (and organisms) through culvert inlets, outlets and connected drainage ways. It may also include reinforcement of eroding inlets and outlets by installing riprap or other erosion control measures. Damaged culverts and culverts requiring frequent repeat maintenance should be considered for future remediation via redesign and reinstallation.

The following items should be checked for and addressed as part of routine maintenance inspections:

- partial or complete blockage of the inlet or outlet of the pipe with sediment, stone, leaves, woody debris, refuse or any other items that could affect flow through the culvert
- evidence of scour, bank or channel bed erosion near the inlet or outlet of the culvert
- evidence of flow overtopping the road at the culvert location
- damage to the pipe including crimping of the inlet or outlet, crushing or piercing of the pipe
- severe corrosion of the pipe
- damage to headwalls

Staff should inspect ditches and culverts as part of their regular road maintenance activities. This inspection is especially important during leaf fall and following periods of heavy rain. Staff should consider the location of the culvert before performing maintenance using heavy equipment. Culverts located in active stream channels, dedicated or critical habitat areas may require special permission or installation of erosion control measures before maintenance can commence.

Leaves and woody debris that have accumulated in or around the inlet of the culvert should be removed immediately using hand tools if possible. Removal of accumulated silt and/or gravel from ditches approaching the culvert inlet should be performed using a small excavator, backhoe or a tractor equipped with a scrape blade. Sediment in or around the immediate vicinity of the pipe inlet or outlet should be removed using hand tools to prevent damaging the culvert. Cleaned out material is to be pulled away from the culvert then hauled and spread at a site where it cannot be washed back to the culvert area.

Repeat problems with sediment collecting around the inlet may indicate the existence of an erosion problem originating from the slopes, streams or ditch lines in the vicinity of the culvert.

Identification and stabilization of these problem areas through practices such as seeding or matting could improve performance of the culvert and reduce maintenance requirements.

Flow overtopping the road at the culvert location generally indicates that the pipe is undersized and could warrant resizing and replacement. Any damage to the culvert, as described above, may also necessitate replacement of the pipe. If maintenance staff identifies any culverts that may need replacement, they should contact engineering staff to calculate the peak flow capacity and diameter of the new pipe.

Any culvert upgrade consisting of a single pipe 36" and greater or a crossing utilizing multiple lines of pipe should include design considerations for fish passage. Specific considerations can be obtained by contacting the Division of Inland Fisheries, Habitat Conservation Program - Technical Guidance section.

Pump Assessments

There are four pumps on the J. Morgan Futch Game Land that are used to fill and drain the impoundments. They are also used to control water levels once the area is flooded and while crops are being raised.

Pump #1 is located adjacent to parking area #1 just off of US 64. It is a diesel powered unit that runs a PTO driven pump with inlet and outlet flaps, and it is easily accessible. At the time of inspection, this pump appeared to be in good condition. However, the flaps at the inlet and outlet of the pump line that allow water flow and prevent water from backing into the canals and impoundments are poorly designed resulting in frequent failures. The flaps consist of metal disks on hinges mounted at the inlet and outlet pipes. They are opened and closed using a winch. A revised design that offers greater durability and easier operation should be investigated. Consideration should be given to installing a fence around the pump to prevent public access and potential vandalism.

Pump #2 is located on the western property line at approximately the center of the game land boundary. It is an older, diesel powered pump. At the time of inspection, the pump appeared to be in relative good condition given its age. This pump is mainly used by the co-op farmer to remove water from the game land in the spring and as a supplement to pump #4 during large rain events. Ideally, this pump would be replaced in the near future with a portable pump without a power unit.

Pump #3 is located at the southern property line at approximately the center of the game land boundary. It is an electric pump. It is accessed by a foot bridge that crosses the diversion canal. At the time of inspection, the bridge appeared to be in good condition. However, there were no hand rails on the bridge. Some consideration should be given to replacing this bridge with a more substantial, steel or aluminum bridge in the near future. Consideration should also be given to installing a gate or something similar to prevent public access to the bridge and pump. At the time of inspection, this pump was not working well. According to NCWRC staff, the impeller on the pump was thought to be worn out and should be considered for replacement within the next ten years. The electric panel for the pump was located next to the bridge,

adjacent to the water's edge. While no problems were noted with the electric service, the panel should be replaced soon per a recent onsite inspection by an electrician to ensure that all of the components are rated for outdoor use next to standing water and in good working condition. Some consideration should also be given to either relocating the service or installing a fence to prevent public access and vandalism.

Pump #4 is located next to parking area #2 just inside of the gate. This pump is also easily accessible by a truck. This pump is also electric, and appeared to be in good working condition. However, the flaps at the inlet and outlet of the pump line that allow water flow and prevent water from backing into the canals and impoundments are poorly designed resulting in frequent failures. The flaps consist of metal disks on hinges mounted at the inlet and outlet pipes. They are opened and closed using a winch. A revised design that offers greater durability and easier operation should be investigated. Some consideration should be given to installing a fence around the pump and electric panel to prevent public access and possible vandalism. As noted above with regards to water control structures, culverts, and diversion canals, the pipes that supply water to the pump should be upsized to ensure there is a sufficient water supply. Aquatic vegetation should also be removed from the canals to allow adequate flow.

An operations and maintenance plan should be in place for the operation and regular inspection of the pumps and the associated components. The pumps should be replaced in a rotating sequence so that all of the pumps do not fail simultaneously. Consideration should also be given to purchasing pumps with stainless steel components. This will provide greater durability and longevity. The estimated cost to replace the pumps could range from $10,000 to $100,000 per pump depending on the size and any dewatering measures that may be required.

Well Assessments

There are two wells on the J. Morgan Futch Game Land that are used to fill the impoundments. Well #1 is located adjacent to pump #4 and parking area #2. At the time of inspection, no real deficiencies were noted for this well. However, consideration should be given to installing a fence around the well and electric panel to prevent public access and potential vandalism.

Well #2 is located at the junction of impoundments 10, 11, 13, and 14. No deficiencies were noted for this well at the time of inspection. Consideration should be given to installing a fence around the well and electric panel to prevent public access and potential vandalism.

Recreational Facility Assessments

The J. Morgan Futch Game Land primarily serves as a waterfowl impoundment that provides opportunities for hunters. This section will review existing recreational facilities and describe opportunities identified for potential new development.

Public Fishing Areas

The J. Morgan Futch Game Land serves primarily as a waterfowl impoundment. Currently, there are no public fishing areas on the game land. Since the game land is drained and flooded

constantly, there are limited amounts of permanent impounded water. No public fishing areas are proposed for this game land.

Shooting Ranges

The J. Morgan Futch Game Land serves primarily as a waterfowl impoundment. The game land is also used for agriculture. Due to the game land's relatively small size, nearly the entire area already has a designated use. There is insufficient undesignated space for a shooting range at this site and no ranges are proposed.

Hunter Blinds

The J. Morgan Futch Game Land serves primarily as a waterfowl impoundment. As such, blinds have been installed by NCWRC staff to accommodate hunters. At the time of inspection, multiple blinds were installed on each impoundment. The blinds are floating, wooden platforms. Since the blinds have not been installed for a long time, maintenance needs and frequency are still being determined. However, they should be inspected at least bi annually before and after hunting season and during the season as damage is reported or noticed. Most of the blinds are accessed by wading into the impoundment from the shore and walking to the blind. Some consideration should be given to installing ADA accessible blinds. These would require a bridge from the shore to the blind or a blind mounted at the shore.

There are several bridges used for hunter access on the game land. Most of the bridges inspected were wooden. They appeared to be in fair condition at the time of inspection. However, NCWRC staff noted that damage due to bear activities have been reported. Consideration should be given to replacing the wooden structures with steel or aluminum bridges that will provide more stability and longevity. The estimated cost to replace the bridges could range from $10,000 to $25,000 per bridge depending on the size and foundation requirements.

In addition to the wooden bridges, concrete hog slats are used in places to cross smaller V-ditches. The hog slats appeared to be in reasonably good condition at the time of inspection. Several problems have been noted with hog slats on other projects in recent months including spalling of concrete due to rebar corrosion. In the future, hog slats using epoxy coated or stainless steel reinforcement should be investigated. Also, steel or aluminum bridges should also be considered for replacement of the hog slats as they age.

Wildlife Viewing and Photography

Wildlife viewing and photography is growing in popularity. There are two observation towers on the J. Morgan Futch Game Land that could be used for this purpose. Adequate parking should be available in the two parking lots, and there is access by foot traffic to each tower. So, no new additional infrastructure would be required to accommodate this activity. This activity is currently allowed by users following established regulations on Scouting-only Zones on game lands.

Geocaching

Geocaching is a recreational activity, in which participants use a GPS receiver or mobile device to hide and locate hidden containers, or caches, located somewhere outdoors. Due to the relative small size of the J. Morgan Futch Game Land, it is unlikely that it will grow as a potential non-traditional use. However, there is one known geocache site at parking lot #2. There are no major infrastructure elements required for this non-traditional use, but it would be beneficial to the participants to provide parking areas near the start/end of the geocaching trails if there is sufficient demand. Currently, there is adequate parking on the game land for this non-traditional use.

Hiking

Currently, there are no designated hiking trails on the J. Morgan Futch Game Land. Hiking is becoming a more popular activity and could be a potential demand on the game land. It is recommended that staff develop a long term plan for trails, which can be used for both hunter access and recreational hikers. The extensive network of dikes and roads provide good access to most of the game land. Potential conflicts among different user groups should also be evaluated and addressed.

Camping

The J. Morgan Futch Game Land currently does not have any designated camping areas. As non-traditional uses are becoming more popular, it is recommended that we investigate locations for potential recreational campsites to be designated in the future if this is determined to be a desirable activity on the game land.

Horseback Riding

Horseback riding is growing in popularity. Currently, the J. Morgan Futch Game Land is not used for horseback riding. Due to the relative small size, limited capacity for expanding parking areas, and the lack of adequate infrastructure, the J. Morgan Futch Game Land should not be considered for horseback riding.

Recreational Facility Maintenance

Maintenance of recreational facilities is critical to the overall operation of the game land program. Typical use of the game lands is dispersed, however, recreational facilities concentrates users on a specific area or feature. This concentration of users, whether it is a boating access, fishing access, shooting range, or other use, results in a need to ensure the facility is safe and functional. Routine site visits for inspection and maintenance will accomplish this goal. Site visits should consist of two actions: (1) Inspection for safety issues and functionality; (2) Actual maintenance activities.

1. Inspections should examine the following items
    a. Safety inspection items:

Facility components
- Decking
- Handrails
- Structural supports (piles, substructure, and floats)
- Fasteners (bolts, screws, and nails)

Slip or trip hazards
- Uneven walking surfaces
- Mud on walking surfaces
- Ponded water on walking surfaces
- Drop offs

Overhead
- Dead trees or limbs
- Overhead utilities

b. Functionality Inspection Items

Parking
- Surface condition (ruts, potholes, gravel)
- Delineation (wheel stops, paint)

Ramp
- Blockages (sediment, wood)
- Surface condition

Pier/Dock
- Bollards
- Wooden components
- Bumpers

Signage
- Kiosk (entrance, regulation and information)
  - ADA
  - No Parking

2. Maintenance activities should include routine and corrective activities
   a. Routine Activities include:
      - Litter and debris removal
      - Grass mowing
      - Woody vegetative growth control
   b. Corrective activities can include but not be limited to:
      - Lumber replacement
      - Sign replacement
      - Minor grading
      - Tree or limb removal

Over time recreational facilities degrade to the point that routine maintenance activities cannot provide corrective action. Examples of this level of degradation include but are not limited to: structural problems, persistent and/or severe erosion issues, and broken/or severely degraded concrete. Once this level of degradation is reached, supervisory personnel should inspect the facility and determine the scope of the needed repairs. If major repairs are required supervisor personnel should contact an engineer for assistance.

Public Uses

As stated previously in the Game Lands Program Mission Statement, primary public uses of North Carolina game lands are hunting, fishing, trapping, and wildlife viewing. However, the Commission recognizes the desirability of providing opportunities for other activities on state-owned game lands that are feasible and consistent with the agency's mission and compatible with these traditional uses.

As the human population of North Carolina has rapidly grown, state-owned game lands have received increasing pressure to provide public outdoor recreation opportunities. These uses include traditional activities such as hunting, fishing, trapping, and wildlife viewing, as well as other outdoor recreational pursuits. While hunting, fishing, trapping and wildlife viewing are the primary public uses of state-owned Game Lands, the Commission has always allowed other dispersed and non-developed recreational activities. Funding sources for the NCWRC are focused on natural resources management rather than recreational development. Because of this, the NCWRC must exercise care in providing for recreational activities that may not be compatible with the natural resources for which the lands are valued and the primary management objectives of these lands.

As a response to these increasing pressures, the NCWRC developed a Game Lands Use Evaluation Procedure to provide a statewide framework for determining appropriate uses for Commission-owned or controlled game land properties.

Different user groups of the J. Morgan Futch Game Land

Based off of anecdotal information and input received from the public input processes that occurred from 12 March to 15 May 2014, we have made our best determination of different user groups that occur on Futch. The discussion of the different users groups below primarily use responses to question number 3 from the public input meeting and the online comment website: **How do you use this game land?** The user groups are listed below and discussed in greater detail. Please note that the percentages when added together for any question exceed 100% since many respondents use the game lands for multiple purposes.

Traditional game land users

- Hunters

- Fishermen
- Trappers
- Wildlife viewers

Discussion of traditional game land users

According to public input comments, hunters make up largest number of traditional users. As discussed earlier in the Plan, Futch is enrolled in the Permit Hunt Opportunities Program which allows for managed participation and provides for unique hunting opportunities. As with the hunting opportunities, one trapping permit is offered at Futch. Overall, we believe that traditional users are satisfied with permit hunting opportunities provided on this game land.

Waterfowl hunters

The main purpose for the acquisition of Futch was for the restoration and enhancement of waterfowl habitat and to provide hunting opportunities. As the entire Futch property is managed for waterfowl, waterfowl hunting is extremely popular. Thousands of ducks and tundra swans migrate through or winter in and around Futch. Ninety-seven percent of public input respondent's waterfowl hunted Futch.

Futch is comprised of 15 sub-impoundments with varying management strategies. Through the permit system, NCWRC staff can manage hunting pressure and hunter numbers. Permitted waterfowl hunting opportunities include 18 party opportunities (54 maximum permits) for Early Season Waterfowl Hunts. The 2014-15 Late Season Waterfowl Hunts consisted of 20 days with 20 blinds. Each blind serves 3 permit holders for a maximum of 1200 permits.

Early season waterfowl hunters are allowed to hunt anywhere within the zone for which they are drawn. Because these hunts are held in early October, some of the sub-impoundments may not be flooded. During the late season hunts, hunters are required to hunt from a blind. In the permit application process, applicants choose dates and blinds that they want to hunt. The blinds were initially installed for the 2013-2014 waterfowl season. Surveys to determine hunter satisfaction with the blinds were sent to all permit holders after to the waterfowl season. Initial design for the survey is to gain insight through 3 years of waterfowl blind use. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.

Futch is not hunted during the September Teal Season as most of the impoundments would not be flooded by this time.

With the implementation of Youth Only Waterfowl days, youth under the age of 16 can hunt Futch without a permit during the Youth Waterfowl days. Participation in the youth hunts has been high in recent years. NCWRC staff will monitor the participation levels to determine if these hunts should be permitted.

Tundra swans and Canada geese can be taken provided the hunter has the appropriate permit during their permit hunt at Futch. Futch provides an excellent opportunity for hunters to harvest their swan.

To better manage and improve the quality of permitted waterfowl hunts, a survey is in the processes of being adopted by the NCWRC (Appendix III). From the information gathered from this survey, we will be able to determine the number of different species harvested, the level of effort that was put forth during the hunts, and the level of satisfaction of each hunter based on several criteria. Currently, random hunter bags checks are being used to determine what species and numbers that are harvested and hunter attendance rate.

Vehicular access is limited at Futch to reduce disturbance to waterfowl. Some of the blind locations require a long walk. This limited access is important to the conservation of waterfowl and to the quality of hunt offered. Allowing vehicular access will cause bird to use Futch less. All infrastructure needs are being met to satisfy this user group.

Deer hunters

Deer hunting is limited at Futch due to the priorities that are place on waterfowl and waterfowl habitat. Of the responses received for question 3, (How do you use this game land?) only 6% of the respondents indicated that they used the game land for deer hunting. Deer hunting is by permit only. Permits are offered for a portion of the archery season by point-of-sale permits. There are no quota limits to this permit. No gun or blackpowder season permits are offered due to the conflicts with waterfowl and waterfowl hunting.

Although deer hunting opportunities are limited, the adjacent Alligator River Game Land offers season long deer hunting opportunities. No special permits are required to hunt Alligator River Game Land.

Turkey hunters

Turkeys are not regularly seen on Futch. Turkey hunting opportunities on Futch do not exist. Turkey hunters are encouraged to hunt Alligator River Game Land or apply for special hunting opportunities at nearby Lantern Acres Game Land.

Black bear hunters

A high number of bears use the agricultural fields at Futch. These bears come from adjacent properties and feed in the corn and soybeans. The NCWRC does not offer bear hunting opportunities on Futch as the bear season corresponds with the waterfowl season. Bear hunting opportunities exists on the adjacent Alligator River Game Land and Lantern Acres Game Land.

With ample opportunities existing on other game lands, needs are being met for this group.

Small game hunters

During the hunting season, upland habitat is limited to the dike system. The small size of available habitat does not support a viable population of small game species. Hunting the existent small game species is in conflict with the priorities set for Futch. Small game hunters are encouraged to hunt the adjacent Alligator River Game Land or Lantern Acres Game Land.

Webless migratory game bird hunters

Doves can be hunted on Futch by point-of-sale permit, usually during the first week of the season as not to interfere with the archery deer hunts. Dove hunting success usually is dictated on whether or not the corn has been harvested. Only 3% of respondents use Futch to dove hunt. Dove hunters are required to use non-toxic shot while hunting the waterfowl impoundments.

During the public input process, several respondents commented on the need to allow snipe and/or rail hunting at Futch. NCWRC staff has considered these requests and determined allowing hunting of rails and snipe are incompatible with the goals and purpose of Futch. The primary purpose for Futch is to provide waterfowl habitat. Futch is an important resting area for waterfowl between the established waterfowl seasons. Additional disturbance on the impoundments will have a negative impact to waterfowl. The public input comments included comments concerning providing snipe hunting opportunities in February after the waterfowl season. Futch may have its highest concentrations of waterfowl using the game lands during February, as it serves as an important staging, resting, and foraging area for bird preparing for the spring migration. Allowing snipe hunting even on a small number of units will affect the entire game land.

