

A SPECIAL
REPORT
FROM DELTA
WATERFOWL



2020
**Research
and Education**



Delta Waterfowl has maintained a philosophy that waterfowl management decisions should always be based on sound science. It's a principle Delta has followed since Dr. Albert Hochbaum began his work as the organization's first science director in 1938 at the Delta Marsh. Delta has continually focused our research on ducks and duck hunting issues in North America. This strategy allows The Duck Hunters Organization to study important, long-term issues, as well as new concerns impacting ducks and duck hunters.

Delta's research informs our duck production, habitat conservation and Hunter3 programs, as well as waterfowl management decisions throughout North America. Ultimately, all of our research supports Delta's mission to produce ducks and ensure the future of duck hunting.

This special report highlights our 2020 research program. Although the descriptions of each project are brief, more information is always available. As always, feel free to contact me to discuss any of Delta's research.

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Canvasback Nest Success Evaluating Predator Management for over-water nesting ducks

TRENT ROHRER, M.S. STUDENT, AND DR. JOSH STAFFORD, SOUTH DAKOTA STATE UNIVERSITY

► Delta continues to seek effective and efficient application of Predator Management techniques to improve nest success for over-water nesting ducks such as canvasbacks, redheads and ring-necked ducks in the parkland habitat of Canada.

This year we will explore whether trapping in the fall, in addition to the spring, is a more effective way to reduce key mammalian nest predators, especially raccoons. We will study two blocks that were trapped in fall 2019 and spring 2020, and another two blocks will be spring-only trapped. These will be compared to non-trapped blocks to judge our efficacy at increasing nest success and brood counts. We will be counting broods using drones equipped with thermal and visual cameras, since this approach has proven far superior to field assistants doing ground counts.

Hot Spot Trapping to Improve Dabbling Production

Evaluating dabbling nest success with a new trapping technique

MATT DAVIS, M.S. STUDENT, AND DR. CHRISTOPHER MALCOM, BRANDON UNIVERSITY

► Delta is exploring whether focusing Predator Management on highly productive patches of grassland habitats could more efficiently boost production of dabblers such as mallards, pintails and gadwalls.

Predator trapping has typically focused on the full area of a township-sized block. Recent Delta projects have identified "hot spot" trapping as a potentially more effective approach to removing predators and a more efficient use of management dollars. Focusing trapping efforts on "hot spots" (i.e., grass-only sites) would allow waterfowl managers needed flexibility in both the size and location of Predator Management sites. This project will take place in North Dakota and help inform whether "hot spot" trapping can help increase duck production in the best quality habitats.

Raccoon Satellite Telemetry

Studying movements and habitat use of raccoons to improve effectiveness of Predator Management

DR. CHARLOTTE MILLING, DR. STANLEY GEHRT AND MR. SHANE MCKENZIE, MAX MCGRAW WILDLIFE FOUNDATION

► In 2018 and 2019, we fitted 29 raccoons with GPS transmitting collars on Delta's canvasback study block in Manitoba. The transmitters collected incredible amounts of location data on each raccoon's daily movements. We discovered that raccoons spent a large percentage of time in wetland edges.

This year, we're again collaring 15 raccoons to track their movements in breeding duck habitat. The goal is to better understand raccoon habits so we can set traps in their preferred locations, thereby more effectively reducing these top predators of diving-duck nests. We will also use stable isotopes to evaluate the role of duck eggs in the diet of raccoons. Ultimately, the goal is to learn more about raccoons, so





we can manage these non-native predators and increase production of canvasbacks, redheads, ring-necked ducks and other over-water nesting ducks.

Counting Broods Using Drones

Evaluating brood use of wetlands in agricultural landscapes

CATRINA TERRY, M.S. STUDENT, AND DR. KEVIN RINGELMAN, LOUISIANA STATE UNIVERSITY

► In 2019, we surveyed 242 prairie pot-hole region wetlands using a combination of camera-equipped drones and wetland sampling, and found 240 broods.

Using a special drone equipped with a thermal-imaging camera and a regular camera, researchers will continue surveying selected wetlands in agricultural landscapes for brood use. The goal is to better understand brood use in order to conserve the most important habitat for breeding ducks. This research will evaluate the quality of wetlands as brood water by examining usage by ducks, as well as determining invertebrate abundance and vegetation structure.

Ring-necked Duck Tracking

Implanting satellite transmitters to monitor movements and habitat use

DR. MITCH WEEGMAN, UNIVERSITY OF MISSOURI

► After successful field seasons marking ring-necked ducks in 2018 and 2019, in February 2020 Delta implanted an additional six ringnecks with satellite transmitters in South Carolina, 22 in Virginia, and 48 in southern Georgia during the third year of the project.