The NCWRC recognizes the desire to hunt rails and snipe on public lands. Existing opportunities can be found at Gull Rock Game Land and Lantern Acres Game Land. Both game lands have large managed waterfowl impoundments. Gull Rock Game Land lies on the Pamlico Sound and the marsh habitat with interspersed mudflats may offer good rail habitat. As additional game lands are acquired, considerations will be given to incorporate snipe hunting opportunities.

Fishermen

Limited fishing opportunities exist on Futch. Fishing is limited to the canals closest to US Highway 64.

Trappers

Trapping of furbearers is currently allowed at Futch. Trapping is by lottery draw permit and only one permit is issued.

We are currently unaware of any specific infrastructure needs that would provide better opportunities for trappers. Additionally, we believed that ample opportunity is provided to trappers and there are no additional strategies we could implement to increase the use of the game land by trappers. It is in the NCWRCs interest to have Futch trapped to help remove unwanted nutria and muskrat. These pests cause extensive and costly dike damage.

Wildlife Viewers

Wildlife viewing is popular at Futch, especially in the fall and winter when the ducks and swans move into Futch. Nine percent of respondents use the game land for waterfowl viewing. To give users a better experience, 2 observation towers have been erected. From these platforms, visitors can see nearly all of the game land. In response to the popularity of the wildlife viewing and hunter scouting, Scouting-only Zones where established to limit the disturbance to waterfowl across Futch. From November 1 to March 1, all activities except hunting and trapping are restricted to that zone.

With the addition of the observation towers, all needs are being met for this group.

Non-traditional game land users

- Bicyclist
- Campers
- Geocachers
- Outfitters and eco-tourism
- Hikers and runners
- Horseback/trail riders
- Photographers
- Researchers, universities, and museums
- Target shooters
- ATV riders and other off-road vehicles
- Other illegal activities

Discussion of non-traditional game land users

We have attempted to determine all game land users of Futch and have made determinations of appropriateness and compatibility for each use based on the fact that hunting, fishing, trapping, and wildlife viewing are the primary uses. As long as non-traditional uses do not negatively influence the natural resources that the NCWRC manages or negatively impact traditional uses, they may be determined appropriate and compatible. Some non-traditional uses require special consideration and are only considered to be appropriate and compatible under certain circumstances.

Non-traditional users are strongly encouraged to refer to the *North Carolina Inland Fishing, Hunting, and Trapping Regulations Digest* and the *Permit Hunting Opportunities in North Carolina* booklet to identify hunting and trapping seasons as well as specific days and times that hunting and trapping occur on the game land. Out of safety concerns, game land users are also strongly encouraged to wear blaze orange while using game lands. No hunting is allowed on Sundays on game lands. Fishing can occur at any time on the game land.

Bicyclist

Bicycling on the Futch is considered compatible as long as bicyclists stay on designated roads and trails. Impacts to natural resources can be minimized by regulating use through numbers, timing, and conditions of trails. The use of Futch by bicyclists is currently very low. The current road system offer bicyclist the best opportunities to ride on the game land. Bicyclist must adhere to the Scouting-only Zone regulation.

Campers

Camping is not permitted on the game land. Small parking areas do not offer adequate room for camping. As non-traditional uses are becoming more popular, it is recommended that we investigate locations for potential recreational campsites to be designated in the future if this is determined to be a desirable activity on the game land.

Geocachers

There is one known geocache site at parking lot #2. There are no major infrastructure elements required for this non-traditional use. Currently, there is adequate parking. Geocaching is considered a compatible activity as long as the NCWRC's geocaching policy is adhered to (Appendix IV).

Outfitters and Eco-tourism

Guided hunts are thought to occur only at extremely low levels due to hunters being required to possess a valid permit. All the general waterfowl permits are lottery draw permits.

Eco-tourism on the game land is experiencing a surge in interest from local governments, groups, and entrepreneurs. These people see the game land as a resource to draw in tourism to boost the local economy.

It is important for land managers to monitor the above activities and document any issues that may arise. Over use by these activities can negatively impact the resource and traditional users.

Hikers and Runners

The use of the Futch by hikers and runners is considered compatible because it creates minimal disturbance to the natural resources and is consistent with NCWRC policies and objectives.

Hikers and runners traditionally stick to established roads and trails and their impact to the road systems is essentially non-existent. Hikers and runners must adhere to the Scouting-only Zone regulation.

Out of safety concerns and respect for traditional game land users, hikers and runners should realize and be considerate of all hunting activities on Futch and the times that they are likely to occur.

Horseback/trail Riders

Currently, the J. Morgan Futch Game Land is not used for horseback riding. Due to the relative small size of the game land and parking areas and the lack of adequate infrastructure, the Futch should not be considered for horseback riding.

Potential threats to the game land include the introduction of invasive plants and the disturbance to wildlife. Nesting birds in the spring and summer may abandon a nest if disturbed. Waterfowl may be less likely to use the waterfowl impoundments if disturbance is increased. Newsome *et. al* (2002) conducted a study on the effects of horse riding on national parks and other natural ecosystems in Australia and determined that environmental impacts include, but are not limited to, soil degradation and compaction, erosion, loss of vegetation height and cover, change in plant species composition, degradation of existing roads and trails, the introduction of invasive grass and weed species, accidental transport of fungal pathogens, and the loss of vegetation, which are all common problems associated with horse use.

Given the absence of space and lack of environmental conditions suitable for developing equestrian opportunities with minimal impacts, this use should be directed to the adjacent Alligator River Game Land.

Photographers

The use of the Futch by photographers is considered compatible. Photographers create very little impact to the natural resources of the game land and their impacts to roads and trails is minimal. Photographers must adhere to the Scouting-only Zone regulation.

Researchers, universities, and museums

The use of Futch by researchers, universities, and museums is considered compatible and does not impact management objectives of the Game Lands Program. These entities use the game land for the collection of data for research and educational purposes. It poses very minimal threats to traditional game land users and does not interfere with or disturb the natural resources of this property. These activities are usually handled through NCWRC's permitting process. At times, research activities provide information that may be beneficial to managing the property.

Target shooters

There are currently no restrictions to target shooting on Futch. It is considered a compatible activity as long as it does not create safety concerns for the shooter or other game land users and staff, does not cause destruction to NCWRC property, and shell casings are retrieved.

The NCWRC is currently involved in the design and implementation of shooting ranges on game lands across the state. Upon implementation of a designated shooting range on a nearby game land, all target and recreational shooting activities will be limited to that area.

ATV riders and other off-road vehicles

The use ATV's and other off-road vehicles on Futch is considered an inappropriate use. More times than not, these vehicles create disturbance and cause destruction to valuable resources on game lands. They greatly degrade roads and trails and create erosion and water quality concerns when driven in and around streams. Because these vehicles are very agile and maneuverable, riders tend to stray away from developed roads and trails and into areas that land managers desire to be undisturbed. These actions can be detrimental to various plant and animal communities and offset previous efforts made to conserve and manage these areas.

Several public comments were received concerning the distance hunters have to carry equipment to reach selected blinds. However, allowing additional motorized vehicles access will create disturbance that results in reduced use by waterfowl and negative impacts to hunt quality.

Other Illegal Activities

Illegal activities include wildlife/plant/artifact/mineral theft, vandalism, drug use, sexual rendezvous, and trash dumping. These activities are monitored by the Enforcement Division of the NCWRC.

Information Needs

Our current state of knowledge about wildlife occurrences on Futch is somewhat limited. The distribution and occurrence of many cryptic taxa such as reptiles, amphibians, and small mammals are under-surveyed and their relative distribution and abundance are unknown or misunderstood. Futch was included in the 2 year Integrated Waterbird Management and Monitoring Initiative conducted by the US Fish and Wildlife Service. This program counted birds, including shorebirds, wading birds, ducks, swans, and geese, using the impoundments during migration and wintering periods from the fall 2010 to spring 2012.

Waterfowl hunter bag checks are conducted several times each season. Hunter participation and the number of each species are documented with these checks.

Our current knowledge of game animals is limited, even though we know the number of harvested deer on Futch. Futch is too small to manage for big game species; we can only allow hunting opportunities that do not conflict with waterfowl management.

The following is our current knowledge of our priority species. These priority species were identified because they are game animals that are hunted or trapped on Futch or they have a state or federal status. They are either known or thought to occur on this game land. Included in this information are inventory and management needs and research recommendations for the future. The appropriateness of tracking population trends for some wildlife species will be evaluated and appropriate techniques will be identified when it is determined such actions are warranted and only when appropriate levels of staffing and funds are available.

The identification of game land hunters (or other users) would allow the NCWRC to generate a general observation survey in which data on the observations of multiple species could be collected by hunters or any game land user interested in recording the requested information. This cooperation of game land users would supplement our survey efforts and potentially reduce workloads required by NCWRC staff. Information derived from these surveys coupled with other information collected by field staff will give NCWRC biologists the ability to better estimate and track population trends. This valuable information will help staff determine the best management techniques to implement in order to achieve our desired future conditions.

Reports of diseased animals should be investigated and, when possible, attempts will be made to diagnose the cause of infection or cause of death. Also, as specific disease surveillances are conducted (Chronic Wasting Disease, Lymphoproliferative Disease Virus, etc.), the game land will be incorporated into the effort when appropriate. This game land will likely be involved with any waterfowl disease surveillance.

Non-game Wildlife Species

- ***Birds***

The impoundments at Futch are important in the regional conservation of shorebirds and wading birds. Water level management across the 15 sub-impoundments may be the biggest factor in determining the availability of foraging area for both wading birds and shorebirds. In the Habitat Communities section of this plan, timing of drawdowns and timing of flooding were considered to meet some of the needs for these birds. Shorebirds (i.e. yellowlegs, avocets, black-necked stilts, and dowitchers) require very shallow water for foraging. Foraging habitat needs for migrating shorebirds should be met within the agricultural fields, both moist soil managed and cropped units. Timing of drawdowns in March and April offer the shallow water and mudflats needed for shorebirds in these units.

Wading birds (i.e. storks, ibises, herons, and egrets) require water levels slightly deeper (less than 7 inches) than shorebirds. The five species of wading birds discussed below share common habitat requirements although they may occupy different prey niches or feeding styles. Many of the impoundments have slight changes in elevation resulting in varying water levels across a unit. As water is being removed from an impoundment both wading birds and shorebirds use the impoundment for foraging. March and April are critical months as wading birds are migrating to nesting areas. Water levels in the catfish pond moist soil units should be a depth that is ideal for wading birds. The moist soil units in the catfish ponds and the ditches and canals around the agricultural fields may offer the best habitat for wading birds during the summer months and during fall migration.

Wood Stork

Current knowledge

Wood storks are conspicuous because of their white color, large size, and are not difficult to detect when nesting. They nest in trees and shrubs within swamps. Only 3 confirmed nesting colonies have been recorded in North Carolina and those colonies are not active each year. Wood storks have been observed at Futch in the summer months and observations are extremely rare. NCWRC and other entities conduct regular surveys for wood storks. They are listed as "Endangered" in North Carolina.

Inventory and monitoring needs

Seasonal surveys of impoundments should be conducted to determine use of these habitats by wood storks on Futch. Wood storks should be counted when other wading bird aerial surveys are conducted. Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Management needs

Management practices that would benefit wood storks include protection of forested swamplands, gradual drawdown of water levels in impoundments during early spring, and slow increases in water levels in the fall. Impoundments should be managed for diverse water levels to benefit the greatest number of waterbird and waterfowl species. Shallow (1-6 inches) water levels in mid to late summer would increase density of fish in impoundments and greatly benefit wood storks. Wood storks are tactile feeders and increase their foraging success by feeding in shallow ponds and ditches with high densities of fish.

Providing suitable foraging habitat for wood storks during spring migration in March and April will have a positive impact on wood storks. The known nesting areas are in the southern part of the state and nesting adults are not expected to be using Futch.

Research needs

There are currently no known research needs.

Little Blue Heron

Current knowledge

Juvenile little blue heron's plumage is nearly completely white during their first fall and winter, which may lead to incorrect identification with snowy egrets. Little blue herons can be found foraging in the shallow areas of the impoundments particularly in the catfish ponds or the timber unit openings in early spring and during summer and fall as water is added to moist soil units. Little blue herons are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Seasonal surveys of the waterfowl impoundments should be conducted to determine use. These efforts should be incorporated into NCWRC's Wildlife Diversity Program.

Management needs

Management practices that would benefit little blue herons include protection of the forested swamplands, gradual drawdown of water levels in the impoundments in early spring and slow increases in water levels in the fall. Impoundments should be managed for diverse water levels to benefit waterbirds and waterfowl.

Research needs

There are currently no known research needs.

Snowy Egret

Current knowledge

Snowy egret numbers have been in decline since the 1990's. Foraging habitat loss does not seem to be a cause since they can be seen feeding in brackish tidal mudflats, shallow freshwater ponds, and shorelines. Snowy egrets can be found foraging in the shallow areas of the impoundments. Snowy egrets are opportunistic feeders and deploy varying tactics to catch prey. Snowy egrets are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Seasonal surveys of the waterfowl impoundments should be conducted to determine use. These efforts should be incorporated into NCWRC's Wildlife Diversity Program.

Management needs

Management practices that would benefit snowy egrets include gradual drawdown of water levels in the impoundments in early spring and slow increases in water levels in the fall. Impoundments should be managed for diverse water levels to benefit waterbirds and waterfowl.

Research needs

There are currently no known research needs.

Tricolored Heron

Current knowledge

Tricolored herons prefer salt and brackish waters but can be found foraging in freshwater pools and impoundments. They typically nest on coastal islands with other wading birds. They can be seen feeding in brackish tidal areas, shallow freshwater ponds, and shorelines. Nearly 90% of its diet consists of fish. The catfish ponds and ditches and canals may be the most likely areas to support this species at Futch as most of the impoundments are completely dry during part of the year thereby prohibiting fish establishment. Tricolored herons are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Seasonal surveys of the waterfowl impoundments should be conducted to determine use. These efforts should be incorporated into NCWRC's Wildlife Diversity Program.

Management needs

Management practices that would benefit tricolored herons include gradual drawdown of water levels in the impoundments in early spring and slow increases in water levels in the fall. Impoundments should be managed for diverse water levels to benefit waterbirds and waterfowl.

Research needs

There are currently no known research needs.

Glossy Ibis

Current knowledge

Unlike the other wading birds discussed above, excluding wood storks, glossy ibises are tactile feeders using their long decurved bill to probe the bottom looking for food. They are very opportunistic foraging on many different insects, leeches, mollusks, crustaceans, fish, amphibians, lizards, snakes, and small birds. Plants may constitute a large portion of their diet during some seasons. Glossy ibises are commonly seen foraging in the catfish pond moist soil

units. They typically nest with other wading birds. The number of nesting pairs is declining in North Carolina. Glossy ibises are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Seasonal surveys of the waterfowl impoundments should be conducted to determine use. These efforts should be incorporated into NCWRC's Wildlife Diversity Program.

Management needs

Management practices that would benefit glossy ibises include gradual drawdown of water levels in the impoundments in early spring and slow increases in water levels in the fall. Impoundments should be managed for diverse water levels to benefit waterbirds and waterfowl.

Research needs

There are currently no known research needs.

Bald Eagle

Current knowledge

Bald eagles are commonly sighted on the game lands. Many times they can be seen perched in a tree overlooking the impoundments. Statewide, eagle populations have been recovering since a ban on agricultural insecticide DDT was instituted in 1972. In 1982, the NCWRC started the North Carolina Bald Eagle Project and released 29 juvenile eagles between 1983 and 1988 from artificial nests near Lake Mattamuskeet. In 1984, the first North Carolina post-DDT ban eagle nest was documented near the lake.

Bald eagles nest in large living pines or cypress trees near water. At the impoundments on the game land, eagles have been observed targeting ducks and coots. Futch helps support at least one pair of eagles nesting on the adjacent Alligator River Game Land. The bald eagle is listed as "Threatened" in North Carolina.

Inventory and monitoring needs

Observations of nests or suspected nesting activity should be reported to the Wildlife Diversity Section. When aerial surveys are conducted for wading birds, eagles should also be documented.

Management needs

Management practices that would benefit bald eagles include protection of forested swamplands, managing waterfowl impoundments to attract waterfowl and waterbirds that eagles prey on.

Research needs

There are currently no known research needs.

- ***Mammals***

Red Wolf

Current knowledge

There are no documented records of red wolves in the state prior to 1987, however, wolf biologists believe that they did occur throughout the southeast and eastern North Carolina. In the 1960's biologist recognized the decline of red wolf populations in Texas and Louisiana and as a result the wolf was listed "Endangered" in 1967. A recovery plan was adopted in 1973, paving the way for a captive breeding program for releases into the wild. Alligator River National Wildlife Refuge was selected as a suitable site for the introduction of an "Experimental Population" with the release of 4 breeding pairs. Since those reintroductions, wolves occupy mainland Dare, Tyrell, Beaufort, Hyde, and Washington counties. Sightings have been documented in the southern part of the state.

Red wolf genetic integrity is being compromised with the hybridization with coyotes. This is the primary threat that USFWS biologists are facing for the recovery of the species. Other threats include vehicle injury and death and gunshots.

Red wolves are federally listed as "Endangered-Experimental/Non-essential".

Inventory and monitoring needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Management needs

Red wolves are a common occurrence on Futch. Wolves hunt the fields and dikes. Current management for waterfowl and maintaining the dike infrastructure will continue to benefit wolves. Permitted trappers are aware of the presence of wolves and close coordination with the US Fish and Wildlife Services is expected.

Research needs

There are currently no known research needs for red wolves on Futch.

- ***Reptiles***

Timber (Canebrake) Rattlesnake

Current knowledge

Timber rattlesnakes are known to occur on Futch. In the Coastal Plain, their use of habitat varies from pocosins to pine woodlands. They primarily feed on small rodents but adults are capable of consuming small rabbits and squirrels. They are a long lived species with recorded lifespans of up to 28 years in captivity. Declining trends in populations can be attributed to loss of habitat, wanton killing, road kills, and poaching. Timber rattlesnakes are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Management needs

The adjacent woodlands, including Alligator River Game Land, surrounding Futch may contain the source of timber rattlesnakes on Futch. They are expected to hunt the dikes in search of small mammals. Rattlesnakes are beneficiaries of the management that exist on the game land.

Research needs

There are currently no known research needs.

Pigmy Rattlesnake

Current knowledge

Pigmy rattlesnakes potentially could occur on Futch. There are no known records of them on the game land. In the Coastal Plain, their use of habitat mainly consists of pine woodlands. They primarily feed on lizards, mice, and frogs. Pigmy rattlesnakes are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Management needs

If they occur at Futch, they are expected to hunt the dikes in search of prey. Rattlesnakes are beneficiaries of the management that exist on the game land. Enforcement should be aware of the illegal pet trade and monitor suspicious activities on the game land.

Research needs

Late summer surveys may give additional information about the occurrence of pigmies on the game land. Efforts should be coordinated through the Wildlife Diversity Program of the NCWRC pending available staffing and funding.

Carolina Watersnake

Current knowledge

Similar in markings of the northern watersnake, the Carolina watersnake is noticeably darker in color. They feed primarily on fish and amphibians. The probability of this species occurring at Futch is low, however, prey species are abundant and can support a population of snakes. Carolina watersnakes are listed as a species of "Special Concern" in North Carolina.

Inventory and monitoring needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Management needs

If they occur at Futch, they are expected to be found in canals and ditches throughout the game land. No additional management is required for this species.

Research needs

Surveys targeted at Wildlife Action Plan priority aquatic snake species is needed to determine distributions within expected ranges.

- ***Amphibians and Other Reptiles***

Current knowledge

No known listed species of amphibians exist at Futch, but the class in general is worth mentioning. Amphibians help support various wading birds and reptiles that use Futch. Other snakes and turtles also use the canals, ditches, and flooded impoundments.

Inventory and monitoring needs

Any inventory of herps on the game land should be coordinated through the Wildlife Diversity Program of the NCWRC pending available staffing and funding. Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for priority species. Surveys targeted at Wildlife Action Plan priority amphibian species could help determine distribution on these species on game lands.

Management needs

Slow drawdowns are crucial to amphibians as this gives them time to complete metamorphosis. Ideal conditions may exist with proposed moist soil management in the catfish ponds. The SAV units in the catfish ponds hold water the entire year adding habitat for both amphibians and reptiles.

No other management needs are required at this time to support amphibians and reptiles.

Research Needs

There are currently no known research needs.

Game Species

Waterfowl

Current knowledge

The purpose for the acquisition of Futch was for the restoration and enhancement of waterfowl habitat. The entire game land is managed to meet this conservation need. Waterfowl use on the game land at times is very high. Common species observed include wood duck, mallard, black duck, green-winged and blue-winged teal, ring-necked duck, northern pintail, American widgeon, gadwall, hooded merganser, American coot, and tundra swan. Futch is the premier state-owned waterfowl impoundment in North Carolina.

Inventory and monitoring needs

Waterfowl hunter harvest surveys should continue at their current intensity. Annual vegetation surveys should be conducted in August-October to evaluate fall foods and May-June to assess moist soil crops prior to any planting activities. Very little is known about the use of our waterfowl impoundments in relation to the availability of invertebrates. It has been proposed that invertebrate sampling be conducted in order to potentially help guide future management.

Pre-season wood duck banding should continue on the game land. Recent efforts to band wood ducks in the impoundments have been extremely helpful in meeting statewide banding quotas.

There is also potential to gather valuable information from game land waterfowl hunters. A mail survey has been proposed that would identify hunter effort, number, and species of waterfowl harvested and gain input on hunter satisfaction. This information will help guide future management on the area.

Futch was included in the 2 year Integrated Waterbird Management and Monitoring Initiative conducted by the US Fish and Wildlife Service. This program counted birds, including shorebirds, wading birds, ducks, swans, and geese, using the impoundments during migration

and wintering periods from the fall 2010 to spring 2012. If this program continues, Futch should be an observation site.

Management needs

Providing quality moist-soil vegetation, submerged aquatic vegetation beds, cereal grains, abundant open water, and flooded timber should continue to be the primary goals of waterfowl impoundment management.

Techniques to accomplish these goals should include timely and gradual flooding and drawdowns of these areas. Timely soil disturbance is critical in stimulating the seed bank to promote highly desirable vegetation like smartweed. Impoundment management is covered in more detail in the Habitat Communities section above.

There is a demand for additional public land waterfowl hunting opportunities in the state. Acquisition of land with the potential creation of impoundments should be pursued. These lands must meet several criteria, one being the availability of water.

Research needs

There are currently no known research needs.

White-tailed Deer

Current Knowledge

White-tailed deer is the only big game species hunted on the game land. Tyrrell County deer density averages 15-29 deer/mi^2 (Appendix VI). The agricultural fields at Futch are excellent draws for deer from adjacent properties. Archery permits are available point-of-sale. Over 5 hunting seasons, 2008 to 2013, only 12 deer have been reported harvested from Futch.

Inventory needs

Deer density surveys will be of little value on this game land due to its small size.

Staff should continue to investigate reports of diseased animals. When a diseased animal is reported on the game land, attempts will be made to diagnose what disease process is occurring. Also, as disease surveillance is conducted, the game land will be incorporated into the surveillance effort when appropriate.

Management Strategy

As a habitat generalist, the white-tailed deer will benefit from the continuation of current land management practices. NCWRC will continue to manage the open lands in a manner that supports a wide array of wildlife species but the focus is on waterfowl habitat. Deer hunting is

allowed during the period prior to fall waterfowl migration. Deer hunting will continue to take place through point-of-sale permits as hunter participation is low.

Hunters looking for additional hunting opportunities are encouraged to explore Alligator River Game Land or Lantern Acres Game Land. Alligator River Game Land lies adjacent to Futch. Special Deer Hunt Permits are not required for either of these game lands.

Research needs

There are no known research needs at present.

American Black Bear

Current Knowledge

Bear are common on the game land usually feeding in the corn and soybeans. Bear hunting is not permitted at Futch since the seasons fall during waterfowl season.

Inventory/monitoring needs

No known inventory or monitoring needs are known at this time.

Management Strategy

Bears on the game land should be managed following the guidelines outlined in the NC Black Bear Management Plan (NCBBMP) available to the public on the NCWRC website.

Many studies have concluded that black bear habitat preferences are simply a function of food. Therefore, any land management practices to improve/sustain food availability (soft and hard mast) will benefit black bears.

Bears are hunted on the adjacent Alligator River Game Land and at Lantern Acres Game Land. Many of the bears that use Futch come from Alligator River Game Land to feed.

On Futch, bears are responsible for crop damage and damage and destruction of hunter bridges and observation towers. The waterfowl blinds were installed in the fall of 2013. No known bear damage has occurred on them but is expected. Fences should be installed to protect infrastructure including pumps and electrical panel boxes. Bridge handrails should be metal to prevent bears from tearing them down.

Research needs

No known research needs at present.

Furbearers

Current Knowledge

The most common furbearers on Futch are muskrats and nutria. These are considered pest due to extensive burrowing in dikes causing collapses and leaking. The SAV catfish ponds, miles of canals, and the canal along US Highway 64 offer excellent year long habitats for both species. Coyote, fox, bobcat, mink, otter, opossum, and raccoon all use the game land. Populations of each of these species are low due to the small size of Futch.

Inventory/monitoring needs

Inventory and monitoring should be considered on an as needed basis. Nutria and muskrat damage should be noted and addressed before extensive damage occurs.

Management Strategy

Maintain current trapping season to allow for trapping opportunities and the harvest of surplus furbearers. Encourage trappers to utilize the game lands.

NCWRC staff and licensed trappers may be required to remove nutria and muskrats. NCWRC staff should secure funding to contract a Wildlife Damage Control Agent to remove muskrats and nutria.

Research needs

No known research needs at present.

Webless Migratory Birds

Current knowledge

Webless migratory game birds that use Futch include mourning dove, common snipe, and possibly Sora rails. Mourning doves use Futch after the crops are harvested prior to flooding. Common snipe use the impoundment the entire winter, but most likely the highest concentrations are in February and March. Snipe prefer very shallow water and mudflats with patchy vegetation. Sora rails prefer tall, dense vegetation and water less than 6 inches. Fall migration for Soras in this region is from late August to late October. They are likely to be found in the moist soil agricultural units and the catfish pond moist soil units.

Inventory and monitoring needs

On Futch, no inventory or monitoring is needed.

Doves have been banded at Futch in the past and should continue if staffing and funding permits.

Management needs

Comments received during the public input process show a desire to hunt snipe during February after the close of waterfowl season. Waterfowl in February and March are preparing for the migration north. Futch is used as a staging and foraging area to prepare the birds for their migration. During this period is when the State's coastal impoundments have their highest density of waterfowl. Hunting of snipe, even on a portion of Futch, would disturb the birds across the entire game land.

Hunters are encouraged to visit nearby Lantern Acres Game Land for snipe hunting opportunities. Gull Rock Game Land has a 300 acre waterfowl impoundment that may offer both rail and snipe hunting opportunities. In addition to the impoundments, Gull Rock Game Land has an extensive marsh that can be hunted during low tides. With the acquisition of additional properties with the potential for waterfowl impoundments, consideration will be given to the desire to hunt snipe. At Futch, the importance to conservation of waterfowl outweighs the limited snipe hunting opportunities.

Research needs

There are currently no known research needs.

Financial Assets and Future Needs

The financial assets of Futch include a variety of assets in the form of infrastructure, personnel, vehicles, and heavy equipment. It should be noted that the large majority of these assets are also used to manage other game lands in the Northern Coastal Ecoregion and some assets, including personnel, are periodically used in other areas of North Carolina where they may be needed by the NCWRC to achieve management objectives in those areas.

Equipment and other asset needs are evaluated annually and operating budgets are allocated annually based on these equipment needs, upcoming projects, the costs of normal operating procedures, and the availability of these funds. The financial report below in Table 5 is an estimate based on existent infrastructure and habitat maintenance and future infrastructure development. The figures use the 2003-2013 10 year average Consumer Price Index annual inflation rate of rate of 2.48%.

Table 5. Financial Summary of Activities for J. Morgan Futch Game Land

J. Morgan Futch Game Land

Financial Summary of Activities

Habitat Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
H	Herbaceous Seeding	Admin. Co-Op Farm Leases	1	Lease/GL	$ 1,000	1000	1025	1050	1076	1103	1130	1158	1187	1217	1247	$ 11,193
H	Herbaceous Seeding	Seed or maintain	40	ac	$ 175	7000	7174	7352	7534	7721	7912	8108	8309	8516	8727	$ 78,352
H	Population Controls	Beaver/muskrat trapping	50	ac	$ 30	1500	1537	1575	1614	1654	1695	1738	1781	1825	1870	$ 16,790
H	Vegetation Control	Control Vegetation in Impoundments	90000	kW hr	$ 0.09	8100	8301	8507	8718	8934	9155	9383	9615	9854	10098	$ 90,664
H	Water Level Management	Electric Units and Wells	96	hr	$ 26.5	2544	2607	2672	2738	2806	2875	2947	3020	3095	3172	$ 28,475
H	Water Level Management	Mgmt of water levels - labor and vehicle costs	15	sub-imp	$ 1,166.11	17492	17929	18378	18826	19292	19771	20261	20764	21279	21806	$ 195,786
															Subtotal	$ 468,270

Operation and Maintenance Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
O & M	Bridges	Maintain bridges	14	brg	$ 150	2100	2152	2205	2260	2316	2374	2433	2493	2555	2618	$ 23,506
O & M	Dams and Dikes	Maintain dams and dikes	6	mi	$ 500	3000	3074	3151	3229	3309	3391	3475	3561	3650	3740	$ 33,579
O & M	Public Use Facilities	Maintain Observation Deck	2	ea	$ 225	450	461	473	484	496	509	521	534	547	561	$ 5,037
O & M	Public Use Facilities	Maintain parking area	2	park	$ 225	450	461	473	484	496	509	521	534	547	561	$ 5,037
O & M	Road and Trails	Maintain gates	7	gate	$ 100	700	717	735	753	772	791	811	831	852	873	$ 7,835
O & M	Road and Trails	Maintain road	2	mi	$ 2,500	5000	5124	5251	5381	5515	5652	5792	5935	6083	6233	$ 55,966
O & M	Road and Trails	Maintain trail	4	mi	$ 2,500	10000	10248	10502	10763	11030	11303	11583	11871	12165	12467	$ 111,931
O & M	Signs and Boundaries	Maintain boundary	2	mi	$ 135	270	277	284	291	298	305	313	321	328	337	$ 3,022
O & M	Public Use Facilities	Maintain waterfowl blind	20	blind	$ 225	4500	4612	4726	4843	4963	5086	5213	5342	5474	5610	$ 50,369
															Subtotal	$ 296,281.50

Development Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
D	Road Upgrade	Road #1	0.8	mi	$ 200,000	160,000										$ 160,000.00
D	Road Upgrade	Road #2	0.5	mi	$ 200,000		102,480									$ 102,480.00
D	Road Upgrade	Road #3	0.9	mi	$ 200,000			186,928								$ 186,928.00
D	Road Upgrade	Road #5	0.5	mi	$ 200,000				107,440							$ 107,440.00
D	Road Upgrade	Road #4	0.4	mi	$ 200,000					87,936						$ 87,936.00
D	Road Upgrade	Road #6	0.5	mi	$ 200,000						112,400					$ 112,400.00
D	Road Upgrade	Road #7	0.75	mi	$ 200,000							172,200				$ 172,200.00
D	Road Upgrade	Road #8	0.8	mi	$ 200,000								187,776			$ 187,776.00
D	Parking Area	Parking Area #2 Upgrade	1	ea	$ 90,000	90,000										$ 90,000.00
D	Parking Area	Parking Area #1 Upgrade	1	ea	$ 30,000										36,696	$ 36,696.00
D	Culverts	Install WCS on Western Edge of Property	1	ea	$ 15,000		15,372									$ 15,372.00
D	Culverts	Install WCS's in Impoundment #7	2	ea	$ 15,000		30,744									$ 30,744.00
D	Culverts	Install WCS's in Feeder Canals	2	ea	$ 15,000			31,488								$ 31,488.00
D	Bridges	Replace Bridges to WCS's	4	ea	$ 10,000					43,968						$ 43,968.00
D	Bridges	Replace Wooden Hunter Bridges	8	ea	$ 15,000				128,928							$ 128,928.00
D	Security Fencing	Install Fencing Around Wells, Pumps, Electrical Panel Boxes	6	ea	$ 1,000	6,000										$ 6,000.00
D	Pumps	Replace Pump #2 with Gator tm type portable pump	1	ea	$ 20,000										22,396	$ 22,396.00
D	Pumps	Replace Pump #6	1	ea	$ 30,000									33,720		$ 33,720.00
D	Pumps	Replace Pump #1	1	ea	$ 30,000									33,720		$ 33,720.00
															Subtotal	$ 1,502,356.00

Inflation rate is calculated from the Consumer Price Index (CPI-U) which is compiled by the U.S. Bureau of Labor Statistics

2013	2.07%	
2012	3.16%	
2011	1.64%	
2010	-0.34%	
2009	3.85%	
2008	2.85%	
2007	3.24%	
2006	3.39%	
2005	2.68%	
2004	2.27%	
2003	2.49%	
10 yr Av		

Grand Total **$ 2,266,907.50**

Staffing

The Columbia crew was established in 2013. The current game land management staff responsible for management of Futch includes 2 permanent, full-time technicians and two 11-month temporary technicians stationed in Columbia. Other technician staff from Edenton, Hertford, or Williamston may assist the Columbia crew when necessary. Additional staff that assist with management of the game land includes the Northern Coastal Ecoregion Management Biologist, Northern Coastal Wildlife Forester, and Northern Coastal Ecoregion Technician Supervisor. Overseeing all previously mentioned staff is the Coastal Ecoregion Supervisor that supervises personnel throughout the entire Coastal Region. The Northern Coastal EcoRegion work area consists of 21 game lands totaling 216,329 acres, 50 boating access areas, and 9 public fishing areas (Fig. 11).

The Columbia crew has one of the heaviest workloads of any of the Northern Coastal Ecoregion crews. The Columbia crew conducts management activities on other game lands and boating access areas within the work area. Additional staffing needs will be evaluated if demands for more intensive management increases or additional lands are acquired.

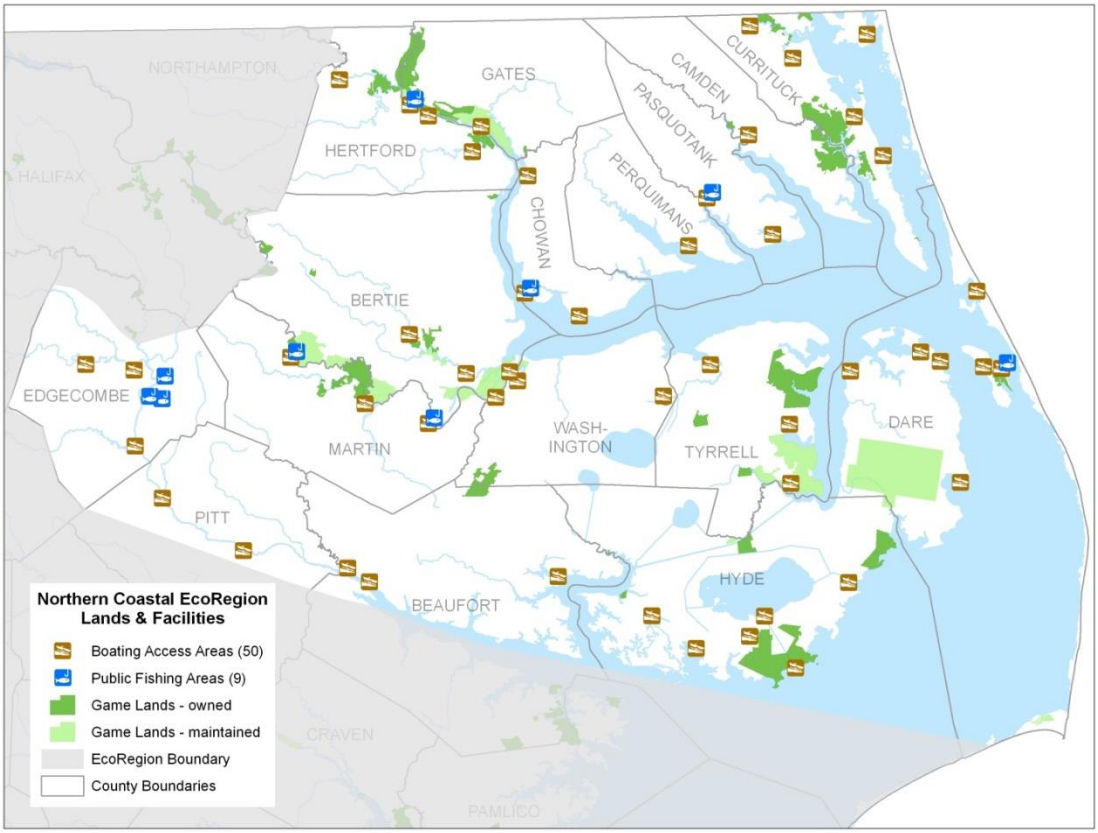

Fig. 11. Northern Coastal EcoRegion Lands and Facilities. Map created by Anna Stefanowicz: Land and Water Access Section, North Carolina Wildlife Resources Commission.