The goals are to monitor migration paths, discover breeding areas, and understand habitat use and movements during the ringneck’s annual cycle. Little is known about ring-necked ducks, which is surprising because they are the most important diving duck in hunter harvest — the only diver consistently in the top 10 in all four flyways.

Ringnecks are doing well, and we hope to understand why they have been so successful at increasing in numbers. In addition, this research has immediate value to waterfowl managers in the Atlantic Flyway under the recently implemented multi-stock harvest regulation-setting

method. Importantly, the initial results of our study suggest that ring-necked ducks that winter in the southeast are not nesting in the eastern survey area, but farther west.

Lower Mississippi Flyway Dabbler Tracking

Determining duck locations during hunting seasons and migration

DR. DOUGLAS OSBORNE, UNIVERSITY OF ARKANSAS DIVISION OF AGRICULTURE, AND DR. MITCH WEEGMAN, UNIVERSITY OF MISSOURI

► Delta Waterfowl seeks to better understand the migration and wintering ground habits of dabbling ducks in the Mississippi Flyway to determine whether further management strategies are needed.

Employing backpack transmitters powered by miniature solar panels, Delta installed radios on mallards, green-winged teal and American wigeon to record movements for a full year. Ducks were caught after the 2019-2020 hunting season in Arkansas. This pilot work is partially designed to test new ultra-light weight transmitters (1/3 ounce) that we hope to deploy in large numbers in the fall of 2020.

The primary goal is to understand when and where these ducks migrate, particularly in the fall, as well as how they respond to hunting pressure and weather events.

Working Wetlands

Understanding farmers' perceptions of Delta's Working Wetlands program

DR. CHERYL WACHENHEIM, NORTH DAKOTA STATE UNIVERSITY

► Delta Waterfowl, in partnership with the U.S. Department of Agriculture Natural Resources Conservation Service, initiated a new approach to conserving small wetlands in cropland. This human dimensions survey work of program participants is designed to gain insight from producers and thereby learn how we can better serve farm operations and protect small wetlands that are critical for breeding ducks. The research will inform large, landscape-scale program development pioneered by Delta's Working Wetlands and incorporated in the 2018 Farm Bill, in hopes of conserving wetlands across the U.S. prairie pothole region.