Infrastructure

Currently, the Columbia crew does not have a NCWRC owned facility to operate from. The crew's office is located in a North Carolina Department of Transportation (NCDOT) office located outside of Columbia. There is minimal space for equipment storage. There is also an agreement with the Creswell NCDOT to store equipment. Most of the crew's equipment is house at the Edenton Depot or is temporarily left on game lands. Any equipment maintenance must be done in the field or at the Edenton Depot. Efforts should be made to acquire a facility or land and build a depot for the crew.

Other infrastructure throughout the game land includes numerous culverts/water control structures(wcs) for the management of water levels in 5 waterfowl impoundments, 2 wells, 4 pumps, 1 power unit, 8 wooden bridges, 4 gates that are used to control access, and 2 observation towers.

Major infrastructure upgrades planned over the ten year planning horizon for Futch include repairs to the roads and trails, replacement of pumps, and wcs/culvert replacements. All of these improvements are covered in the Infrastructure Development and Maintenance section.

Heavy equipment and vehicles

Efforts are underway to equip the crew with the equipment necessary to maintain the game lands. As a new crew, equipment needs are being met through the sharing of other crew's equipment.

Some of the heavy equipment and vehicles needs are being met to conduct management activities on the game lands. Heavy equipment includes 2 farm tractors with various implements, an excavator, motor grader, and a bulldozer. Tractor implements include, but are not limited to, disk harrows, rotary mowers, a no-till grain drill, and box blade. Other equipment includes an ATV, and 2 types of boats.

Personnel at the Columbia Depot are currently outfitted with an adequate supply of vehicles. Additional vehicles and equipment include a hauling unit, dump truck, a belly-mounted side-mower, motor grader, bulldozer, and excavator are shared throughout the Northern Coastal Ecoregion.

As previously stated, the replacement or addition of these assets is evaluated annually based on existing and predicted needs and are acquired if funding is available.

Acquisition Plan

The NCWRC's plans for future acquisition will include adjacent lands. The majority of the land around Futch is already owned by the NCWRC. Special considerations will be given to; lands that provide corridors for the connectivity of key parcels or are critical to enhance the NCWRC's

ability to protect rare habitats, the land management needs of a property, and the public access and public uses that a property provides.

Prior to any acquisition, initial land investigations will be conducted by NCWRC staff and evaluations will be submitted by Phase I and II acquisitions forms (Appendix VII). Land will only be acquired from willing sellers and/or through donations, and all purchases will be based off of available funding. Furthermore, all potential acquisitions will be evaluated on a case-by-case basis by NCWRC staff.

The NCWRC recognizes the need and desirability to acquire other properties where managed wetland impoundments can offer migrating and wintering habitat for waterfowl and migrating and foraging habitats for wading birds and shorebirds. Properties located in high waterfowl use areas on prior converted wetlands that have access to water for pumping should be considered for acquisition.

Regulations and Enforcement

Enforcement of all rules and regulations falls to the Enforcement Division of the NCWRC. Primary enforcement activities on the game land include: aircraft patrols for bait, check points for license and game compliance, foot, remote camera setups on bait and littering sites, nighttime poaching setups and surveillance, and routine road patrols. These activities occur throughout the year across the game land, with the highest frequency of enforcement activities occurring during the hunting season. The critical time for the Enforcement Division on the game land occurs during the waterfowl season.

As with most game lands, the major enforcement problems on Futch pertain to regulation violations, license/permit issues, and misidentifying harvested waterfowl. Engineering and Lands Management staff and the Enforcement Division have an excellent working relationship and communication on game land issues between the two groups should continue.

The following is a list of regulations specifically related to Futch:

- Futch is designated as a permit-only game land.
- When drawn for a blind, hunters must hunt from the blind for which they were drawn.
- From November 1 to March 15, activities other than hunting or trapping are restricted to the Scouting-only Zones.

Partnerships and Collaborations

Partnerships and collaborations among various conservation groups, universities, state and federal agencies, non-governmental agencies, non-profit groups, national organizations, clubs, and private citizens have been pivotal to the successful management of the J. Morgan Futch Game Land. Newly created and continued partnerships between the NCWRC and these groups

will be essential for meeting the goals and needs outlined in this plan. Below is a list of partners that have assisted with conservation efforts on Futch.

Atlantic Coast Joint Venture

Mission Statement: "to provide a forum for federal, state, regional and local partners to coordinate and improve the effectiveness of bird conservation planning and implementation in the Atlantic Flyway region of the United States.

Ducks Unlimited

Mission Statement: "*DU conserves, restores and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people."*

North American Wetland Conservation Act

Purpose: *"The North American Wetlands Conservation Act of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife.*

North Carolina Clean Water Management Trust Fund

Mission Statement*: "to clean up pollution in the State's surface waters and to protect, preserve and conserve those waters that are not yet polluted."*

North Carolina Natural Heritage Program

Mission Statement: "*To provide science and incentives to inform conservation decisions and support conservation of significant natural areas in our state."*

The Nature Conservancy

Mission Statement: "*To conserve the lands and waters upon which all life depends.*"

United States Fish and Wildlife Service

Mission Statement: "W*orking with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.*"

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Public Input

A public input meeting was held at Walter B. Jones Center for the Sounds building in Columbia, NC on March 25, 2014. After a presentation on J. Morgan Futch Game Land, a NCWRC staff facilitator worked through a list of questions to gather input (Appendix VIII). Completed questionnaires were returned at the meeting. Some attendees opted to post comments on the online "Comment on Game Land Plans" link that was found on the NCWRC website. Attendees who returned questionnaires at the meeting could also submit comments using the online comment link. The online comment period was open March 12 through May 15, 2014. Comments were recorded for the same seven questions that were presented at the public input meeting. One email comment was received for public input consideration. Appendix IX lists the comments and plan response.

Appendices

I. Archeological Resources Protection Act

Archaeological Resources Protection Act North Carolina General Statutes Chapter 70, Article 2

This statute applies to all state-owned, occupied or controlled property except for highway rights-of-way.

The purpose of the statute is to provide for the protection of archaeological resources on state lands. Major provisions of the law are as follows:

1. Archaeological resources are defined as any material remains of past human life or activities which are at least 50 years old and which are of archaeological interest, including pieces of pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, rock paintings, rock carvings, intaglios, graves or human skeletal materials.
2. Permits are required in order to conduct archaeological investigations on state lands.
3. (The 1991 amendment to ARPA, effective July 1, 1991, transferred to the Department of Cultural Resources--from Department of Administration--the authority to issue permits under G.S. 70, Article 2.)
4. Information on archaeological site locations is exempted from unrestricted public access may result in damage to or destruction of the archaeological resources
5. All archaeological resources, equipment and vehicles utilized in conjunction with violation of the law are subject to forfeiture.

Prohibitions and penalties under the law are as follows:

1. No person may excavate, remove, damage or otherwise alter or deface any archaeological resource located on state lands without a permit.
2. No person may sell, purchase, exchange, transport, receive or offer to sell, purchase, exchange, transport or receive any archaeological resource excavated or removed from state lands in violation of the law.
3. Any person who knowingly and willfully violates or employs any other person to violate any prohibition of the law, shall upon conviction, be fined not more than $2,000 or imprisoned not more than six months, or both.
4. Each day on which a violation occurs shall be a separate and distinct offense.
5. Civil penalties may also be assessed against any person who violates the provisions of the act.

II. Cooperative Farm Lease

North Carolina Wildlife Resources Commission
Co-Op Farm Bid Information

Please review the information contained in this package, if you are interested in bidding on WRC Co-Op Farms located on the J. Morgan Futch Game Land in Tyrrell County, North Carolina.

Included in this package is a standard farm lease agreement required of all Co-Op farmers. This agreement outlines the terms of Co-Op farming. Carefully review the lease agreement prior to bidding.

A bid form is provided for your use. Please complete this form and return it to the address listed below prior to the bid deadline. A check for the full amount of your bid for one year lease price must accompany the bid form. Checks should be made payable to the North Carolina Wildlife Resources Commission. Checks for unsuccessful bidders will be returned after bid opening.

David Turner
Northern Coastal Management Biologist
132 Marine Drive
Edenton, NC 27932

If you have any questions concerning Co-Op farming, please call:

David Turner
Northern Coastal Management Biologist
252-482-1808
252-802-0217 cell

North Carolina Wildlife Resources Commission
Co-Op Farm Bid Form

BID DEADLINE: 1:00 P.M., March, 19, 2014

J. Morgan Futch Game Land, Tyrrell County, North Carolina

Co-Op Farm	Farm Acreage	Bid/Acre Per Year ($)	Total Farm Bid Per Year($)
J. Morgan Futch	237	$	$
		TOTAL	$

_____ _____
(Bidder Signature) (Date)

Bidders Address and Phone Number _____
_____
_____
_____

Send Bid Form and Check (Check should be made payable to North Carolina Wildlife Resources Commission) to the following:

David Turner
Northern Coastal Management Biologist
132 Marine Drive
Edenton, NC 27932

Bids must be received by 1:00 p.m, March, 19, 2014.

CO-OP FARM LEASE

This Lease is entered into this ____ day of _____ between the North Carolina Wildlife Resources Commission, 1751 Varsity Drive, Raleigh, North Carolina 27606 (WRC) and _____
_____
____

A. PROPERTY RIGHTS

The WRC hereby leases to the tenant, to occupy and use for agricultural purposes, the following described property, hereinafter referred to as the Co-Op Farm, located in Tyrrell County, State of North Carolina and commonly known as the **J. Morgan Futch Co-Op Farm**:

(See Attached Maps)

and consisting of **237** acres, more or less together with all buildings and improvements there on and all rights thereto except as specified below.

1. RIGHT OF ENTRY:

The WRC reserves the right to enter the Co-Op Farm at any time.

2. ADDITIONAL AGREEMENTS REGARDING PROPERTY RIGHTS:

Access to the Co-Op Farm is restricted to those personnel directly involved in the farming operation.

Only personnel associated with the farming operation are authorized beyond locked gates. Keys to locked gates shall not be duplicated.

Tenant shall abide by all N.C. Wildlife Resources Commission Regulations. (No plants, wildlife, artifacts, etc... shall be removed from the Co-Op Farm unless authorized by the WRC.)

Tenant shall not hinder the public's use of the area as regulated by the N.C. Wildlife Resources Commission.

Tenant shall restore roads damaged in connection with farming activities to original condition.

Tenant shall not have the privilege of regulation NCAC 10-B-0106 (no depredating wildlife can be destroyed on lands owned or controlled by the WRC).

Tenant is not granted permission to hunt or trap on the Co-Op Farm without proper license or permit.

B. IMPROVING, CONSERVING AND MAINTAINING THE CO-OP FARM:

1. FIELD BORDERS:

Tenant will maintain a **30-foot field border** around all fields, unless otherwise specified by WRC personnel and will disk field borders on a **3-year rotation**.

Tenant will maintain a **15-foot filter strip** (measured from the center of the ditch) on each side of all lateral interior ditches. The tenant to control woody vegetation will disk filter strips on a **3-year rotation**. Herbicides may be used to control unwanted woody vegetation; however its use must be approved by the WRC prior to application.

2. PUMPING:

Tenant will be responsible for pumping costs associated with farming operations. The WRC will invoice the tenant for electrical costs. Pumping required to flood impoundments in the fall and de-water areas in the spring will be paid by the WRC. Tenant will be invoiced for electrical usage during the period April- August.

3. DITCH MAINTENANCE:

Tenant will be responsible for ditch maintenance. The tenant may clean ditches as needed and will be responsible for vegetation control within the ditch system. Herbicides may be used to control unwanted vegetation; however herbicides must be used in accordance to label and approved by the WRC prior to application.

4. DIKE MAINTENANCE:

Tenant will be required to restore dikes damaged in connection with farming activities to original condition.

5. PLANTING AND PLANTING AREAS:

Tenant shall not mow, disk, spray or plant on the Co-Op Farm until execution of the lease and as outlined in the conditions of the lease.

Tenant shall plant only crops approved by the WRC. Grain and bean crops are encouraged. In the case of potatoes, a second crop (grain, bean or millet) must be planted behind potatoes in time for the crop to mature.

Tenant will not be permitted to mow, disk, spray or plant in areas designated for tree or wildlife plantings.

Double cropping will be permitted, provided that one-tenth of each crop shall be left standing for wildlife food (IE. the area planted to the second crop will be smaller by one-tenth than that planted on the first crop, except potatoes). These areas will be specified and marked by WRC personnel or their agent.

Moist soil units will be rotated across the farm. These areas will remain fallow during the set-aside year and will be maintained in moist soil conditions. These areas will not be included in the farm lease acreage.

See attached map for Field Number reference. Cropped Acres are the acres within the fields minus the acreage allocated to field borders. Moist Soil Units will be managed by the WRC within the given year.

Field Number	Cropped Acres	Crop Year	Crop Year	Crop Year
		2014	2015	2016
1	41.3	Moist Soil	Crop	Crop
2	54.7	Crop	Crop	Crop
3	46.6	Crop	Crop	Moist Soil
4	33.4	Crop	Crop	Crop
5	34.2	Moist Soil	Moist Soil	Crop
6	23.1	Crop	Moist Soil	Moist Soil
7	71.3	Crop	Crop	Crop

6. SOIL FERTILITY:

Tenant will purchase at his expense and apply to the land all fertilizer and lime necessary to maintain soil fertility during his tenancy in as good condition as at the beginning of the lease.

7. PESTICIDE USE:

Tenant shall not apply any restricted use pesticides to the Co-Op Farm, unless requested in advance and approved by the WRC. Prior to planting, tenant must file a pesticide use plan with the WRC outlining pesticides to be used, application rates, methods and times, crop and pest targets. The WRC will review each plan and will authorize, deny or recommend changes in pesticide use.

Tenant shall not apply any pesticide to the Co-Op Farm until authorized by the WRC.

Pesticides shall be applied only by or under the direct supervision of a certified pesticide applicator.

Tenant shall dispose of all pesticide containers, fertilizer bags and other related materials and any other hazardous substance as required by law.

8. MAINTENANCE OF IMPROVEMENTS:

Tenant will keep any buildings, fences, farm roads and other improvements on the farm in as good repair and condition as they are when he takes possession, ordinary wear and tear, loss by fire or unavoidable depreciation or destruction excepted.

9. CONSERVATION PRACTICES:

Tenant shall use such conservation farming practices recommended by the Agricultural Extension Service and Soil Conservation Service as they pertain to land use and the culture of the various crops being grown.

Tenant is required to plant a cover crop where land is broken in fall.

All conservation practices employed on the Co-Op Farm must be approved in advance by the WRC.

C. RENTAL RATES

The tenant agrees to lease the Co-Op Farm at a rate of _____ per acre. Agricultural lands leased and cultivated (See Attached Map) shall not exceed a total of **237** acres, at a total lease value of $_____/year. **(3 Year Lease Amount $_____-Amount Due-$ _____)**

D. TERM OF LEASE:

1. TERM:

The term of this lease shall be for the period
April 1, 2014 to December 31, 2016

2. CONTINUOUS OCCUPANCY:

The tenant agrees that he shall not sublet the Co-Op Farm during the term of the lease.

3. SURRENDER OF POSSESSION:

The tenant agrees to surrender possession and occupancy of the premises peaceably at the termination of the lease.

4. REVIEW OF LEASE:

A request for general review of the lease may be made at least 30 days prior to the final date for giving notice to terminate this lease. Amendments and alterations to the lease shall be made in writing.

5. TERMINATION OF LEASE:

This lease may be terminated immediately, by prior written notice, by either party, if the conditions outlined within the agreement are violated.

E. MISCELLANEOUS PROVISIONS:

1. NO PARTNERSHIP CREATED:

This lease shall not be deemed to give rise to a partnership relation, and neither party shall have authority to obligate the other without written consent, except as specifically provided in this lease.

2. GOVERNMENT PROGRAMS:

The farm will be operated in compliance with all Government programs, unless otherwise noted.

3. DEBTS AND ACCIDENTS:

The tenant agrees that the WRC shall in no way be responsible for the debts of or liabilities for accidents or damages caused by the tenant.

4. WILLFUL NEGLECT:

Willful neglect, failure, or refusal by the tenant to carry out any substantial provision of this lease shall give the WRC the benefits of any proceeding by law.

IN WITNESS WHEREOF, the parties have signed this lease on the date first above written.

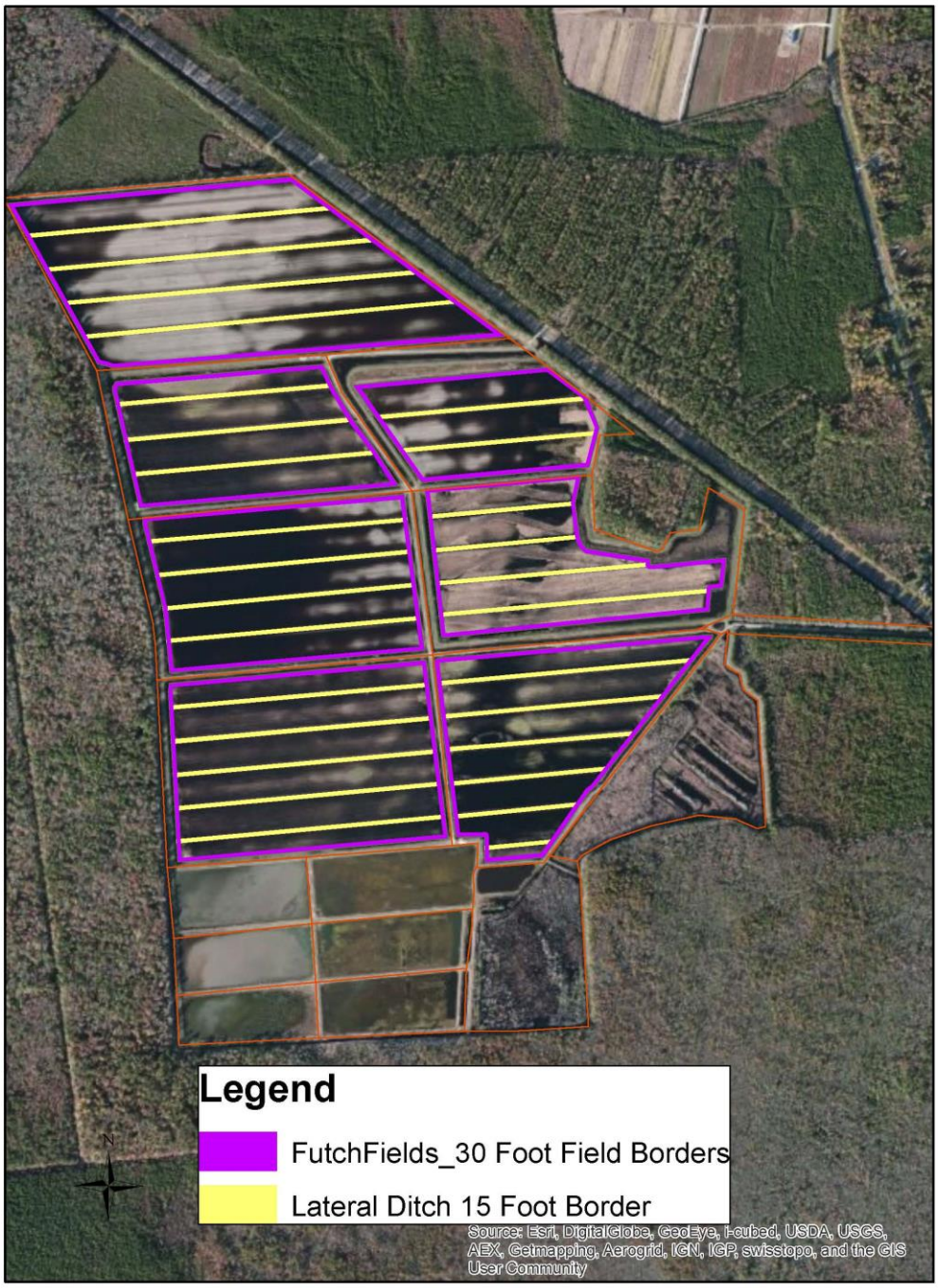
Witnesses:

_____ _____(SEAL)
(North Carolina Wildlife Resources Comm.)

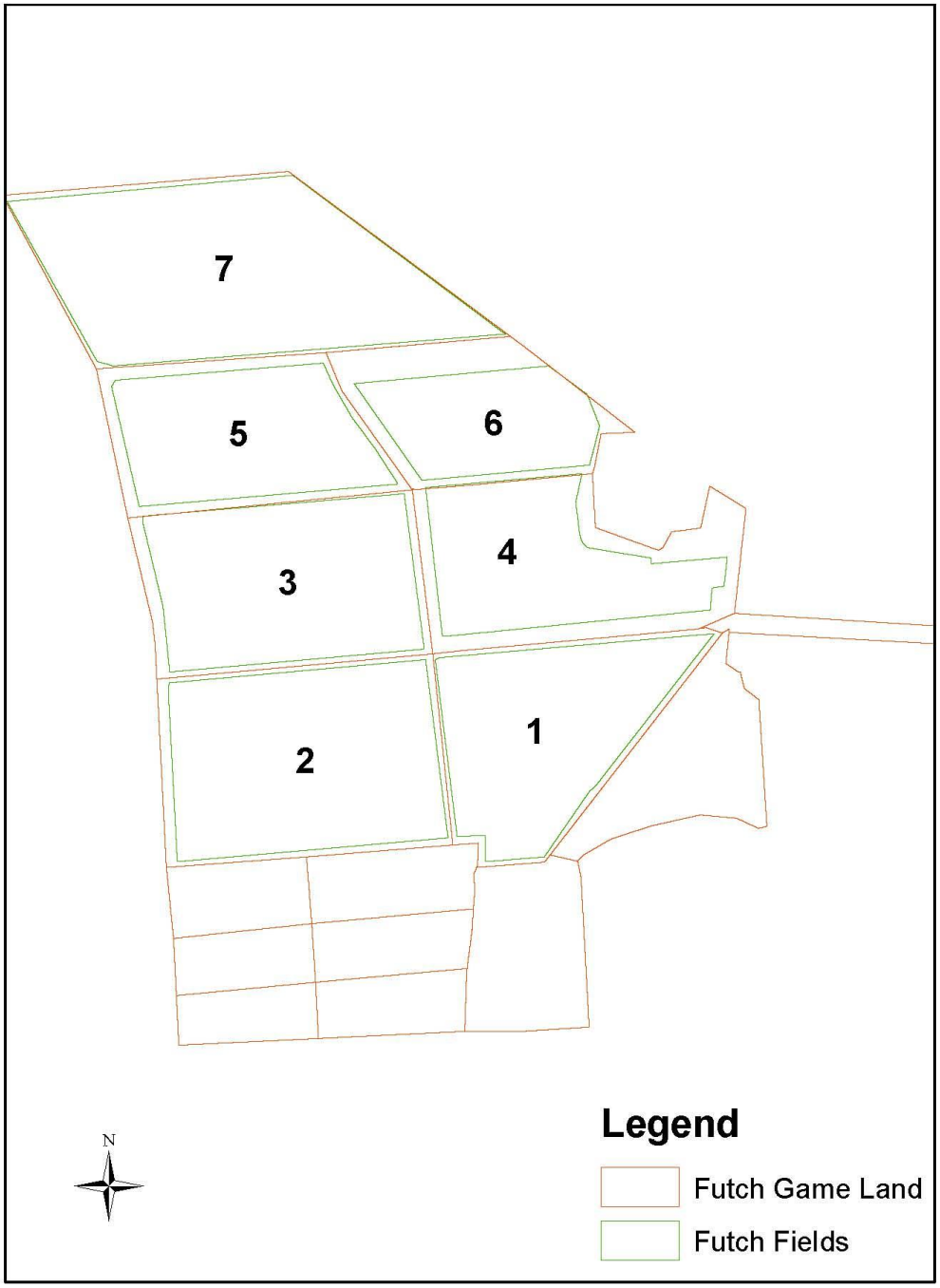
_____ _____ (SEAL)
(Tenant)

Futch Farm Lease Cropped Acres Per Field

Futch Field Edge and Lateral Ditch Buffers



Futch Field Numbers



III. Waterfowl Hunter Survey

2011-12 «Item_Name» (Item # «Item_Number») Survey

The North Carolina Wildlife Resources Commission requests that you complete this 2-page survey (front/back) and return it using the enclosed postage-paid envelope or submit your response online at www.ncwildlife.org. This survey provides an opportunity for you to let us know about hunting experiences you may or may not have had using the «Item_Name» permit. Your responses are used by the Commission to better manage and improve the quality of permit hunts. **We ask that you respond even if you did not hunt using this permit.**

«CustomerID»
«First_Name» «Middle_Name» «Last_Name» «Suffix»
«Address_1»
«City», «State» «Zip» «Zip4»

Permit Number: «PermitID»

Submit your response online at www.ncwildlife.org

1. Did you hunt during at least one day using the «Item_Name» permit?

☐ Yes

☐ No **Indicate the reason(s) you did not hunt and return the survey in the postage-paid envelope:**

☑ **all that apply**

☐ Not enough waterfowl
☐ Weather was poor for waterfowl hunting
☐ Not enough water in impoundment
☐ My hunting partner(s) could not go
☐ I hunted somewhere else during the day(s) I had a permit for
☐ I could not afford to make the trip(s)
☐ Work or family obligations or health problems
☐ Other (please specify):

_____

2. Please indicate which hunt(s) listed below you hunted using the permit. List the number of days and total number of hours hunted. (**Check the box if you did not hunt during a particular hunt choice date**)

Hunt Choice and Date	Number of Days Hunted	Total Number of Hours Hunted	Did Not Hunt
«HuntChoice_1»			☐
«HuntChoice_2»			☐
«HuntChoice_3»			☐
«HuntChoice_4»			☐
«HuntChoice_5»			☐

3. Please indicate the number of each waterfowl species you *personally* harvested using the permit during the hunt(s) listed below. (**Check the box if you did not harvest any waterfowl during a particular hunt choice date**)

Hunt Choice and Date	Number Harvested						Did Not Harvest Any Waterfowl
	Tundra Swan	Ducks	Mergansers	Coots	Canada Geese	Snow Geese	
«HuntChoice_1»							☐
«HuntChoice_2»							☐
«HuntChoice_3»							☐
«HuntChoice_4»							☐
«HuntChoice_5»							☐

CONTINUE ON REVERSE SIDE ➔

Permit Number: «PermitID»

4. Did you scout any hunt area(s) listed on the permit prior to the hunt date(s)?

☐ Yes

☐ No

5. Using the rating scale shown below, enter one rating in every box for each hunt listed.

Rating Scale: Very Dissatisfied (1) … Very Satisfied (5) — Hunt Choice and Date	Rating						
	Accessibility of hunting area	Satisfaction with number of waterfowl seen	Satisfaction with number of waterfowl harvested	Quality of waterfowl habitat	Weather	Behavior or courtesy of other hunters	Overall hunting experience
Rating Example	***1***	***4***	***2***	***4***	***2***	***3***	***2***
«HuntChoice_1»							
«HuntChoice_2»							
«HuntChoice_3»							
«HuntChoice_4»							
«HuntChoice_5»							

6. Do you think the number of other hunters during your hunt(s) using the permit was…. (☑ **one for each hunt choice date listed**)

Hunt Choice and Date	Number of Other Hunters			
	Too Few	Just Enough	Too Many	Did Not Hunt
«HuntChoice_1»	☐	☐	☐	☐
«HuntChoice_2»	☐	☐	☐	☐
«HuntChoice_3»	☐	☐	☐	☐
«HuntChoice_4»	☐	☐	☐	☐
«HuntChoice_5»		☐	☐	☐ ☐

7. How far did you travel (one way) for a hunt using the permit? (☑ **one**)

- ☐ 0 to 60 miles
- ☐ 61 to 120 miles
- ☐ 121 to 180 miles
- ☐ More than 180 miles

If you have any questions regarding this survey, please call us at (888) 248-6834. Thank you for your time and support of our wildlife programs.

STAY INFORMED….

Start receiving e-mails regarding permit hunting opportunities, application and survey reminders, draw status information, and N.C. Wildlife Update.

Sign up at www.ncwildlife.org/enews or give us your e-mail address (print neatly): _____

IV. Geocaching Policy

GEOCACHING POLICY

CONTENTS

Acknowledgement This document represents the efforts of an inter-divisional committee assembled for the purpose of developing an agency-wide policy to address geocaching on all agency lands. Special acknowledgement is extended to Mr. Matt Busch for his participation and contributions to this document on behalf of Geocaching.com and the geocaching community.

Alert Hunting is a primary public use on the majority of lands managed by the Wildlife Resources Commission (WRC). As such, all users are stongly encouraged to be familiar with applicable hunting seasons and to wear a hunter orange cap/hat or other outer garment made of hunter orange material while on WRC lands during open hunting seasons. WRC lands are also intensively managed and some areas may not be conducive to recreational use while management acitivies are underway. Users are encouraged to avoid areas undergoing active timber harvest, prescribed burns, construction projects and other similar management activities.

INTRODUCTION

Geocaching is a real-world, outdoor treasure hunting game using GPS-enabled devices. Participants navigate to a specific set of GPS coordinates and then attempt to find the geocache (container) hidden at that location (http://www.geocaching.com/guide). Individuals who participate are known as geocachers.

OBJECTIVES

- Minimize potential impacts of geocaching on WRC-allocated lands.
- Where appropriate and compatible, support geocaching as a means of providing for additional recreational use of WRC-allocated lands and to increase awareness of WRC and its mission.

APPLICATION

This policy applies to all WRC-allocated lands and those WRC-managed properties where the landowner has ceded authority for the management of recreational uses to WRC. On those lands which WRC manages under cooperative agreements which do not cede authority for management of recreational uses in general, geocaching activities are subject to control of the landowner.

CONSENT

On WRC-allocated lands, and those WRC-managed properties where the landowner has ceded authority for the management of recreational uses to WRC, blanket permission is granted for the placement of geocaches which comply with the provisions of this policy. No special license, permit or fee is required at this time.

DEFINITIONS

Archive - Archiving a cache removes the listing from public view on Geocaching.com.

Cache (Geocache) – A hidden container that includes, at minimum, a logbook for geocachers to sign.

EarthCache - An EarthCache is a special place that people can visit to learn about a unique geoscience feature of our Earth. EarthCache pages include a set of educational notes along with cache coordinates. Visitors to EarthCaches can see how our planet has been shaped by geological processes, how we manage its resources and how scientists gather evidence to learn about the Earth.

Geocachers – Individuals who participate in placing and/or seeking geocaches.
GPS - GPS stands for Global Positioning System. It is a system of satellites that work with a GPS receiver to determine your location on the planet.

Multi-Cache (Offset Cache) - A Multi-Cache ("multiple") involves two or more locations. The final location is a physical container. There are many variations, but most Multi-Caches have a hint to find the second cache, and the second cache has a hint to the third, and so on. An offset cache (where you go to a location and get hints to the actual cache) is considered a Multi-Cache.

Physical Cache – Cache consisting of a sealed container and containing at least a logbook and pen or pencil.

Stash Note - In geocaching, a stash note is a note left in a cache container to explain geocaching to any non-cachers who might stumble across the cache.

Virtual Cache – Cache that exists in the form of a location where no physical object is left. **Note**: grandfathered caches are still available to find, but have otherwise been retired as a geocache type and may no longer be created on Geocaching.com.

WRC – Wildlife Resources Commission.

GENERAL GUIDELINES

1. WRC will seek to foster a cooperative partnership with the geocaching community to promote the objectives of this policy

2. Geocachers are encouraged to practice principles of Leave no Trace outdoor ethics.

3. The cache owner must assume all responsibility for the accuracy of online content.

4. WRC accepts no responsibility for the security or maintenance of physical caches.

5. Geocachers are encouraged to wear blaze orange in areas where hunting is allowed.

6. All caches must be registered and comply with www.geocaching.com guidelines finder (see ATTACHMENT 1).

7. Caches may not be used for purposes of advertising, commercial gain, or promotion of political or other social agendas.

8. Acceptable caches include physical caches, virtual caches, multi-caches, and EarthCaches.

CACHE PLACEMENT

9. Caches may not be placed in areas of known archaeological, historical, or ecological significance.

10. Caches may not be placed in stockpiled construction/maintenance materials such as gravel, lime, sand, etc.

11. Caches may not be placed in locations that present a safety risk to those subsequently attempting to locate the cache. Examples include, but are not limited to caves, rock outcrops, top of ledges, base of overhanging cliffs, elevated positions that require climbing above ground level, blind curves adjacent to roadways, etc.

12. Caches may not be placed within 100 feet of any lake, pond, or waterway.

13. Caches may not be placed in locations where public access is prohibited.

14. Cache placement may not involve alternation of the natural environment, such as digging, cutting, or removal of vegetation from its present location except that dead and down vegetation may be used to help with concealment.

15. Caches may not be placed within or attached to any buildings, piers, docks, or wildlife nest box structures and may not be attached to any other feature by use of nails, screws, bolts, or wire.

16. Caches may not be placed within cavities of any tree.

17. Marks may not be placed on any natural or man-made feature to aid in locating a cache.

18. Caches may not be placed in maintained landscaped areas, wildlife openings, or areas containing agricultural crops. Areas containing blackened tree trucks, which indicate frequent application of prescribed fire, should be avoided.

CACHE CONTAINERS

19. Containers must be clearly labeled on the exterior as a "geocache", along with the name of the cache as it appears at: http://www.geocaching.com/

20. Containers should be waterproof or sealable.

21. Containers may not exceed a volume greater than 1 cubic foot.
22. Clear (see through) containers are preferred.

23. Containers may not consist of PVC or metal pipe.

CACHE CONTENTS

24. Containers must include contact information of the cache owner, to include at a minimum an email address and GC# (Geocaching ID#) if applicable.

25. All cache containers should contain a standard geocache "stash note" explaining the activity to an unintentional finder (see ATTACHMENT 2).

26. Contents must be family friendly and appropriate for all ages.

27. Caches may not contain items that are inappropriate, offensive, dangerous, or illegal. Examples of such items include, but are not limited to firearms, weapons, ammo, alcohol, drugs, explosives, items of an adult nature, etc.

28. Caches may not contain food items.

29. The cache should contain a log book and pen or pencil for finders of the cache to log their visit.

30. Trade items are acceptable, provided such items are in compliance with this policy.

ENFORCEMENT

WRC supports responsible non-traditional use of WRC lands and recognizes the enjoyment and recreational value associated with Geocaching. However, we reserve the right to restrict, without prior notice, any cache and/or all Geocaching activities:

- deemed to be in an inappropriate or potentially unsafe location,
- where uses conflict with legal hunting, fishing, trapping, or the Commission's management and administration of WRC lands,
- found to be causing or having the potential to cause undue impact to archaeological, historical, or ecological resources,
- containing inappropriate, offensive, dangerous, or illegal items, or
- determined for any other reason to be in non-compliance with the provisions of this policy.

An immediate attempt will be made to contact the owner of any cache that is removed to provide the owner with an opportunity to retrieve the cache and to alert the owner of the need to archive the cache as quickly as possible.

ATTACHMENT 1 – GEOCACHING.COM

Each cache submitted to Geocaching.com is reviewed to ensure that the cache meets the Geocaching Listing Guidelines (http://www.geocaching.com/about/guidelines.aspx). It may take up to three days for the volunteer to contact you and make your cache live on the web site. Sometimes the volunteer will need to work with you to fine-tune the listing so it can be published.

Following is the general review process and sequence of events:

- Hider places the cache, fills out the appropriate form http://www.geocaching.com/hide/planning.aspx at geocaching.com, and checks off the boxes indicating they have read and understand the guidelines.
- Cache appears in a queue that only the Geocaching.com volunteers and staff can access.
- Cache is reviewed to ensure it meets the Geocaching.com guidelines, with specific attention paid to the location in areas known to have a geocaching policy, proximity to other caches, schools, railroads, and other sensitive areas.
- The cache description is verified to make sure it matches the posted waypoint and that the hider lives near enough to properly maintain their hide.
- The cache is then published and posted to geocaching.com for all to see.
- All listings on WRC lands must include approved logo.

ATTACHMENT 2 – GEOCACHE STASH NOTE

GEOCACHE SITE – PLEASE READ

Congratulations, you've found it! Intentionally or not!

What is this hidden container sitting here for? What is this thing doing here with all these things in it?

It is part of a worldwide game dedicated to GPS (Global Positioning System) users, called Geocaching. The game basically involves a GPS user hiding "treasure" (this container and its contents) and publishing the exact coordinates so other GPS users can come on a "treasure hunt" to find it. The only rules are: if you take something from the cache, you must leave something for the cache, and you must write about your visit in the logbook. Hopefully, the person that hid this container found a good spot that is not easily found by uninterested parties. Sometimes, a good spot turns out to be a bad spot, though.