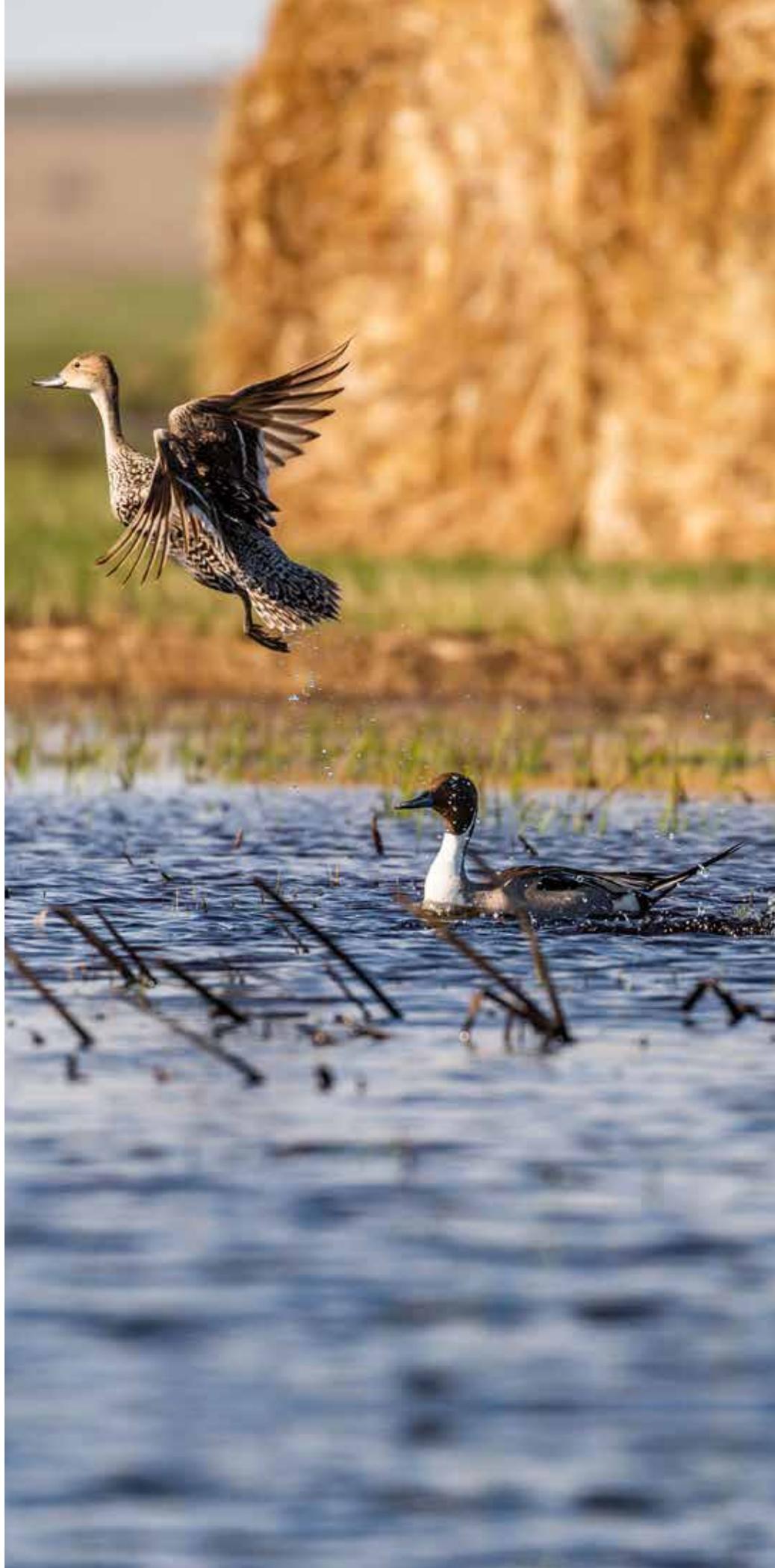
Pintail Harvest and Survival

How does hunting harvest impact duck populations?

THOMAS RIECKE, UNIVERSITY OF NEVADA-RENO

► Researchers are undertaking one of the big unanswered questions in waterfowl management: What influence does hunting harvest have on populations?

By using new scientific approaches, the team can more accurately answer this question for a number of important species, including mallards, pintails and blue-winged teal. They will take a unique approach and look at population cohorts (male/female and juvenile/adult) to more fully understand how differing survival rates might help inform the relationship between harvest and population sizes. In addition, they will revisit our understanding of how density dependence (that is, how many breeding pairs of ducks that a given year's wetlands can accommodate) works in duck populations. They are finding that long-used models may not improve our understanding of the impacts of hunter harvest on duck populations.



Has Pintail Production Declined?

Evaluating changes in pintail age structure and sex ratios

DR. TODD ARNOLD, UNIVERSITY OF MINNESOTA

► Pintail population trends are of great interest to duck hunters, especially in light of U.S. Fish and Wildlife Service regulations lowering the bag limit to one bird per day in 2017-2018, and again for the 2019-2020 and 2020-2021 seasons. Dr. Arnold is reviewing pintail age and sex ratios using USFWS Parts Collection Survey data to document how age ratios (proportion of juveniles in the fall flight) and sex ratios (females to males) have changed since 1961. This work is important to inform pintail harvest models used to set regulations. Additionally, examining long-term pintail data has become more important, as data sets continue to grow and analytical techniques expand to make sense of long-term changes.

Atlantic Flyway Mallard Stable Isotope

Determining the origins of mallards taken by hunters in the East

DR. MIKE SCHUMMER, STATE UNIVERSITY OF NEW YORK COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

► Delta is undertaking this important research to inform mallard harvest regulations in the Atlantic Flyway.

Spring surveys suggest that the eastern U.S. mallard population is declining, while eastern Canada's mallards are holding stable. Therefore we need to understand the relative importance of the different breeding areas, particularly given the reduction of Atlantic Flyway mallard limits to two mallards (one hen) daily for the 2019-2020 and 2020-2021 seasons.

By examining stable isotopes in the flight feathers of mallards shot in the Atlantic Flyway, researchers can determine where the ducks grew those feathers in the summer. This is a novel way to determine the origins of birds shot in the Atlantic Flyway. Banding data currently estimates that about two-thirds of mallards shot in the eastern U.S. stem from the eastern U.S. breeding population. An objective of our work is to determine if stable isotope research confirms



this same high percentage of eastern U.S. mallards in the Atlantic's hunter harvest total.