IF YOU FOUND THIS CONTAINER BY ACCIDENT:

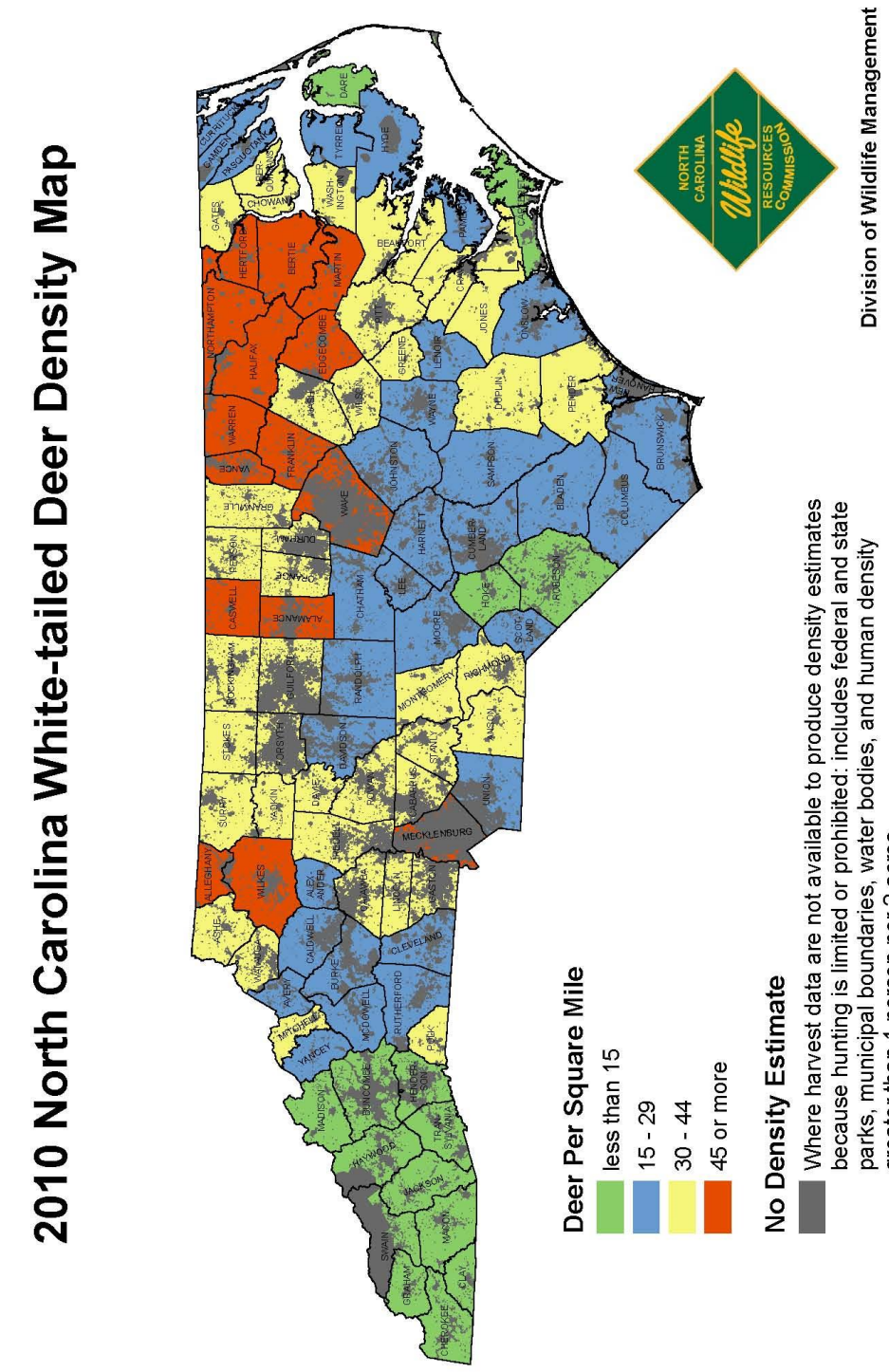
Great! You are welcome to join in! Geocaching.com asks only that you:

- Please do not move or vandalize the container. The real treasure is just finding the container and sharing your thoughts with everyone else who finds it.
- If you wish, go ahead and take something. But please also leave something of your own for others to find, and write it in the logbook.
- If possible, let Geocaching.com know you found it by visiting the web site listed below.

Geocaching is open to everyone with a GPS enabled device and a sense of adventure. There are similar sites all over the world. The organization has its home on the Internet. Visit Geocaching.com if you want to learn more, or have any comments

http://www.geocaching.com

X. 2010 Deer Density Map



VI. Phase 1 and Phase 2 Land Acquisition Forms

North Carolina Wildlife Resources Commission

Land Acquisition Investigation Form

- INITIAL INVESTIGATION-

WRC Staff Contact:

Date First Presented to WRC:

Tract Name:

Acreage:

County:

Estimated Value: $

Property Owner or Representative:

Phone: (W) (C)

Address:

Status: ☐ High Interest ☐ Moderate Interest ☐ Low Interest ☐ No Interest

Grant Potential: ☐ NHTF ☐ CWMTF ☐ OTHER (explain):

Resources Assessment and Biological Benefits (brief):

Additional Comments:

Program Potential: ☐ Game Land-

☐ Waterfowl Blind Area ☐ Wildlife Conservation Area ☐ Fishing Access Area ☐ None

Potential Source(s) of Stewardship Funds (indicate federal:state match rates):

Relative Priority Evaluation Score (attach worksheet): ☐

Recommendation: ☐ Pursue Acquisition ☐ Defer ☐ Do not Pursue Acquisition

Map Attached: ☐ Yes ☐ No

WORKSHEET
Relative Priority Evaluation for Conservation Lands

Tract Name ( ) _____

Criterion	Score (1-5) 5=Excellent 1=Poor
1. Augments existing protected lands by addressing an inholding or adjacent tract, provides key access, buffers or connects existing WRC-managed lands.	_____
2. Represents good hunting, fishing, wildlife viewing, and other resource-based recreational opportunities.	_____
3. No conflicting surrounding land uses.	_____
4. Serves as a wildlife corridor between areas already protected for conservation purposes and provides connectivity to priority Wildlife Action Plan habitats.	_____
5. Augments land conservation efforts on a landscape scale by providing nuclei ("anchors") for regional conservation efforts, corridors, key linkages between conservation areas, or keystone tracts.	_____
6. Fills a need identified by the Wildlife Action Plan, such as critical, rare or unique habitats; natural heritage elements; or significant aquatic/terrestrial resources.	_____
7. Is this an area in which we would like to establish a new game land, wildlife conservation area, or fishing access?	_____
8. Is it large enough to be a new game land, and if not, are there possibilities for expansion (goal 3,000-5,000 minimum)?	_____
9. Is area adequate for fishing access development with suitable parking, and if not, are there possibilities for expansion?	_____
TOTAL SCORE	_____

North Carolina Wildlife Resources Commission
Land Acquisition Investigation Form

-PHASE II: FINAL ACQUISITION DETAILS-

WRC Action/Approval to Pursue (Date):

Acquisition Plan (specify total project cost, each source, and amount of OBLIGATED funds):

Based on Appraisal: ☐ Yes ☐ No

If Yes, Name of Appraiser:

Date of Appraisal:

Appraisal Handled by State Property Office: ☐ Yes ☐ No

Acquisition Plan Includes Bargain Sale: ☐ Yes ☐ No

If Yes, Explain Details:

Source(s) of Stewardship Funds (indicate federal:state match rates):

Five Year Stewardship Costs & Revenue Projection Evaluation (attach worksheet)

Five Year Estimate of Total Stewardship Expenditures:	$:	
Five Year Estimate of Total Projected Revenue:	$:	

Additional Comments:

VII. Public Comment Questions, Comments and Response

Game Land Management Plan

Public Input Meeting

Your input is important to us, so please participate. You can provide written comments on this form, comment online at @ www.ncwildlife.org then click on "Comment on Game Land Plans", or provide verbal comments during the breakout session.

Core Questions

1. What habitats do you think are most important to protect and/or improve on this game land?

2. Considering those that live on land and in water, what species do you think are most important to protect and/or improve on this game land?

3. How do you use this game land?

4. Please explain why you think the current level of access is, or is not, satisfactory on this game land?

5. What suggestions, if any, do you have for changing how this game land is managed and maintained?

6. What would encourage you to start using this game land, or to continue using it more actively?

7. What additional comments do you have regarding this game land?

Game Land:

Date:

Affiliation:

Summary of Public Input

1. What habitats do you think are most important to protect and/or improve on this game land?

HABITAT TYPE	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Waterfowl	**14**	**58%**
Agricultural Fields	**6**	**25%**
Timber/Swamp	**5**	**21%**
Moist Soil/Millet	**4**	**17%**
All Habitats	**2**	**8%**
Catfish Ponds	**2**	**8%**
Submerged Aquatic Vegetation	**2**	**8%**
Deer	**1**	**4%**

Public Input Meeting/Online	Comment
Public Input Meeting	maintain ag and moist soil units
Public Input Meeting	diversity-different habitats for different needs
Public Input Meeting	SAV
Online	I think the duck impoundment for duck habitat is the most important for that piece of land
Online	moist soils habitat for waterfowl
Online	Protect the swamp areas. Improve the catfish pond areas.
Online	I believe that both the Agricultural Impoundments and the swamp habitat should be protected. During previous hunts, I have seen a large array of waterfowl.
Online	I think Futch is perfectly balanced with agricultural fields, ponds, ditches, sapling swamp, standing crops, uncut areas, and woods.
Online	waterfowl habitat
Online	Access to the flooded timber should be returned.
Online	Need to focus more on waterfowl hunting and plant millet, smartweed, corn (not soybeans). Also the impoundment needs to be flooded for longer periods, especially after season closure.
Online	THE FOOD AND BLINDS WILDLIFE SHOULD DO MORE WORK AT OTHER GAME LAND AND PUT OUT BLINDS OUT AND IT WOULD STOP ALL THE PROBLEM WITH PEOPLE TRYING TO GET TO THE SAME PLACE AND HUNT
Online	Sub-aquatic vegetation in the catfish ponds.

Online	The waterfowl habitat is most important. The annual planting of the impoundments needs to continue in at least the same that it was conducted this past year.
Online	All present the diversity is excellent
Online	I think NC should Really consider planting rice. That would be much more productive than the rotten corn, beans and millet you guys continue to allow area farmers to play around with. Rice loves water and that can be controlled in an impoundment even in dry summers.
Online	Waterfowl habitat and food sources
Online	Habitat that is geared for the use by waterfowl during their migration and for providing an adequate food source.
Online	I think the only improvements needed are to spread the blinds out a little more, that is if they keep them. I think the habitat is fine as is.
Online	Duck habitat.
Online	It has been a shame to watch the trees in the 2 blocks on the southeast side of the gamelands become flooded and die. Those were some of the best areas to bow hunt when the gamelands were first opened for archers. Preserving areas where hunters can hang a treestand and stand a decent chance of harvesting a deer would be tops on my list. Otherwise, I believe the management of the lands on Futch is pretty good.
Online	The number of blinds needs to be reduced by half.....I should not be competing w/another blind in sight.....also, days of hunting should be 2 consecutive with a day or two break....no one will come and hunt for just one day, and Columbia will not earn potential dollars/revenue....
Online	Corn/Bean fields that are flooded for waterfowl. When conditions are optimal this impoundment harbors more birds than any other public hunting game land in NC
Online	The duck impoundments.

2. Considering those that live on land and in water, what species do you think are most important to protect and/or improve on this game land?

SPECIES	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Waterfowl	**20**	**95%**
All Wildlife	**2**	**10%**
Other Game Species	**1**	**5%**

PUBLIC INPUT MEETING/ONLINE	COMMENT
Public Input Meeting	waterfowl
Public Input Meeting	waterfowl
Public Input Meeting	waterfowl
Online	Ducks
Online	
Online	All Duck species.
Online	I think waterfowl are the most important to protect.
Online	Manage for waterfowl
Online	waterfowl
Online	Don't really understand this question? Any wildlife in E. NC that needs a wetland to exist should be considered as a resource we should manage. As far as protecting, that needs to be clarified. Too may nut jobs/environmentalist get involved in this definition and I'm one for "managing" a resource not protecting it.
Online	I feel it is important to maintain the waterfowl habitat so that they continue to use the game land in the future.
Online	They are all important. I would focus on the waterfowl habitats.
Online	The area should be managed as waterfowl habitat. You should have more liberal seasons on non-waterfowl seasons at times it would not negatively impact the planned waterfowl hunts.
Online	Ducks. There are not many WMAs in NC, and there are not many places that plant food for ducks.
Online	DUCK HUNTING AND YOU STOPED ALL OF THE PROBLEM WITH THE PEOPLE AND MADE FOR A GRAET HUNT
Online	All waterfowl species should be considered highest priority. Do not drain fields for dove and deer.
Online	WATERFOWL
Online	waterfowl
Online	I like the focus Futch has on waterfowl, and there is likely not much that can be improved on.
Online	waterfowl
Online	The ducks
Online	Ducks

3. How do you use this game land?

Activity	PERCENTAGE OF REPONSES
Waterfowl Hunting	**97%**
Deer Hunting	**6%**
Wildlife Viewing	**9%**
Dove Hunting	**3%**

PUBLIC INPUT MEETING/ONLINE	Comment
Public Input Meeting	waterfowl hunting
Public Input Meeting	duck hunt
Public Input Meeting	waterfowl hunting
Online	I apply each year for permit to duck hunt
Online	waterfowl hunting
Online	I have hunted at J. Morgan Futch for a number of years with my daughters and friends for both dove and waterfowl. Getting a waterfowl draw is always one of the highlights of the season and opening our fall with a dove hunt here is a tradition for us.
Online	Myself and my two boys have duck hunted JMF for last 4 or 5 years and enjoyed it tremendously until this year. Birds new exactly where blinds were especially in soybean field. Only 4 blinds along back east side on JM3 did any shooting. Suggest you do away with blinds and go back to first come first serve. True duck hunters will take the time to scout and make sure there at the gate at 4AM ready to go and put themselves in the proper location. Also when you get non duck hunters (duck commander imitators) in a blind near you and they shoot/flair ducks nonstop it would be nice to move elsewhere and not have to call it quits when you drive from Raleigh to Columbia. We stuck it out until 1pm but will probably not put in next year for any location with blinds.
Online	I use JMF as an hunting area, I have hunted there a couple of times and have been pleased even though I have not always killed my limit. It is an experience to be on the game land.
Online	waterfowl hunting under the permit system
Online	I have duck hunted on Futch.
Online	I have hunted JMFutch for appx 10 years - exclusively for ducks and swan
Online	My family and I hunt ducks there if we are lucky enough to draw a day
Online	Waterfowl hunting
Online	I have deer hunted there before and some point may apply for a waterfowl hunting permit.
Online	Duck hunting
Online	Waterfowl Hunting

Online	Waterfowl viewing and waterfowl hunting
Online	Duck hunting.
Online	waterfowl hunting
Online	Waterfowl hunting
Online	As a family we observe and hunt waterfowl.
Online	Permit draw waterfowl hunts
Online	DUCK HUNTING AND THE BLIND WERE GRAET
Online	I use J. Morgan Futch game land for waterfowl hunting. I think it would be great if they opened a snipe season in February like they a have a dove season in september.
Online	My son and I have been drawn for the duck hunt there for all but one year the past 8 years. Even though it is a 4 hour drive from Asheboro, NC we thoroughly enjoy it.
Online	Hunt and observe waterfowl in their natural habitat
Online	Draw duck hunts and take my boys on the youth duck hunts
Online	I use the game lands for waterfowl Hunting.
Online	Waterfowl only.
Online	I previously drew a waterfowl hunt duringa the 2013 season and was impressed by the amount of waterfowl. I am looking forward to hopefully draw another hunt next season. Keep up the good work. By the way the blinds were a great addition,cplenty of room and just far enough apart.
Online	I have duck hunted there when successfully drawn and also take advantage of the deer archery season almost annually.
Online	Waterfowl hunting .
Online	Apply for permit for waterfowl hunts. Like the assigned blinds. Would prefer to put in for a date and be assigned a blind rather than having to select blind for specific date. Would also like to see two day hunt (similar to Mattamuskeet) to better accommodate hunters who travel significant distance to hunt (over 3 hrs) Similar improvements and lantern acres would be good too.
Online	Duck Hunting

4. Please explain why you think the current level of access is or is not, satisfactory on this game land?

CURRENT LEVEL OF ACCESS	PERCENTAGE OF REPONSES
More Restrictive	3%
Keep Access As Is	56%
Increase	9%
Change How You can Hunt/Assign the Blinds	18%
Increase Hunt Days	0%
Change Permit/Party Hunt System	12%
Better Parking	3%
Allow ATV/UTV	3%
Increase Hunting for Other Species	3%

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	satisfactory	
Public Input Meeting	Blind has helped as far as user conflict and more enjoyable hunt, but harvest has probably gone down.	
Public Input Meeting	Access is satisfactory	
Online	Do not like the permit system where you select a blind on a given date. Would prefer select date and then be assigned a blind. Consider allowing movement to vacant blind after say 10:00 and the option to change a party member. I know of past instances of parties canceling because one or more members could not go. THe remaining person could have found a replacement.	Rule 15A NCAC 10D .0103(i) states that the permits must be issued by random computer selection and are nontransferable. Without a rule change we must abide by this rule.

Online	My party has hunted the catfish ponds before and it is a long, grueling walk. We have hunted some of the closer areas and it wasn't so bad if you can find the bridges. This year we drew # 16 blind and everything was marked very well and the blind was very impressive. So, if every blind is marked and set up the way #16 is, I think it is satisfactory.	
Online	Access to the gamelands is great. Only thing that could help would be a little extra parking.	The parking areas are addressed in the plan. Parking Areas #1 size is adequate for the expected traffic. The State only owns a narrow strip of land to Parking Area #2. Details for improvement to this area is addressed in the plan.
Online	I think it is satisfactory. If it's to easy to go anywhere you want, there is no place for the ducks.	
Online	If there are going to be assigned locations, there should be more of them. My example is a blind for each catfish pond and proportionally thereout.	Beginning with the 2014-15 Waterfowl Season, each blind will have a 300 yard buffer between blinds. We are moving blinds across the game land to meet the buffer criteria. We are also adding an additional blind bring the number of blinds to 20. Putting a blind in each of the catfish ponds would violate the 300 yard buffer criteria.
Online	blinds seem to be two concentrated on one end of the impoundment. Move more to end near columbia. Small parking lot is to near blind number 3. shooting right toward cars in parking lot	For the 2014-15 season, there will be two blinds moved into the impoundment closest to Columbia. As far as former Blind #3 being too close to a parking lot, I think you are referring to former Blind #13. Some people may prefer putting in for a blind that is closer to the parking areas. The shooter is responsible for what they shoot at.

Online	Related to the expansion of new hunting opportunities, I would love to see the archery deer season lengthened, the addition of a snipe hunting period in February, a non-dog bear hunt (especially for archers), and possibly a short gun deer hunt. Until other users groups have to pay to use the gamelands like hunters currently do with a gamelands license and special hunt permits, the hunters should get top billing and trump all other uses of the gamelands. Facility-wise, access is good for almost all users.	Futch is managed primarily for waterfowl wintering and migrating habitat. Shorebirds and wading birds also benefit from the management of seasonal wetlands. Deer hunting is not restricted on the adjacent Alligator River Game Land.
Online	Current level of access is satisfactory.	
Online	I may not understand the draw process but there should be a blind choice as to first available for the date chosen. I have been drawn several times over the years but have never been there when there were more than 3 total groups in the entire impoundment. Ex: If I want to hunt on Jan 1 and select 1,2,3,4,5 blinds, 6,7,8,9 may be available but I miss out. Hope I made this clear, Thanks	During the 2013-14 late waterfowl season, there were 910 permits issued. Twenty five of those were point of sale leftover permits. Most leftover hunt opportunities are for hunts near Thanksgiving Day and Christmas Day. By rule, permits are non-transferable.
Online	I enjoy the way it is set up but I wish that golf carts or atv/utv were allowed to help carry items to the blinds. It is a long walk carrying your gun, decoys, calls, extra ammo, harvested birds, etc. Maybe during the application process, there could be a box checked if the user wishes to use an golf cart, atv, utv and if selected, they could somehow register it with NCWRC.	The use of ATV, UTV, or golf carts would disturb birds roosting on the ponds. If motorized access were granted, there is no way to control the amount of travel once on the game land.
Online	Generally access to blinds does not appear to be a difficulty. The real issue is the quality of the hunting experience now that blinds were constructed. In past years we had excellent hunting opportunities by hunting from layout boats and	

	concealing ourselves in the vegetation. By the middle of the season the ducks avoid flying near the blinds and it is extremely discouraging to have a raft of ducks sitting between blinds. This only encourages people to shoot at ducks that are out of range and leads to more cripples and blind weary ducks . Unfortunately NCWRC has restricted hunting to the blinds and forced this situation on the game land. Also, if NCWRC wants to follow the USFWS example set at Mattamuskeet and other locations they should commit to providing check in and standby hunting opportunities for blinds that have parties that do not show up.	
Online	Satisfactory, I DO BELIEVE that the state needs to allow for hunters who are drawn for a permit to choose their hunting partner, same as the Lake Mattamaskett hunts. Your system of the Party hunt is a waste. Many times one or two of the party members can not make the hunt and those opportunities are be wasted. "Hey, maybe I'll take my son or introduce someone new to the sport." Get it??	Rule 15A NCAC 10D .0103(i) states that the permits must be issued by random computer selection and are nontransferable. Without a rule change we must abide by this rule. We encourage mentoring to youth and new hunters. Consider adding them to future parties.
Online	Access is adequate by using observation posts. Maybe one additional post would be preferable. Keep access restricted since waterfowl don't like to be disturbed repeatedly.	
Online	I feel the current level of access is satisfactory. The draw system for waterfowl hunting allows everyone a chance to hunt there, and the new blinds have gotten rid of the competition for hunting spots within the impoundments. Allowing more access would likely be detrimental to numbers of waterfowl that use the impoundments.	

Online	It would be satisfactory if I could actually access it I believe. I haven't gotten drawn on a permit for this game land in two years. When I hunted waterfowl, hunters set up too close to my party.	1874 individuals applied for 910 possible late season waterfowl permits at Futch for the 2013-2014 season.
Online	Amount of access is adequate. Four o'clock start times for entering impoundments(other than most remote ones) is too early. Theoretically dispersing hunters in assigned blinds addresses this as well as keeping hunters from setting up on top of others. However, birds are landing in areas withno blinds late in the season resulting in poor hunts. Most folks I have talked to would prefer to hunt from their kayaks, layout boats without blinds.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	ACCESS IS GRAET	
Online	Access is very acceptable	
Online	Futch (and NC as a whole) needs to implement a points system to improve odds for those not chosen year after year and you should also have to purchase a state hunting license BEFORE you can apply for a permit, especially for out of state persons. Also number of shotgun shells should be limited on Futch. Way too much sky busting and wasted ammunition there.	
Online	We have had great success in the flooded timber in the south east area and would like to see access returned.	The flooded timber is open to hunting during the early season by permit. During the late waterfowl season the timber units serve as a refuge and may help hold some birds during the hunts.

Online	Even though i have not been chosen in several years i think to keep the hunting experience as good as i have seen it there access needs to be limited. the lottery/ quota system seems to me to be a good idea. In my opinion the fewer duck hunters in the impoundment at the time the better the hunt will be.	
Online	access under the permit system is abysmal. access to public waterfowling needs to be GREATLY INCREASED.	The permit system was instituted to control access to manage hunters and the resource, both to provide for quality hunts. The NCWRC is aware of the need for additional waterfowl impoundments and are always open to investigate potential sites.
Online	I think the level of access is satisfactory. I do feel that birds are disturbed from the viewing areas more than they should be.	In institution of the Scouting Zones and observation towers is the best way to limit anyone from walking through the game land disturbing birds.
Online	Access if fine with two locations and multiple roads to walk and access points into impoundments.	
Online	I believe the property is perfectly managed for the amount of hunt dates and number of hunters for dove, which ends before waterfowl season starts. Waterfowl season is managed extremely well too, hunting the property two days per week is perfect. If anything were to change I'd like to see hunting allowed past 1pm. Although I've never taken advantage of Futch's deer bow hunting, it would seem to be timed perfectly. In terms of walk-in only access, this is also perfect for the property. I have not been on a waterfowl hunt since the blind locations were added this season.	

Online	Too many people applying for limited number of hunting opportunities. Would be in favor of a points system put in place for hunting at JMF so you could at least have the opportunity to hunt it at least once every other year. Would also be in favor of increasing permit price from $5 to $10 as long as the extra revenue stayed with JMF and was used to improve habitat for the following year.	Most of the fees associated with the permits helps cover administrative cost to implement the system. Most of the habitat work is funded through Federal Pittman-Robertson Act funds.
Online	You know when you hunt Futch that you better be prepared to hoof it in. It is what it is, access is good. Draw #3 and you better be in good shape!	
Online	The use of permanent blinds has greatly improved the early bird method of old. Now please develop a stand-by system to fill the blind when there are no-shows and even if a blind limits early. Charging a fee for a stand-by tag(1 or 2 per hunt date) will help bring in needed funds	
Online	I think the access is good. The only issue I see is the long distance you have to transport gear and decoys. As i get older, this becomes a problem.	
Online	The stationary blind set up is good, except that all blinds should not be hunted on hunt dates. The blinds close in proximity should be staggered accordingly. Allow half the blinds to be drawn for on one date, and the next date draw the other half. This would help manage the impoundments much better for both the hunt party's, as well as the waterfowl.	
Online	needs more restricted access, fewer days hunted. Waterfowl seldom use the impoundents during shooting hours due to pressure. Fewer days would improve success.	

Online	Access seams difficult. I have not been drawn in 2 years. Not sure why.	1874 individuals applied for 910 possible late season waterfowl permits at Futch for the 2013-2014 season.

5. What suggestions, if any, do you have for changing how this game land is managed and maintained?

CURRENT LEVEL OF ACCESS	PERCENTAGE OF REPONSES
Continue Farming Operation	**12%**
Maintain Current Management	**18%**
Allow ATV/UTV Use	**3%**
Do Away With Blinds	**9%**
Limit Hunt Days	**3%**
Maintain/Improve Catfish Ponds	**6%**
Crop Rotation	**3%**
Maintain Water Levels	**6%**
Expand Impoundments	**3%**
Extend Hunting Hours	**6%**
Reduce Hunting Hours	**3%**
Shell Limit	**6%**
Limit Access to Observation towers	**3%**
More Millet/Smartweed	**6%**
Increase Fee	**3%**
Allow/Increase hunting of other game	**9%**
Change How One Hunts the Blinds	**15%**
Blind Spacing	**3%**
Reduce Number of Hunters	**3%**
Allow Hunting in Timber Units	**3%**
Increase Hunting Days	**3%**
Offer Teal Season Hunt	**3%**

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	continue farming operation	
Public Input Meeting	management is good as far as diversity	
Public Input Meeting	None	
Online	Again, if there was someway to allow some vehicle to transport gear and decoys to be dropped off at your blind as the distance can be quite long	
Online	Do away with the blind assignments and go back to zone hunting. Blinds are not placed in the most productive areas and the hunters need to be able to have the option to move to where the ducks want to be.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	The stationary blind set up is good, except that all blinds should not be hunted on hunt dates. The blinds close in proximity should be staggered accordingly. Allow half the blinds to be drawn for on one date, and the next date draw the other half. This would help manage the impoundments much better for both the hunt party's, as well as the waterfowl.	The limited public waterfowl hunting areas are extremely popular and reducing hunt days would negatively affect opportunity.
Online	Ensure proper crop rotation and water levels. Address the catfish pond areas. either convert to crop land or take efforts to improve the moist soil plants to make that section attractive and beneficial to waterfowl.	Addressed in plan. As part of the NAWCA grant, the catfish ponds will be managed for both moist soil and submerged aquatic vegetation.

Online	I believe the installation and maintenance of hunting blinds is a waste of NCWRC funds and a detrement to hunting opportunities (the requirement to use them). The location of temperary blinds set up on the day of the hunt allowes the hunter to respond to wind and weather conditions as well as game activity. The requirement to use NCWRC blinds restricts a hunters options and detracts from the quality of the hunt. I will apply for fewer permit hunts which require use of NCWRC blinds as the effort expended is too great not to be able to move to another location within the hunt area if weather or game patterns dictate.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	expand waterfowl impoundments.	The NCWRC is aware of the need for additional waterfowl impoundments and are always open to investigate potential sites.
Online	The only suggestion I have would be to allow waterfowl hunting past 1pm. Futch is a beautifully maintained and managed Game Land.	
Online	Duck hunting and scouting pressure is too great to keep hunts productive thru the season. You should end hunting at 10 am and limit # shotgun shells to 25/hunter. New blinds are great. Thank you for your work to provide quality waterfowl hunts.	
Online	Biologist and management is excellent for Duck hunting normally. We only use JMF for duck hunting when we get permits. We dove elsewhere on public and private land and do all our Turkey hunting and deer hunting on private land.	

Online	Limit the view station times during duck season. Improve habitat of the catfish ponds.	
Online	More waterfowl specific feed (smartweed, millet, etc.) that other animals (bear and deer) will not consume before waterfowl season begins. Also flood impoundment for longer periods before and after season. Increase user fees. If you draw a permit charge persons $25 a piece to hunt.	Flooding regimes are discussed in the plan. Increased fees would exclude many from applying for hunts..
Online	Managed and maintained very well. Wouldnt change anything. Might post a small DEEP WATER sign on the canals. Son went under retrieving a duck:(	
Online	THE GAME LAND IS MANAGED AND MAINTAINED GRAET	
Online	The area should be managed as waterfowl habitat. You should have more liberal seasons on non-waterfowl seasons at times it would not negatively impact the planned waterfowl hunts.	State-owned waterfowl impoundments are important for providing hunting opportunities and for providing critical habitats during fall and spring migration periods for waterfowl, shorebirds, and wading birds. Hunting of other species is addressed in the plan.
Online	Continue agricultural farming practices as a food source for waterfowl during their migration. Corn and soybean rotations preferred. Mix up other crops such as Milo, Japanese Millet but keep corn as the preferred food source.	Addressed in plan. The NCWRC recognizes the importance of maintaining a co-op farmer.

Online	Blinds are great. Now here is where you guys REALLY NEED TO LISTEN. Blinds spread out the hunters and that is what is needed on our public impoundments, BUT now you need to add this option. After 9am, allow hunters to reset as long as they stay in their assigned section. Birds may not want to work the blind. So in the past what I loved about Futch was if you were patient, later in the morning resetting allowed for some of my best hunts. Now you sit in your blind and watch "Mallards" pour into an area 200 yards away, and that is rediculous. Allowing a reset would be a FANTASTIC solution to keeping the blind system in place which controls the spread of hunters, while allowing them the best hunting experience. No need to be in a blind after 9am as long as you are not within say 300 yards of another blind on your reset. Plenty of room in these sections. You may just want to set up on a dyke wall or use a layout.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	With the addition of the waterfowl blinds last season, this game land really became top notch. I really didn't see anything last season that needed to be improved upon.	
Online	NCWRC should mimic Mattamuskeet. Require hunter check in and provide an opportunity for standby hunters or remove the blinds and go back to the previous waterfowl hunt management practices.	

Online	I have a few suggestions on changes at J. Morgan Futch. First, the current blinds, based on numerous reports from hunters (I was not drawn this season), are too close to each other. I heard of shot raining down from blind to blind and an overall feeling that the blinds need to spaced better. Second, I would like to see the archery deer season lengthened. I have bow hunted there quite a bit and would like to have more time to hunt the property. We typically get only 12 days to hunt the property and for those of us that work or have families, we may only get 1 or 2 chances to hunt. Third, I would love to see an opportunity to hunt snipe in the impoundments during the month of February. There are very few public land opportunities to hunt snipe in NC. The impoundments would give us a great place to hunt snipe. Most waterfowl are gone by then and water is starting to be drawn down for planting, which is a benefit to snipe hunters. This would not run against the main goal of waterf	Blinds will have at least a 300 yard buffer between blinds. Consider deer hunting the adjacent Alligator River Game Land. The impoundments offer important resting and foraging habitat to spring migrants. At this time, the NCWRC feels that any snipe hunting at Futch during February would negatively impact waterfowl. As other lands are acquired, considerations will be given to snipe hunters.

Online	Do not restrict duck hunters to hunt in the blind. This was the first year with the blind system and for our party one of worst hunts in over 10 years at futch. We had to take long shots at our swans and I never had an opportunity to shoot a duck within range. We had a late season draw and the birds were educated to the location of the blinds. The brush on the blinds already needed repairing and there was no way to know that until the morning of the hunt. The catfish pond next to us that didn't have a blind had more than 1000 birds on it, so it wasn't that the ducks weren't there. One suggestion would be to create a buffer or blind zone, but let the hunter set up how he needs to in order to work the birds within his zone. This still alleviates setting up on top of each other and the hunters can still use the blind if they want or need to.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	Some areas of open water do not have any blinds causing massive flocks of coots that cannot be harvested.	

Online	I duck hunted at Futch this past November mid season. As far as the blinds that have been set up, I like it. What I would like to see done and others in the group that I hunt with will also be commenting on this as well is more corn being planted in the other sections of the impoundments. When I went this past year, section 1 had a lot of corn but there was none in section 2 that I saw even though on the map provided it listed "zig-zag" corn in the area we were hunting. As far as the ducks go, corn will bring in more ducks than any other crop and would like to see corn planted as much as possible in all 3 sections. Also, we have a long drive to get there and it would be nice to be able to hunt all day or atleast til 3 PM. Thanks.	Crops are addressed in plan.
Online	J. Morgan Fudth is a great place to hunt and NC does a much better job on providing waterfowl habitat and opportunities to the general public then Virginia does. The only concern I had was the total number of hunters on the property for a single session. While it was not unsafe, it just seemed like the birds we did see where trying to get through a guantlet. Thanks for the opportunity to provide a comment.	
Online	There green tree impoundment need to be a selection in the draw hunts. No blind should be constucted though!	These areas can be hunting during the early waterfowl season.

Online	I think they should definitely open a snipe season in February. There are a lot of snipe there during waterfowl season and even more when water levels start getting dropped in February. It would be a great opportunity. You could charge 5.00 for the month of February like you do for doves in September. You could open it the Monday after youth day.	The impoundments offer important resting and foraging habitat to spring migrants. At this time, the NCWRC feels that any snipe hunting at Futch during February would negatively impact waterfowl. As other lands are acquired, considerations will be given to snipe hunters.
Online	Possibly more corn planted. Every year the corn fields seem to be the best areas.	Addressed in plan.
Online	Waterfowl permit draw for specific date and blind assigned. Would also like to see 2 day hunt. More economical for those traveling to come for multiple days. Maybe Mon-Tues and Thurs - Friday	
Online	None other than hunt location placement	
Online	There should be shell limits in place during waterfowl hunts to eliminate the sky busting shooting that hampers the experience for every group on the property. This works at Mattamuskeet very well.	
Online	I suggest modification on the current blind situation. Let's say I am hunting blind number 1 which is located in section one and am not having productive results but blind 6 which is having results and limits out and leaves. Then I could go to blind 6. Basically I am saying lets hunt VACANT blinds within our hunt section instead of basically being limited to the confines of one blind.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	Open for teal season. With first come first serve.	

6. What would encourage you to start using J. Morgan Futch Game Land, or to continue using it more actively?

CURRENT LEVEL OF ACCESS	PERCENTAGE OF REPONSES
Other Game Lands	**3%**
Increase Hunting Opportunities	**42%**
Remove Blinds	**10%**
Change Permit System	**10%**
Shell Limit	**3%**
Increase/Allow Hunting of Other Species	**3%**
Change How the Blinds are Hunted	**13%**
Reduce Hunting Days	**6%**
Increase Number of Blinds	**3%**
Create Quail Habitat	**3%**

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	hunting opportunities	
Online	additional days of hunt opportunities - other game lands etc	The NCWRC is interested in additional lands with waterfowl impoundment opportunities and will investigate suitable sites.
Online	We enter the drawing each year for Futch. We would like to have more than one opportunity to hunt there each year.	Overall chances of being selected is less than 50%.
Online	I love to hunt Futch. Don't know yet if I like the blind idea. Its just such a tough draw to get anymore. I will always put in for it.	

Online	Removal of Blinds and reinstatement of zones would make me continue to apply for permit opportunities. I have hunted this game land for the past 8 years and had successful hunts until the blinds were instated. These limit the area you can hunt and force you to hunt where birds are not. Thus, this making tougher longer shots leading to more crippled waterfowl and much less successful hunts.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	Recommend doing away with the Party Hunt system. Allow the individual drawn invite two guest for his hunt dates.	Rule 15A NCAC 10D .0103(i) states that the permits must be issued by random computer selection and are nontransferable. Without a rule change we must abide by this rule.
Online	shell limit needs to be added to all impoundments. May discourage people taking shots that the should not.	
Online	I would definitely use it alot more if they had snipe hunting there in February.	The impoundments offer important resting and foraging habitat to spring migrants. At this time, the NCWRC feels that any snipe hunting at Futch during February would negatively impact waterfowl. As other lands are acquired, considerations will be given to snipe hunters.
Online	Please offer 'freelance permits' (no blinds) on the area southeast of the access path in JMF2. among the trees and fence rows.	The flooded timber is open to hunting during the early season by permit. During the late waterfowl season the timber units serve as a refuge and may help hold some birds during the hunts.