Eastern mallard ecology and harvest management have taken a backseat relative to other flyways, but we aim to reverse this information deficit and deliver quality information that can help better manage eastern mallards.

Canvasback/Redhead Integrated Population Models

Determining needs for management of key diver species

DR. DAVID KOONS, COLORADO STATE UNIVERSITY

► Redheads and canvasbacks use the same breeding habitat in the prairie pothole region (primarily Manitoba and Saskatchewan), and Delta has collected extensive data on pairs, nests and broods for both species. By using multiple data sets simultaneously, we can learn more about what drives their populations.

The goal of this data analysis work is to develop a model of the annual life cycles for canvasbacks and redheads to determine what factors drive their population growth. The resulting models will characterize the importance of nest success, survival of nesting hens, brood survival, winter survival and hunting mortality on population growth of redheads and canvasbacks. The results from this study will benefit management efforts, and help drive future research efforts on these species.

Canvasback Habitat Modeling

Analyzing nest success in relation to habitat variables

MICHAEL JOHNSON, PH.D CANDIDATE, AND DR. DAVID KOONS, COLORADO STATE UNIVERSITY

► After several seasons of extensive field work on nesting canvasbacks in Manitoba, Johnson will analyze habitat variables to determine their impact on nest abundance, nest success, and brood counts. The goal is to determine the best locations on the prairie breeding grounds for canvasback production. This information will help waterfowl managers target where to best invest in wetland conservation programs to benefit canvasback production.

Pintail Carrying Capacity

Assessing habitat changes for pintails in the prairie pothole region

DR. DAVID KOONS, COLORADO STATE UNIVERSITY

► We're assessing long-term changes in pintail populations by reviewing trends and transect scale of the U.S. Fish and Wildlife Service's annual Waterfowl Breeding Population and Habitat Survey. We will examine which regional groups of pintails have increased, decreased and remained stable. The goal is to understand how pintail carrying capacity has changed locally within the traditional survey area, because it is a key factor in harvest models used to set daily bag limits.

Geolocators on Pacific Flyway Ducks

Determining annual movements and breeding success of three western duck populations

DR. CHRIS NICOLAI, DELTA WATERFOWL, AND DR. KEVIN SHOEMAKER, UNIVERSITY OF NEVADA RENO

► Geolocators are inexpensive and very lightweight data loggers that can be attached to waterfowl leg bands. The loggers record sunrise and sunset for every date they are in the field. That allows us to know with reasonable accuracy where the bird is located. More than 300 Pacific Flyway mallards, canvasbacks and wood ducks have been fitted with geolocators. When we recover one of the loggers (by recapture or hunter harvest) we can get a path of the bird's travels, and we can learn about nesting. When a duck is on the nest, the logger suddenly has long dark periods because the legs are under the hen and get no sunshine. So, geolocators can provide full annual life cycle habitat

use assessments, breeding propensity, and even nest success. These devices provide a unique opportunity to assess the probability of nesting for hens, which is considered the most difficult vital rate to estimate.

Nevada Wood Ducks

Studying long-term changes in an isolated wood duck population

DR. CHRIS NICOLAI, DELTA WATERFOWL

► Delta's Dr. Chris Nicolai has maintained an 18-year project monitoring an isolated population of wood ducks in western Nevada. His unique system allows estimation of seasonal survival and annual recruitment (production) to the population. While the core part of the project collects these types of data from an intense capture/recapture and nest box approach, other data are being used to assess how the birds respond to the high mercury in their diet, among other questions. This long-term study has the ability to repeatedly encounter banded