Online	I believe I use Futch as much as any hunter in the state. I bowhunt there almost annually (I have missed a few hunts due to hurricane impacts or being out west fighting wildfires) and in the past few years, have not even seen another hunter on the property! I duck hunt there when drawn. It would be nice to see some more hunting opportunities enacted like I put in my management suggestions. I would try to participate in any of the hunts I suggested.	Hunting is addressed in plan for different species.
Online	I used the Futch and N. River Gamelands for the 1st time this year. I was excited about using the gamelands after friends had raved about the legendary waterfowl hunting at Futch. Myself, and the other first time gameland hunters in my party were very disappointed. We hunted all day in the allowable time to take only 4 waterfowl. The issue appeared to be that the birds were very blind shy and well aware of the locations. My understanding is that this gameland used to be managed in zones and that the blinds are a new addition to allow for expanded use and access. Had we been able to move in our zone we would have expereinced a much more successful hunt as the waterfowl were not in short supply but merely strayed away from the blinds themselves, and had established flyways around the blind locations. Me personally after my experience, I would rather not be drawn for a hunt than have a repeat of the hunt I had last year. The walk was long, our gear was heavy, and the payoff was mi	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.

Online	The lottery system is adequate in provide a well hunter management program. The installation of blinds and the requirement to hunt from them needs to be removed. Hunters need the flexibility to be mobile. The permit system has eliminated the over crowding that has been experienced in the past at all good waterfowl impoundments.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	more opportunity	
Online	Obtaining a system that allows the Blinds to continue and then being able to reset/move after say 9am.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	I will continue to use it as long as it is managed at least in the manner it has been. I have experienced some exceptional waterfowl hunting there and would like to continue to be able to do so in the future.	
Online	Really need to thin the bears out. My only experience on the gameland is during the bow only deer season. We encountered way more bears than I felt safe around. All the areas I hunt are heavy bear use areas but it is ridiculous in J morgan Futch.	
Online	MORE HUNTS	
Online	Will continue to hunt there any time we are permitted:)	
Online	Actually getting a regular season draw. Seeing it managed better for ducks (less hunting days, better feed, decoying shots taken)	
Online	less restrictions and more drawn hunts. However if the blind system doesn't improve, chances are we won't be putting in to hunt there much longer.	

Online	I did not get drawn this past year for the first time ever . I would suggest making hunts for 2 days in a row . We travel a long way for a one day hunt .	
Online	The location of it is in a good place for migratory ducks.	
Online	issue more permits	
Online	More opportunity to hunt it.	
Online	Use it when I get drawn, however this year I took my son out of school, hunted the draw only to find out that the colors on the map are so close together that I was in the catfish pond when I thought I was in corn crop. Wasted a few hundred dollars and two days for nothing. MAKE YOUR MAP COLORS WITH MORE CONTRAST.	Noted. Good suggestion.
Online	Myself and my two boys have hunted JMF for last 4 or 5 years and enjoyed it tremendously until this year. Birds new exactly where blinds were especially in soybean field. Only 4 blinds along back east side on JM3 did any shooting. Suggest you do away with blinds and go back to first come first serve. True duck hunters will take the time to scout and make sure there at the gate at 4AM ready to go and put themselves in the proper location. Also when you get non duck hunters (duck commander imitators) in a blind near you and they shoot/flair ducks non stop it would be nice to move elsewhere and not have to call it quits when you drive from Raleigh to Columbia. We stuck it out until 1pm but will probably not put in next year for any location with blinds.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.

Online	Futch couldn't be any better. I just wish I could get drawn for more waterfowl hunts there! One thought might be to offer preference points if you're not chosen during the season, something along the lines of the swan hunt permits. I realize it's a popular Game Land with a lot of applicants, like many of the other areas.	
Online	I enjoy just seeing the waterfowl most.	
Online	Make more permanent blinds for each impoundment to increase the chances of successfully being drawn. I will hunt if I draw a permit	The 2014-15 season will include 20 blinds instead of 19.
Online	Fewer days permitted to hunt	
Online	Try to make quail habitat	

7. What additional comments do you have about J. Morgan Futch Game Land?

CURRENT LEVEL OF ACCESS	PERCENTAGE OF REPONSES
Create Handicap Blind	**3%**
Like the Blinds	**27%**
More Waterfowl Hunting Areas	**7%**
Remove Blind Assignments	**10%**
Increase Fee	**7%**
More Food	**10%**
Enforcement	**3%**
Add Hunts	**3%**
Permit Saturdays/Walk-ins Other Days	**3%**
Allow/Increase Hunting Opportunities for Other Species	**3%**
Allow Standby Hunts	**7%**
Limit Other User Access	**3%**
Change the Way One Hunts the Blinds	**7%**
Change Party System	**3%**
Allow Hunting in Timber Units	**3%**
Prefernece Points	**3%**
2 Day Hunt	**3%**
Better Description of Hunt Area	**3%**

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	good work, great spot	
Public Input Meeting	creation of handicap blind	
Online	The blinds make the duck hunting safer year before last we set up had another group set up 20-30 yards away from us and shot over our heads a few times! Blinds are well built and a good idea	
Online	Great public duck hunting. We need more	
Online	As a waterfowl hunter need more access. Not only in this game land but all of the game lands in Hyde county. There is plenty of public land over there that is not available to hunt for waterfowl.	
Online	Keep up the great work!	
Online	Do away with the blind assignments and go back to zone hunting. Increase permit price from $5 to $10 to increase revenue and weed out those who apply for a hunt just because it is only $5 and end up not showing up for hunt date.	Increases in application fees may discourage some from applying. There is a myrid of reasons some hunters do not show.
Online	Futch is a great success story. Glad for the partnership with DU and the result it has had. Would like to see more birds use the back areas.	
Online	Overall, we had a great time duck hunting. There were lots of birds in late January, but they were very blind shy.	

Online	I fully enjoyed my only trip to Futch. Our draw was in blind one, which we had picked, but blinds #1 & 2 both need a food source like the balance of the impoundment. It was nice to see others shoot, but it would have been even nicer had we taken a shot. The blind was so obvious in the bare impoundment that ducks would not even look at us. It was more problematic with all the "sky-busting", which should be addressed also. Otherwise, as stated before, the experience was nice, and one I hope to do again.	The impoundments blinds #1 and #2 were managed for moist soil and SAV's during the 2013-14 waterfowl season. This management is typical in the catfish ponds and will be continued. The impoundment housing blind one has some wildl millets at the upper end and the rest of the impoundment had a good stand of spikerushes. The impoundment housing blind #2 had an excellent stand of sago pondweed.
Online	Thank you for all that you do to ensure a wonderful habitat for wildlife and a place for us to enjoy waterfowl hunting as well. The blinds were excellent. Am looking forward to hopefully being able to hunt there this upcoming season. Thanks again. Great Job!!!!	
Online	Manage to benefit the wildlife before the hunter and hunter satisfaction will increase directly with the number of waterfowl using the impoundment.	
Online	THE BLINDS WAS GRAET	
Online	There was a time when I would get a date at Futch every year. In recent years I have not been drawn for a date at all. I received information about the building of blinds which may help with people getting to close to each other. Evidently more people are applying for the dates. On most days once the shooting starts the birds get out of there in a hurry leaving birds only in places you can't access or pockets no one is setting in.	

Online	Thanks for the opportunity to be able to duck hunt there. My son and I have thoroughly enjoyed it and have many fond memories from there. The improvements this past season with the blinds are greatly appreciated. We didn't feel as rushed to have to get there at 4:00 and beat everyone to the spot we wanted. Keep up the good work.	
Online	make the Game wardens or the Feds who are sitting there all morning do their job and at the very least write a warning for hunters who "SKY BUST". If Ranger Joe is sitting there glassing hunters all morning and sees some DA pulling on birds over 100 yards away, have him professionally "Dress Him Down". If it is habitual, he should put hisr waders, get out of the heated Suburban and walk to the Blind. "Hey boys, I've geen watching you pulling on birds this morning that you will never hit in a million years. Don't ruin everyone's experience in here this morning. I'm documenting this one and if we cite you again this moring or this year! You will not be allowed to submit for public hunts for 2 years. This behavior is what ruins public hunting for those who do it right. Hey, guys the birds are in this impoundment for a reason, they want to LAND and FEED, maybe not your specific area, but Sky Busting an Pass Shooting are two seperate things, so learn the difference or leave. Th	
Online	Add hunt locations to off set the inability to change locations during the hunt!	

Online	The addition of the waterfowl blinds and the drawing of a specific blind for each hunting party was a very positive thing. It eliminated the completion for hunting spots and also adequately spaced the hunting parties out so that things were much safer.	
Online	Improve the food source by providing additional agriculture food (increase percentage left in the field by contract farmers). By increasing the amount of corn left in the fields provides additional food and cover. Grow shorter varieties of corn for the smaller waterfowl so they can have a better opportunity at the feed. Leave more rows of corn in the middle of the fields for food and cover. Not just at the field edges and canals. Remove the requirement that the hunters need to stay in blinds. Birds become blind shy quickly which I personally observed during my latest hunting opportunity. Hunters need more flexibility. The blinds are nice but need to be made more mobile. My only hunting experience has been in the JMF-1 area. The area with blinds #12 and #13 could stand another blind for additional hunting opportunities due to the size of this area. Possible blind to the far northern part of this area if the blind requirements continue.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed. Two additional blinds were moved to Impoundment #7 for hunting season 2014-15.
Online	Only have Sat. lottery humts and open other days for walkins. There is a shortage of game lands with good hunting that are not completely controlled by lottery hunts.	

Online	Overall I enjoy Futch. I wish there were better places to archery hunt there. There are only a handful of places to get up in climbing treestands so it does make it tough to deer hunt in there. I do wish there was a way to standby hunt during duck season. I know that with current staffing that may not be possible but I think the WRC should investigate a way for people to return their permits if they know they cannot make their drawn hunt. Then make them available for first come, first served basis on the web where you currently list the Leftover Permits. I would like to see the WRC do this across the board for draw hunts. Also during hunting season, please keep the focus of this gameland on hunting and not permitting other uses that would disturb hunters. We are the ones that pay for the gamelands licenses and permits. Until all users have to pay, those that pay should get top billing.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	With the addition of the waterfowl blinds, the ducks and coots tend to know where they can land safely. Allowing jump shooting for the last hour of the permitted time may alleviate this problem.	
Online	Please allow snipe hunting there in February.	The impoundments offer important resting and foraging habitat to spring migrants. At this time, the NCWRC feels that any snipe hunting at Futch during February would negatively impact waterfowl. As other lands are acquired, considerations will be given to snipe hunters.

Online	All permit applications should be $15. If drawn should then be able to bring two other people with you. Stop putting in for party hunts.	Increases in application fees may discourage some from applying.
Online	There green tree impoundment need to be a selection in the draw hunts. No blind should be constucted though	The flooded timber is open to hunting during the early season by permit. During the late waterfowl season the timber units serve as a refuge and may help hold some birds during the hunts.
Online	Remove blinds/keep blinds and add zones. Limiting hunters to a specific spot severely limits hunter success rates and greatly increases the amount of crippled waterfowl.	The NCWRC is currently conducting a survey to determine hunter satisfaction with the blind system. Possible changes may be made to how the blinds will be hunted after the surveys are analyzed.
Online	I would like to see this game land go to the points system like the tundra swan permits. This will allow those who do not get drawn every year to have a opportunity to get drawn. My party has been turned down 3 years in a row and would love to have the chance to hunt this we'll managed game land .	
Online	like the assigned blinds - much safer improved descriptions on the blind areas (access, water depth, distance, need for cart etc would be good feature added to the website. Most descriptions are too generic. (e.g. we hunted Lantern Acres for waterfowl this year. Did not get to scout in advance (one of the party was working late, another had a family committment - which delayed going). If description had stressed distance from parking and need for a cart to carry gear that would have been nice	
Online	I think the blind additions was a good idea . Maybe add more blinds and make hunts 2 days in a row .	

Online	NEW BLINDS ARE GREAT-HOWEVER BLINDS WITH PLANTINGS OF GRAIN CONTAIN ALL THE HUNTING. WE WERE IN NON PLANTED AREA--NO SHOTS FROM ALL BLINDS IN OUR AREA BUT BLINDS NEXT TO US HAD LOADS OF SHOTS. OUR GROUP DID NOT HAVE A SHOT ALL DAY.	

Email received and response.

Comment	Response
We hunted #12 this year with very little success, and feel that if we were able to move that we could have had success. The birds were flaring away from the blind. The blinds should stay, but other locations should be made available with the use of poles or PVC pipes, as markers. This would allow flexibility to adapt to the conditions on any given day and present different situations to the birds, not the same box shooting every day. The surveyor explained that there are safety issues and an issue with hunters trying to get to the prime spot first. The one blind and let's say four locations for each blind would allow each party to pick a spot for first flight and move to the blind for later in the morning, thus presenting the birds with multiple shooting locations. In my opinion, this would solve both situations and allow for versatility available in years past. Thank you for the opportunity and allowing hunters access to such a wonderful location. Sincerely,	The blinds and how they are hunted have been an issue that came up through the public input process. The NCWRC is conducting a survey from blind users at Futch to determine how the blinds worked for them.

VIII. Species Ranking Sheet

Descriptions and definitions are gathered from LeGrand et al. (2013) and Gadd and Finnegan (2013).

North Carolina Status Designations for Animals

Status Code	Status	Definition
E	Endangered	“Any native or once-native species of wild animal whose continued existence as a viable component of the State’s fauna is determined by the Wildlife Resources Commission to be in jeopardy or any species of wild animal determined to be an ‘endangered species’ pursuant to the Endangered Species Act.” (Article 25 of Chapter 113 of the General Statutes; 1987).
T	Threatened	"Any native or once-native species of wild animal which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a threatened species pursuant to the Endangered Species Act." (Article 25 of Chapter 113 of the General Statues; 1987).
SC	Special Concern	"Any species of wild animal native or once-native to North Carolina which is determined by the Wildlife Resources Commission to require monitoring but which may be taken under regulations adopted under the provisions of this Article." (Article 25 of Chapter 113 of the General Statues; 1987).
SR	Significantly Rare	Any species which has not been listed by the N.C. Wildlife Resources Commission as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers and has been determined by the N.C. Natural Heritage Program to need monitoring. This is a NC Natural Heritage Program designation.) Significantly Rare species include "peripheral" species, whereby North Carolina lies at the periphery of the species' range as well as species of historical occurrence with some likelihood of re-discovery in the state. Species considered extirpated in the state, with little likelihood of re-discovery, are given no N.C. Status (unless already listed by the N.C. Wildlife Resources Commission as E, T, or SC).

North Carolina Rank Designations of Animals by the North Carolina Natural Heritage Program

Rank	Number of Extant Occurrences	Description
S_1	1-5	Critically imperiled - Critically imperiled in North Carolina due to extreme rarity or some factor(s) making it especially vulnerable to extirpation (local extinction) from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1000).
S_2	6-20	Imperiled - Imperiled in North Carolina due to rarity or some factor(s) making it very vulnerable to extirpation from the state. Typically 6-20 occurrences or few remaining individuals (1,000-3,000).
S_3	21-100	Vulnerable - Vulnerable to extinction in North Carolina either because rare or uncommon, or found only in restricted range (even if abundant at some locations), or due to other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
S_4	100-1000	Apparently secure - Apparently secure and widespread in North Carolina, usually with more than 100 occurrences and more than 10,000 individuals.
_B	1-?	Rank of the breeding population in the state. Used for migratory species only.
_N	1-?	Rank of the non-breeding population in the state. Used for migratory species only.
_?	---	Uncertain - Denotes inexact or uncertain numeric rank.

Federal Status Designations for Animals

Status Code	Status	Definition
E	Endangered	A taxon “which is in danger of extinction throughout all or a significant portion of its range” (Endangered Species Act, Section 3).
T	Threatened	A taxon “which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (Endangered Species Act, Section 3).

SC	Species of Concern	"The Service remains concerned about these species, but further biological research and field study are needed to resolve the conservation status of these taxa. Many species of concern will be found not to warrant listing, either because they do not qualify as species under the definition in the [Endangered Species] Act. Others may be found to be in greater danger of extinction than some present candidate taxa. The Service is working with the States and other private and public interests to assess their need for protection under the Act. Such species are the pool from which future candidates for listing will be drawn." (Federal Register, Feb 28, 1996). The Service suggests that such taxa be considered as "Species of Concern" which has no official status.
XN	Nonessential Experimental Population	"Section 10 (j) of the Endangered Species Act of 1973, as amended, provides for the designation of introduced populations of federally listed species as nonessential experimental. This designation allows for greater flexibility in the management of these populations by local, state, and Federal agencies. Specifically, the requirement for Federal agencies to avoid jeopardizing these populations by their actions is eliminated and allowances for taking the species are broadened." (US Fish and Wildlife Service, 1995).

Global Rank Designations of Animals by NatureServe

Rank	Number of Extant Occurrences	Description
G_1	1-5	Critically imperiled – Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1000) or acres (<2000) or linear miles (<10).
G_3	21-100	Vulnerable - Vulnerable globally either because very rare throughout its range, found only in restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G_4	100-1000	Apparently secure - Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery) and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically with more than 100 occurrences and more than 10,000 individuals.

G_5	1000+	Secure - Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
T_	-	The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.
Q	-	Questionable taxonomy that may reduce conservation priority. Distinctiveness of this entity as a taxon at the current level is questionable. Resolution of this uncertainty may result in change from a species to a subspecies or inclusion of this taxon in another taxon, with the resulting Element having a lower-priority conservation status rank.

North Carolina Status Designations for Plants

Status Code	Status	Definition
T	Threatened	"Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106:202.12).
SR	Significantly Rare	Any species not listed by the N.C. Plant Conservation Program as Endangered, Threatened, or Candidate, which is rare in North Carolina, generally with 1-100 populations in the state, frequently substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease).
SR-D	Disjunct	The species is disjunct to North Carolina from a main range in a different part of the country or world.
SR-P	Peripheral	The species is at the periphery of its range in North Carolina. These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina.

North Carolina Rank Designations of Plants by the North Carolina Natural Heritage Program

Rank	Number of Extant Populations	Description
S_1	1-5	Critically imperiled - Critically imperiled in North Carolina due to extreme rarity or some factor(s) making it especially vulnerable to extirpation (local extinction) from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1000).
S_2	6-20	Imperiled - Imperiled in North Carolina due to rarity or some factor(s) making it very vulnerable to extirpation from the state. Typically 6-20 occurrences or few remaining individuals (1,000-3,000).
_?	---	Uncertain - Denotes inexact or uncertain numeric rank.

Global Rank Designations of Plants

Rank	Number of Extant Populations	Description
G_3	21-100	Vulnerable - Vulnerable globally either because very rare throughout its range, found only in restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G_4	100-1000	Apparently secure - Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery) and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically with more than 100 occurrences and more than 10,000 individuals.
G_5	1000+	Secure - Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.