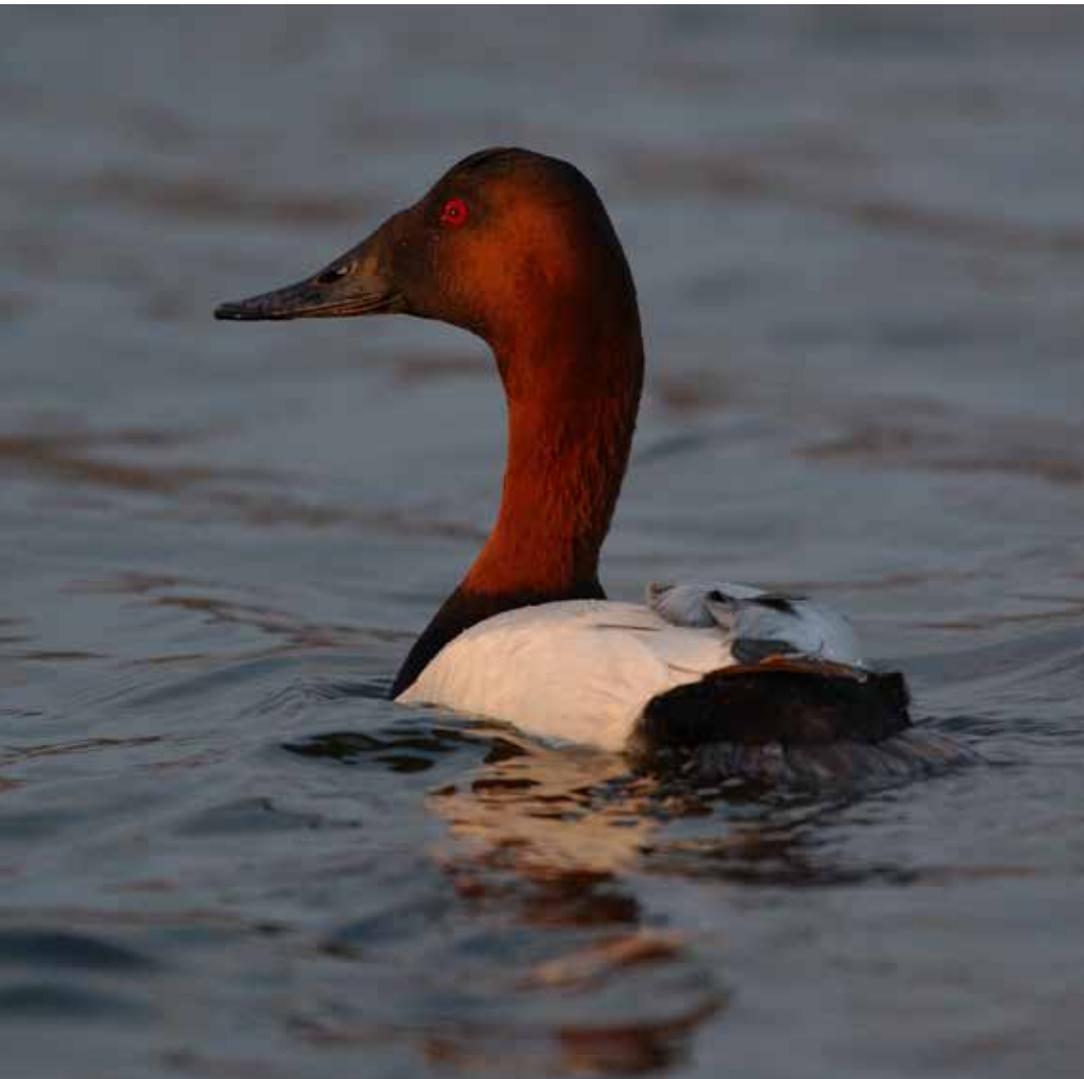
ducks, providing a rare opportunity to learn about the drivers of wood duck populations.

Large Scale Pacific Flyway Radio Project

Monitoring movements of geese and ducks in the Pacific Flyway

DR. CHRIS NICOLAI, DELTA WATERFOWL, MIKE CASAZZA, USGS, CLIFF FELDHEIM, CA DEPARTMENT OF WATER RESOURCES, MARK PETRIE, DUCKS UNLIMITED, AND CAROLINE BRADY, CALIFORNIA WATERFOWL ASSOCIATION

► This is the largest scale satellite telemetry project ever undertaken, having marked more than 1,100 waterfowl across 14 species in the past five years. To do so requires numerous partners to assist with fitting birds with radios, maintaining massive data sets, and analyzing and writing papers. The three primary objectives are to assess: the full annual cycle of habitat use; how different populations of the same species are delineated; and how overpopulations of some geese impact the limited food resources of ducks.



Research Leaders

Throughout the organization's storied history, Delta Waterfowl has amassed an impressive body of research that includes supporting more than 300 graduate students and publishing 600 peer-reviewed scientific papers.

Delta's research has profoundly influenced how waterfowl, wetlands and annual harvest are managed. It has also provided biologists, technicians and young scientists with the opportunity to gain hands-on experience and guidance to become leaders in waterfowl and wetland conservation. We are extremely proud that many of Delta's former students are working for government and non-government agencies, as well as universities.

Delta Waterfowl's important waterfowl and wetland research is made possible by you — our generous donors, members and volunteers. We deeply appreciate your support. Thank you!



OUR MISSION

To produce ducks and secure
the future of waterfowl hunting.

OUR VISION

Abundant waterfowl and endless
opportunities for hunters.

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